

THE GAME

Assemble and play Sudoku



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How to play the game?

The game is intended for one player.

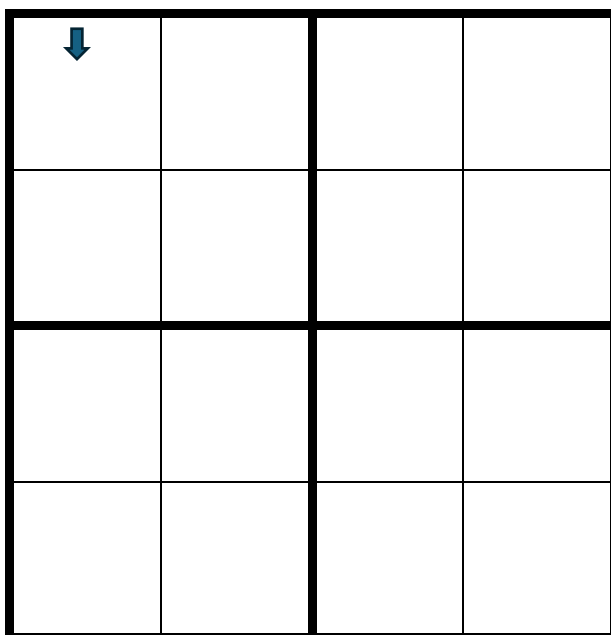
The player receives an empty Sudoku table and tasks.

1. Part 1: The player determines the initial values in the Sudoku table by solving the problems.
2. Part 2: The player fills in the remaining values in the Sudoku table according to the Sudoku rules.

SUDOKU – filling rules (numbers 1-n)

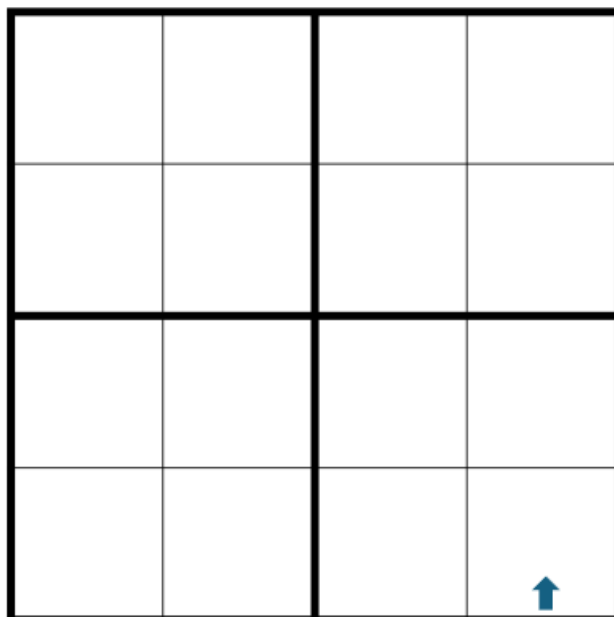
- Each row and each column contain all the numbers from 1 in, i.e. the numbers in a row and column **must not** be repeated.
- Each bold square within the table contains all the numbers from 1 to n, i.e. the numbers in it **must not be** repeated.

GAME 4_1 (4x4 SUDOKU)



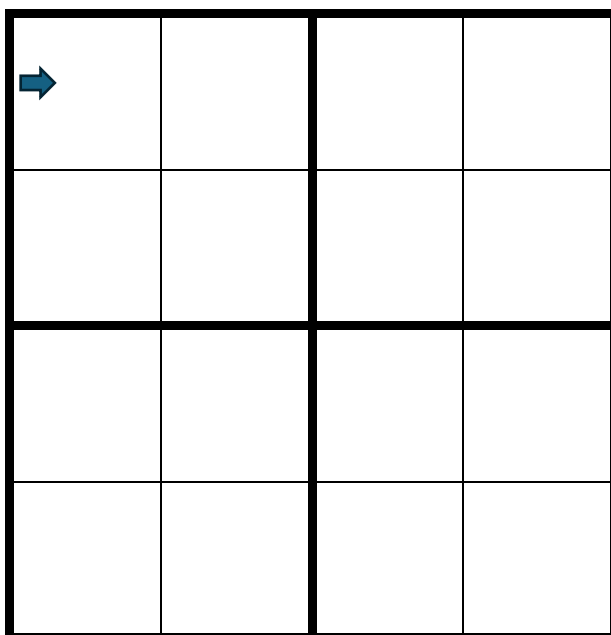
| Hint |
|--|
| MAJA TOOK 5 SLIPS OF PAPER: 2 BLUE, 2 RED AND 1 YELLOW AND STOOD ON THE FIRST FIELD (IN THE CORNER). THERE SHE LEFT A SLIP OF PAPER IN HER FAVORITE COLOR: BLUE. |
| THEN SHE TURNED LEFT, MOVED THREE STEPS AND DROPPED ONE RED SLIP OF PAPER. |
| THEN SHE TURNED RIGHT, TOOK TWO STEPS AND LEFT ANOTHER BLUE SLIP OF PAPER. |
| SHE TURNED AGAIN IN THE SAME DIRECTION AS BEFORE, TOOK TWO STEPS AND LEFT THE YELLOW SLIP OF PAPER. |
| FINALLY SHE TOOK ONE STEP FORWARD AND LEFT THE LAST SLIP OF PAPER SHE HAD IN HER HANDS. |

GAME 4_2 (4x4 SUDOKU)



| Hint |
|---|
| SANJA TOOK 4 SLIPS OF PAPER: BLUE, RED, YELLOW AND GREEN AND STOOD ON THE FIELD MARKED WITH AN ARROW. THERE SHE LEFT A SLIP OF PAPER IN HER FAVORITE COLOR: BLUE. |
| THEN SHE WENT 2 STEPS FORWARD, TURNED LEFT, TOOK ONE MORE STEP AND DROPPED THE YELLOW SLIP OF PAPER WHERE SHE STOOD. |
| SHE TOOK 2 MORE STEPS, TURNED RIGHT AND STEPPED ONE FIELD. THERE SHE LEFT THE RED SLIP OF PAPER. |
| SHE TURNED IN THE OPPOSITE DIRECTION, TOOK 2 STEPS AND DROPPED THE LAST, GREEN, SLIP OF PAPER TO THE LEFT OF HER. |

GAME 4_3 (4x4 SUDOKU)



Hint

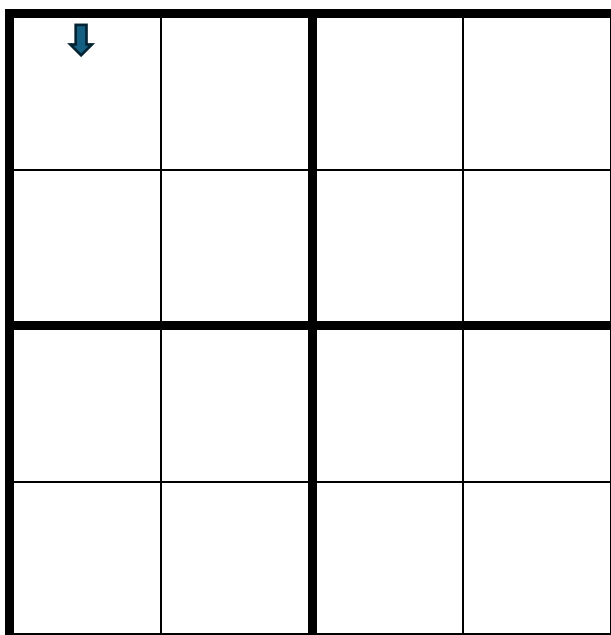
MATIJA TOOK 4 PIECES OF PAPERS: 2 RED, 1 GREEN AND 1 YELLOW. HE STOOD ON THE MARKED FIELD IN THE DIRECTION OF THE ARROW AND PLACED A PIECE OF PAPER THE SAME COLOR AS THE GRASS IS.

HE TOOK ONE STEP FORWARD AND ON THE FIELD HE REACHED, HE LEFT A PIECE OF PAPER OF THE COLOR THAT WILL REMAIN IN HIS HAND EVEN AFTER LEAVING THAT PAPER ON THE FIELD HE REACHED.

HE TURNED TO THE RIGHT, TOOK THREE STEPS, HE TURNED TO THE LEFT, TOOK ONE STEP AND LEFT A BANANA-COLOR PAPER.

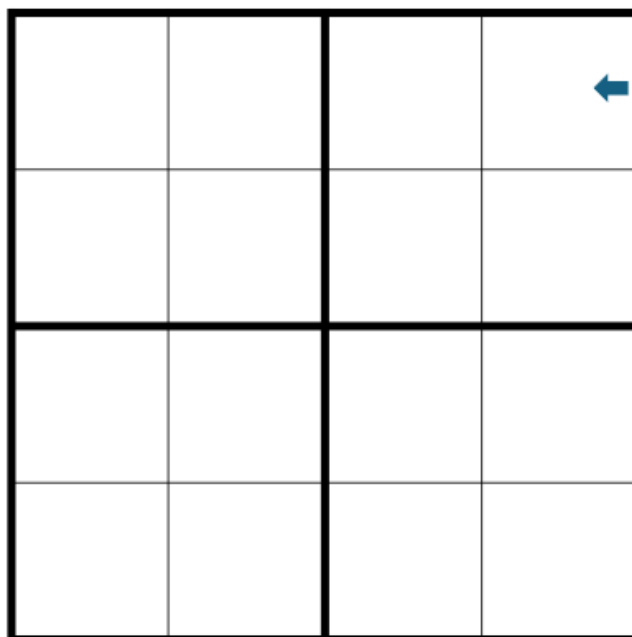
HE TOOK ANOTHER STEP AND LEFT HIS LAST PIECE OF PAPER IN THE PLACE HE REACHED.

GAME 4_4 (4x4 SUDOKU)



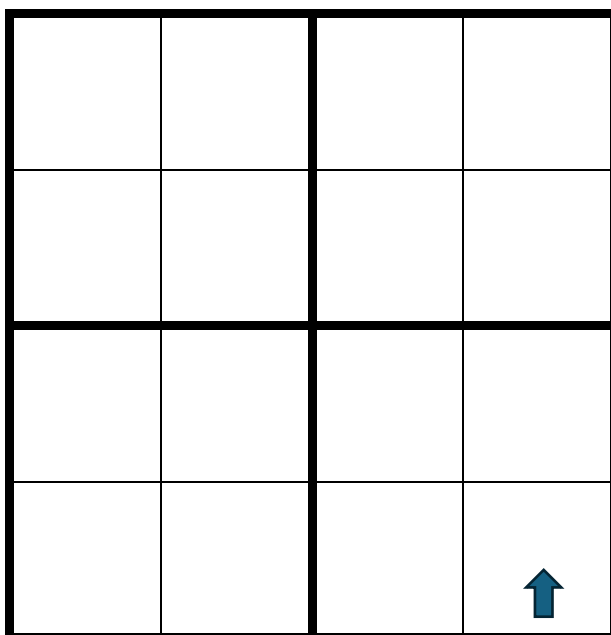
| Hint |
|---|
| Ivan imagined a number, added 3 to it, subtracted 2 from the result, and got 5. Enter the number that Ivan imagined in the first field. |
| Take one step forward, then one step left, and write a number that is half of the number you wrote previously. |
| Move one step forward and enter a number that is half the value of the last number entered. |
| Turn right, take two steps, and write down the sum of the last two numbers. |
| Turn left, take one step, and write down the smallest even number. |

GAME 4_5 (4x4 SUDOKU)



| Hint |
|--|
| IN AN ORCHARD A GRANDFATHER PLANTED 4 ROWS OF APPLE TREES. EACH ROW CONSISTED OF 4 TREES. IN THE FIRST ROW (FIELD MARKED WITH AN ARROW), THE FIRST TREE PRODUCED 2 APPLES. |
| THE LAST TREE IN THE SAME ROW PRODUCED ONE MORE APPLE. |
| THE LAST TREE IN THE SAME COLUMN PRODUCED THE SAME NUMBER OF APPLES AS THE FIRST TREE MENTIONED. |
| THE TREE NEXT TO IT, IN THE SAME ROW, PRODUCED TWICE AS MANY APPLES. |
| THE LAST TREE IN THAT ROW PRODUCED FOUR TIMES FEWER APPLES. |

GAME 4_6 (4x4 SUDOKU)



Hint

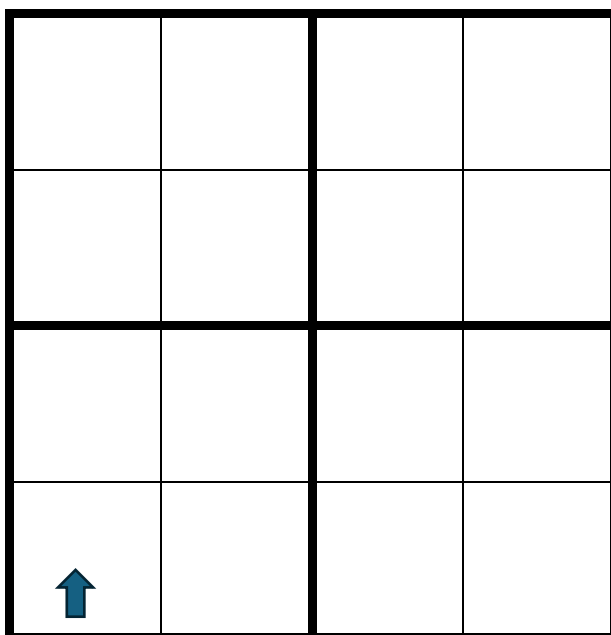
Stand on the field marked with an arrow (in the direction of the arrow) and place a number there that can be written as a fraction whose numerator and denominator are the same.

Move three steps to the left and place the smallest prime number on the field you reached. Turn in the direction indicated by the arrow!

Now move diagonally as many steps as the solution to the previous problem. The arithmetic mean of this number and the first two numbers placed is 2. Place the required number in the place where you are standing.

Turn in the direction indicated by the arrow, move one step forward and one space to the left. Find the product of the first two numbers placed and square the resulting number. Put the number you got here as the final result.

GAME 4_7 (4x4 SUDOKU)



Hint

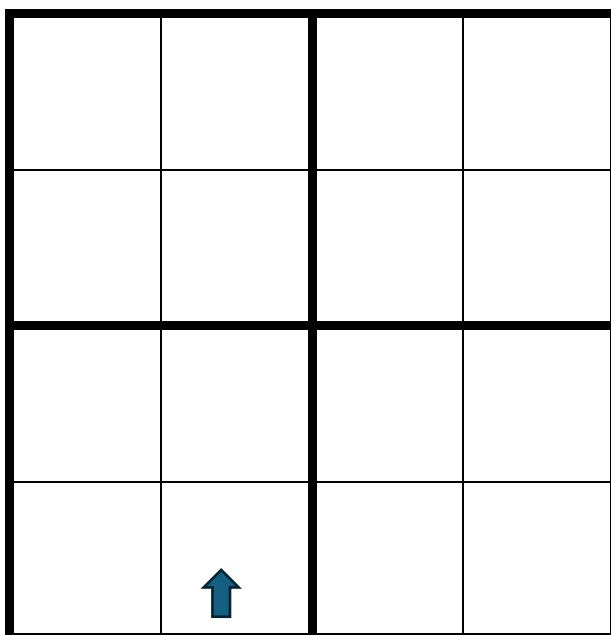
Stand on the field marked with an arrow (in the direction of the arrow) and place a number equal to the side length of a square whose perimeter and area are equal.

Move forward one step. The number you need to put in this field is equal to the square of the length of the hypotenuse of a right triangle whose both legs have length 1.

Move to the end of the row you are in, turn in the direction of the arrow at the starting square, and move one step forward. How many times is the diameter of a circle greater than its radius? The solution to this problem is the number on this field.

Move one step forward. Here, place the number you get when you add up all the numbers you've placed so far and subtract the fourth prime number from them.

GAME 4_8 (4x4 SUDOKU)



Hint

Determine the smallest integer that is equal to the product of the number 7 and the sum of its digits.

Stand on the space marked with an arrow (in the direction of the arrow) and move as many steps as the units digit of the obtained number. Place a number on that space that is equal to the sum of the digits of the obtained number.

Move one step forward, turn left and take one step.

Parents went on a trip with their children and grandchildren. They have 5 sons and each son has 3 sisters. Each sister has one child. How many people went on the trip in total? Add up the digits of the number you get and enter the result in the box you are standing on.

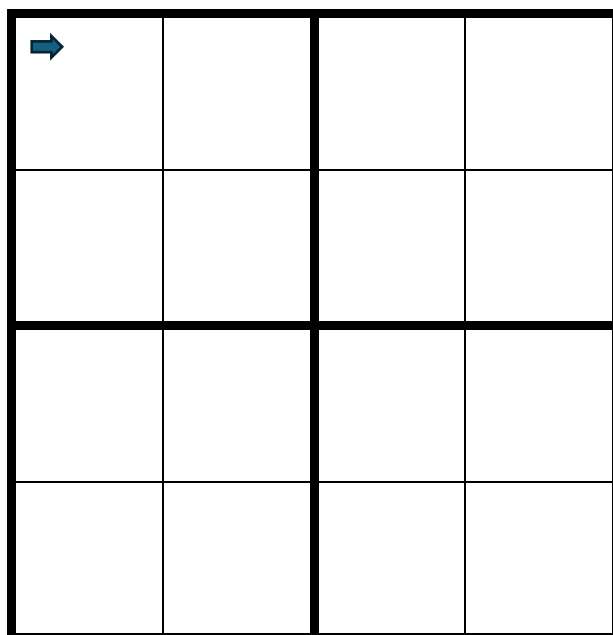
Turn right twice, move two steps and in the space you came to, write the solution to this fun riddle: if you overtake the second person in a race, what place are you in?

We have several marbles and several boxes. If we put each marble in its own box, we would have one extra marble, and if we put two marbles in each box, we would have one extra box. How many boxes do we have, and how many marbles do we have?

Let's now imagine that this Sudoku grid is numbered in ordered pairs so that the first coordinate represents the row and the second coordinate represents the column we are in, so the arrow is at position (4,2).

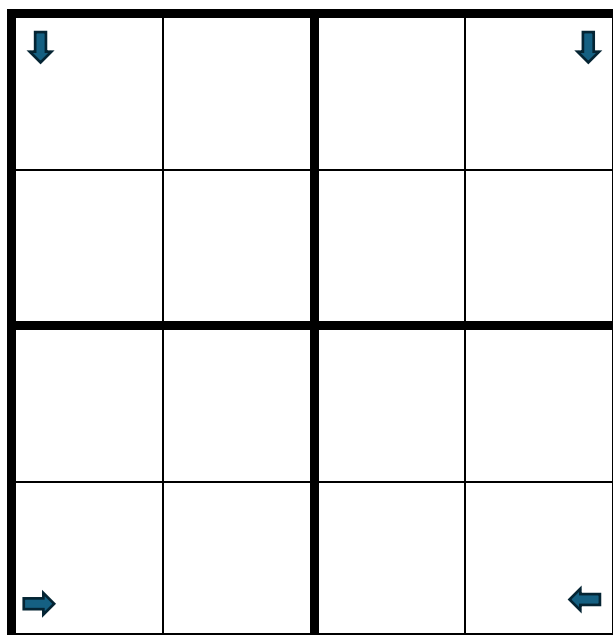
Walk to the position (number of boxes, number of marbles) and place the number 1 there.

GAME 4_9 (4x4 SUDOKU)



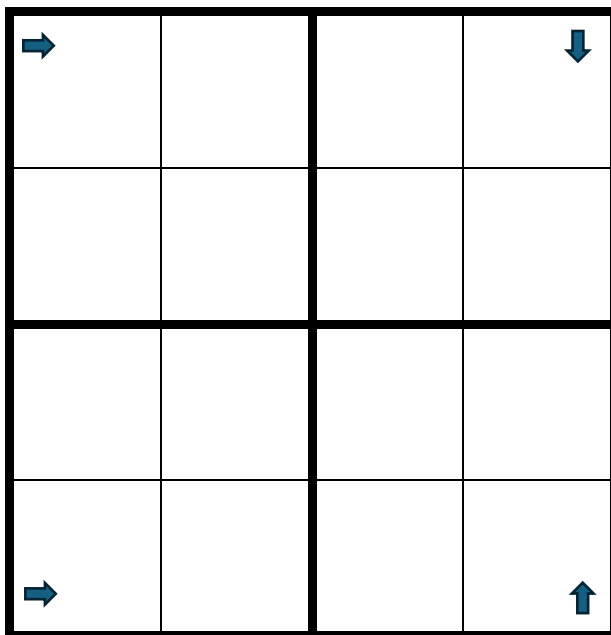
| |
|---|
| <p>PLACE A FIGURE THAT IS LOOKING IN THE DIRECTION OF THE ARROW: TOP LEFT CORNER</p> |
| <p>MOVEMENT: 1 STEP FORWARD RIGHT TURN 1 STEP FORWARD</p> |
| <p>TASK: ENTER NUMBER 4</p> |
| <p>MOVEMENT: 1 STEP FORWARD LEFT TURN 1 STEP FORWARD</p> |
| <p>TASK: ENTER NUMBER 3</p> |
| <p>MOVEMENT: 1 STEP FORWARD</p> |
| <p>TASK: ENTER NUMBER 2</p> |
| <p>MOVEMENT: LEFT TURN 2 STEPS FORWARD</p> |
| <p>TASK: ENTER NUMBER 3</p> |

GAME 4_10 (4x4 SUDOKU)



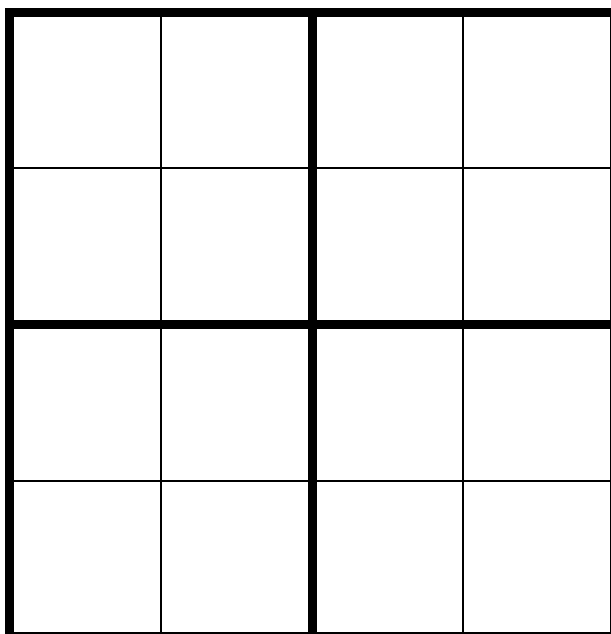
| | |
|--|---|
| <p>SET THE FIGURE: TOP LEFT CORNER</p> <p>MOVEMENT: LEFT TURN 1 STEP FORWARD</p> <p>TASK: ENTER THE SOLUTION TO THE PROBLEM: 1+3</p> | <p>SET THE FIGURE: LOWER RIGHT CORNER</p> <p>MOVEMENT: RIGHT TURN 3 STEPS FORWARD</p> <p>TASK: WRITE THE SOLUTION TO PROBLEM: 5-3</p> |
| <p>SET THE FIGURE: TOP RIGHT CORNER</p> <p>MOVEMENT: 3 STEPS FORWARD RIGHT TURN 1 STEP FORWARD</p> <p>TASK: WRITE THE SOLUTION TO PROBLEM: 7-4</p> | <p>SET THE FIGURE: LOWER LEFT CORNER</p> <p>MOVEMENT: 3 STEPS FORWARD LEFT TURN 1 STEP FORWARD</p> <p>TASK: ENTER THE SOLUTION TO THE PROBLEM: 1-0</p> |
| <p>SET THE FIGURE: LOWER RIGHT CORNER</p> <p>MOVEMENT: 3 STEPS FORWARD RIGHT TURN 2 STEPS FORWARD</p> <p>TASK: WRITE THE SOLUTION TO PROBLEM: 8-6</p> | <p>SET THE FIGURE: TOP RIGHT CORNER</p> <p>MOVEMENT: 3 STEPS FORWARD RIGHT TURN 3 STEPS FORWARD</p> <p>TASK: WRITE IN THE SOLUTION TO PROBLEM: 9-8</p> |

GAME 4_11 (4x4 SUDOKU)



| | |
|--|--|
| <p>SET THE FIGURE: TOP LEFT CORNER</p> <p>MOVEMENT: 2 STEPS FORWARD RIGHT TURN 1 STEP FORWARD</p> <p>TASK: ENTER THE SOLUTION TO THE PROBLEM: 2+1</p> | <p>SET THE FIGURE: LOWER RIGHT CORNER</p> <p>MOVEMENT: 1 STEP FORWARD LEFT TURN 3 STEPS FORWARD</p> <p>TASK: ENTER THE SOLUTION TO THE PROBLEM: 1+3</p> |
| <p>SET THE FIGURE: TOP RIGHT CORNER</p> <p>MOVEMENT: 2 STEPS FORWARD RIGHT TURN 2 STEPS FORWARD</p> <p>TASK: WRITE THE SOLUTION TO PROBLEM: 8-5</p> | <p>SET THE FIGURE: LOWER LEFT CORNER</p> <p>MOVEMENT: 2 STEPS FORWARD LEFT TURN 1 STEP FORWARD</p> <p>TASK: WRITE THE SOLUTION TO PROBLEM: 5-4</p> |
| <p>SET THE FIGURE: LOWER RIGHT CORNER</p> <p>MOVEMENT: 2 STEPS FORWARD LEFT TURN 3 STEPS FORWARD</p> <p>TASK: WRITE THE SOLUTION TO PROBLEM: 3-2</p> | <p>SET THE FIGURE: TOP RIGHT CORNER</p> <p>MOVEMENT: 3 STEPS FORWARD RIGHT TURN 3 STEPS FORWARD</p> <p>TASK: WRITE IN THE SOLUTION TO PROBLEM: 7-5</p> |

GAME 4_12 (4X4 SUDOKU)



The following sequence is determined by repeating four colors, always in the same order.

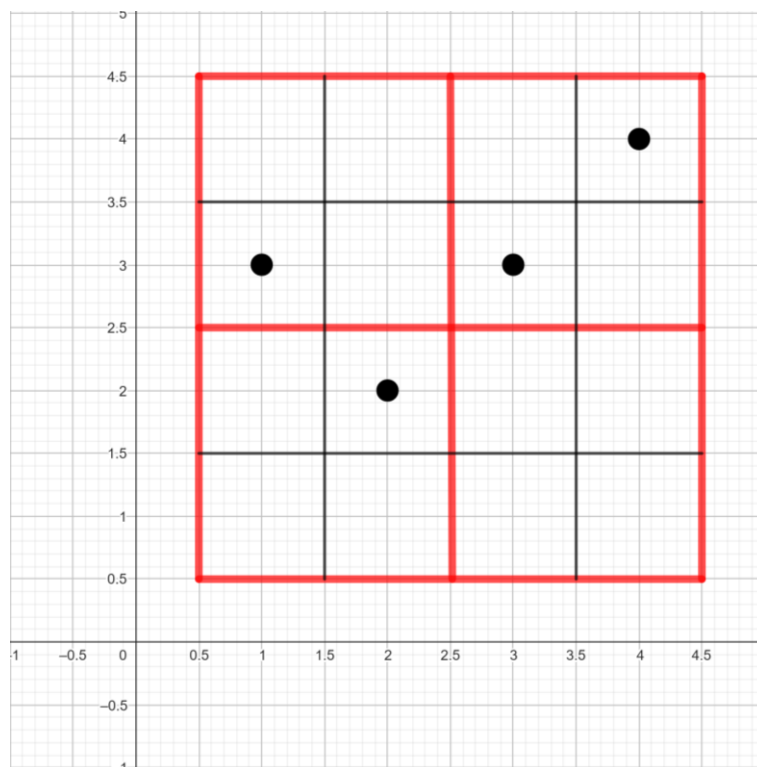
Like this:

$a(1)=\text{blue}$, $a(2)=\text{yellow}$, $a(3)=\text{green}$, $a(4)=\text{red}$, ...

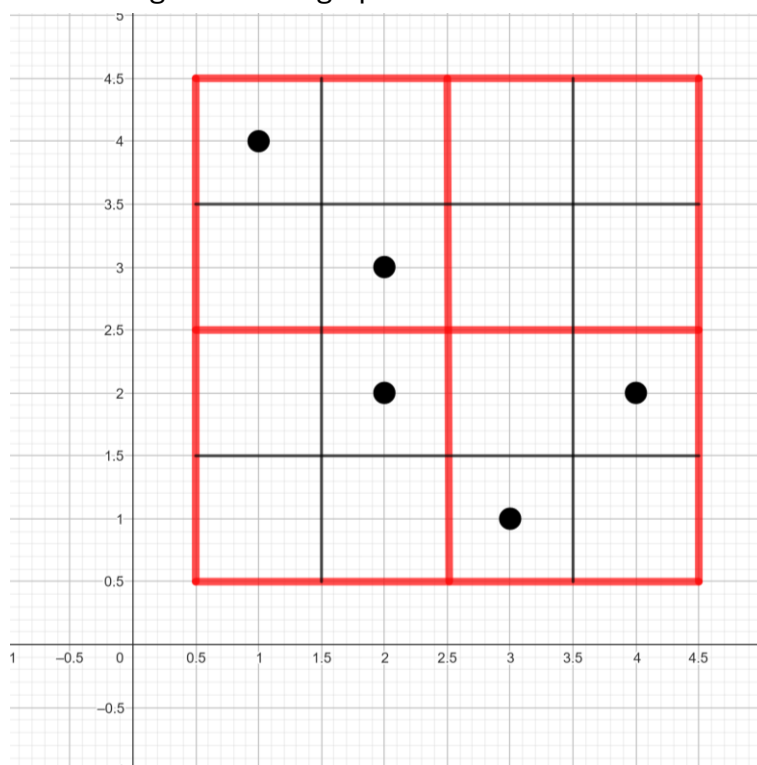
- a) Write the next 5 terms of the sequence.
- b) What is the codomain of this sequence?
- c) Assemble and play sudoku.
 1. Assemble the Sudoku: the last element in the first row is the color $a(2)$; the last element in the third row is the color $a(29)$; the color that is the next member of the sequence is the element before the just-entered element; in the second row and second column is the color $a(n)$, where n is the sum of the row and column.

GAME 4_13 (4X4 SUDOKU) - FUNCTIONS

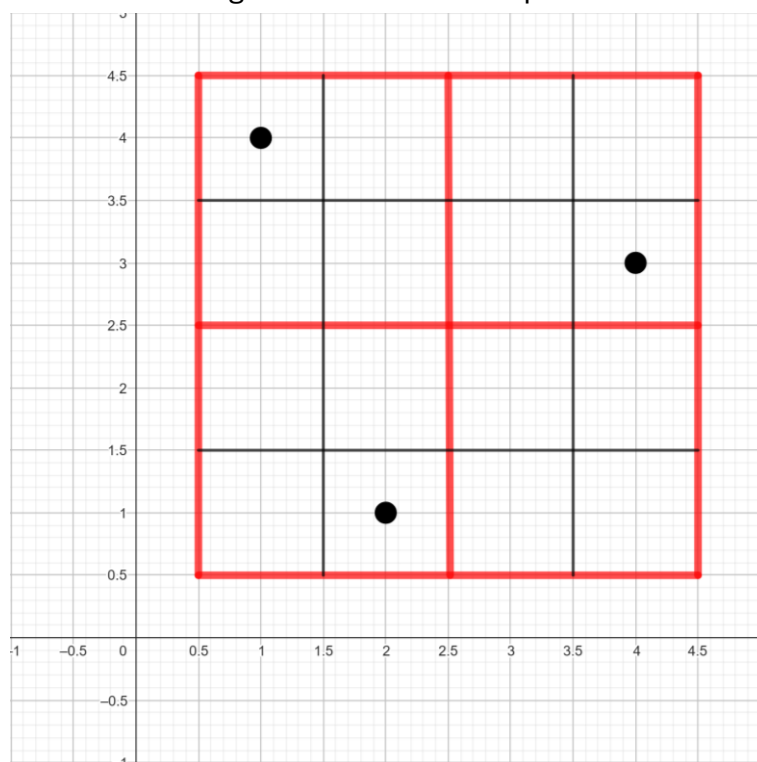
- The function is given by the graph in the figure. At the point of minimum, enter the function value of maximum.



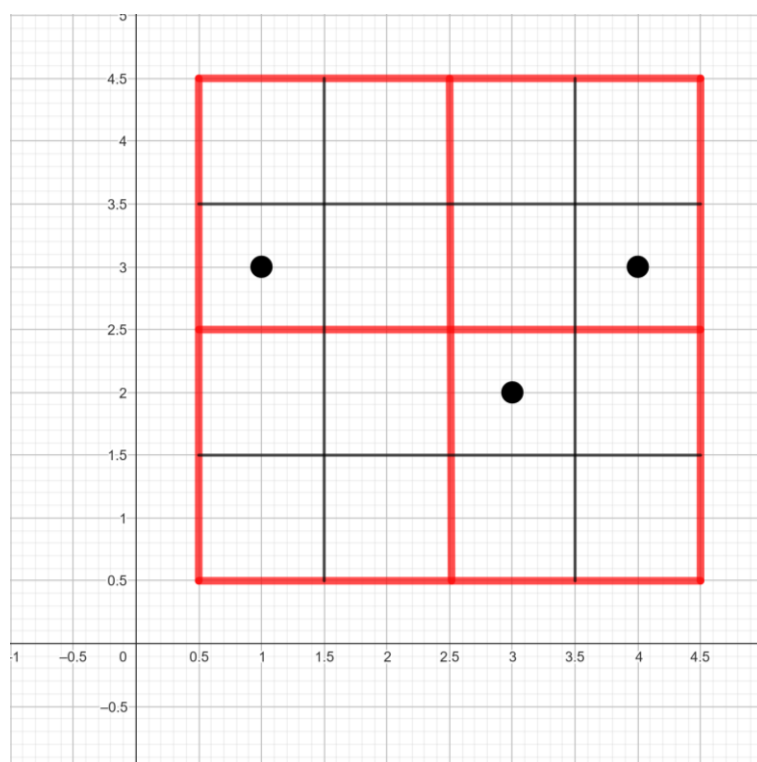
- The figure shows a set of points. . If the set of points is the graph of a function, at the point with the smallest ordinate write the minimum function value. If the set of points is not the graph of a function, at the point with the smallest ordinate write the value of the abscissa of the points that prevent this set from being a function.



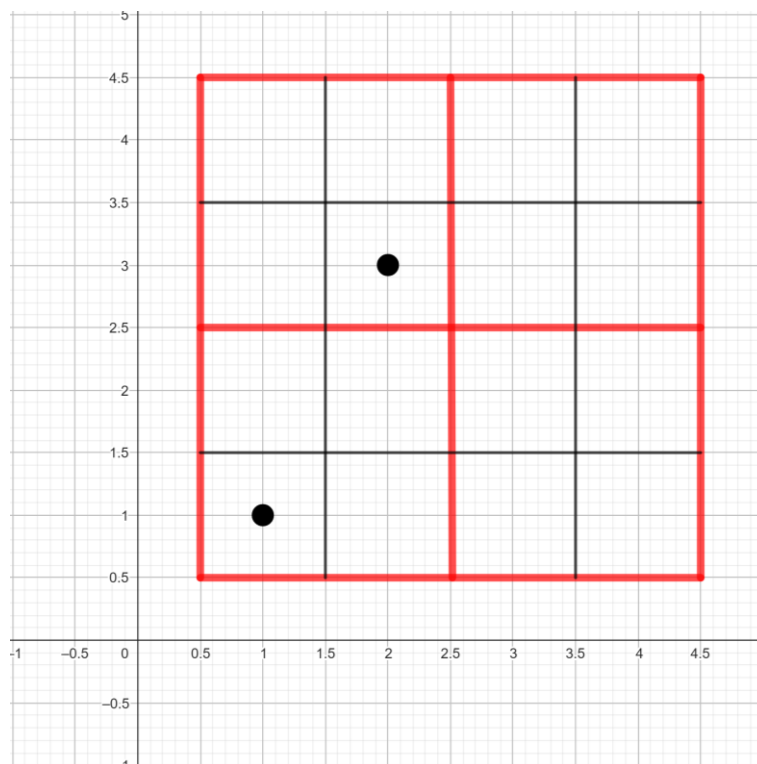
3. A function is given from the set $\{1,2,3,4\}$ to the set $\{1,2,3,4,5\}$. The figure shows a part of the graph of this function. Complete the graph by adding another point whose ordinate is 2. Write the smallest functional value of the given function at that point.



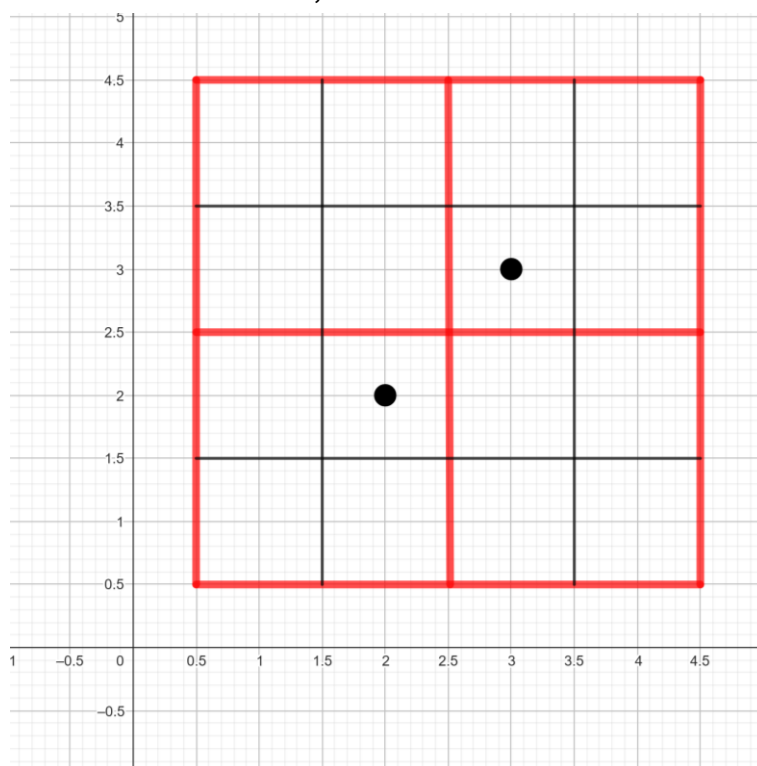
4. A function is given from the set $\{1,2,3,4\}$ to the set $\{1,2,3\}$. The figure shows a part of the graph of this function. Complete the graph so that the function is a surjection and in the added point write the size of the codomain.



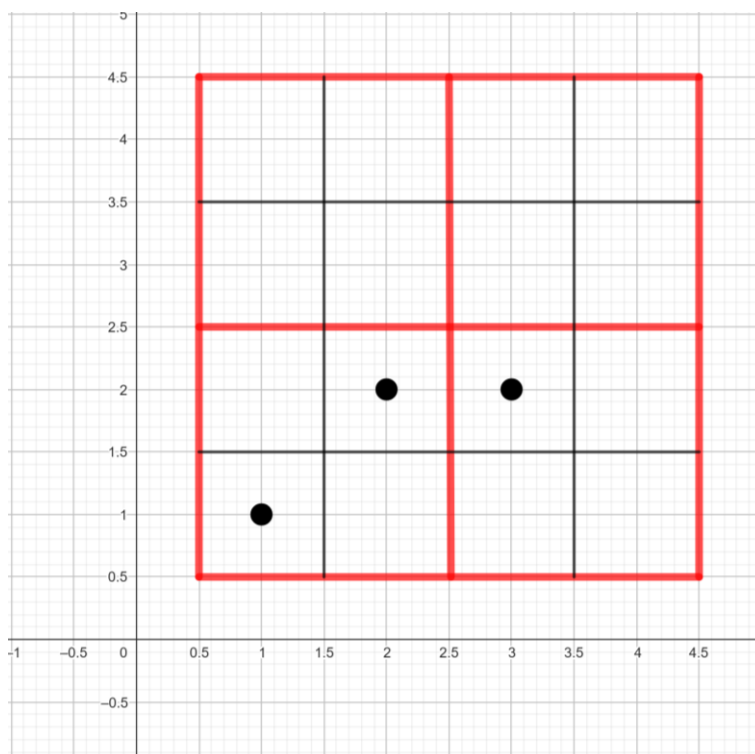
5. A function is given from the set $\{1,2,4\}$ to the set $\{1,2,3,4\}$. The figure shows a part of the graph of this function. Complete the graph so that the function is a strictly increasing injection. At the added point, enter a number from the codomain that is not in the figure.



6. A function is given from the set $\{1,2,3\}$ to the set $\{2,3,4\}$. The figure shows a part of the graph of this function. Complete the graph so that the function is a bijection. At the added point, write a number that is contained in the codomain, but not in the domain.



7. A function is given from the set $\{1,2,3\}$ to the set $\{1,2,3,4\}$, The graph of this function is drawn in the figure. If the function is an injection and not a surjection, write the function value of that point in the point with abscissa 1. If the function is a surjection and not an injection, write the function value of that point in the point with ordinate 1. If the function is neither an injection nor a surjection, write the function value of that point in the point of minimum. If the function is both an injection and a bijection, write the abscissa of the minimum in the point of maximum.



GAME 4_14 (4X4 SUDOKU) – probability

| | | | |
|----------|-----------|----|-----------|
| 1 | 2 | 3 | <u>4</u> |
| 5 | <u>6</u> | 7 | 8 |
| <u>9</u> | 10 | 11 | <u>12</u> |
| 13 | <u>14</u> | 15 | 16 |

Initial conditions (positions 4, 6, 9, 12, 14)

| | |
|--|--|
| <p>4. Is the probability of getting a 6 less than an odd number when rolling a fair die?</p> <p><input type="radio"/> Yes <input type="radio"/> No</p> | <p>6. Is choosing "1, 2, 3, 4, 5, 6,7" in the lottery less likely to win than choosing "4, 17, 23, 31, 38, 41,45"?</p> <p><input type="radio"/> Yes <input type="radio"/> No</p> |
| <p>9. Most injuries happen at home, does that mean you are less likely to get injured if you are outside the home?</p> <p><input type="radio"/> Yes <input type="radio"/> No</p> | <p>12. If you win the lottery, does that affect your chances of winning the lottery in the future?</p> <p><input type="radio"/> Yes <input type="radio"/> No</p> |
| <p>14. If you flip a coin four times in a row, is the probability of getting the sequence "tail, tail, tail, tail" the same as the probability of getting the sequence "tail, head, tail, head"?</p> <p><input type="radio"/> Yes <input type="radio"/> No</p> | |

The rest of the sudoku table (positions 1, 2, 3, 5, 7, 10, 11, 13, 15, 16)

| | |
|---|---|
| <p>1. After rolling a correctly balanced die 10 times without getting a 6, is the probability that the number 6 will come up on the next rolls increasing?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> | <p>2. Mr. Horvat has two children, one of whom is a boy. Can we say that the probability that he has two boys is $\frac{1}{3}$?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>3. Mrs. Ivić has three girls. Is the probability that the next child will be a girl 50%?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> | <p>5. If you roll a dice twice in a row and add up the values you get, is the probability of getting a sum of 12 the same as the probability of getting a sum of 7?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>7. If Marko rolled a dice 10 times, is it certain that he got a six at least once?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> | <p>8. If you roll a dice twice in a row and add up the values you get, is the probability of getting a sum of 2 less than the probability of getting a sum of 3?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>10. If something has a 1% probability, can it still happen on the first try?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> | <p>11. If the probability of rain tomorrow is 40%, does that mean it will rain 40% of the day?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>13. If you draw two cards from a standard poker deck, is the probability of drawing a pair of kings less than the probability of drawing a pair of deuces?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> | <p>15. If an event has never happened, does that mean that the probability of that event is 0?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> |
| <p>16. Is the probability of answering this question correctly by random selection 50%?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> | |

GAME 6_1 (6x6 SUDOKU)

| | | | | | |
|-------|--|--|--|--|-------|
| | | | | | (5.5) |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| (0.0) | | | | | |

| A | B |
|---|---|
| 1. Given the points A(3,0), B(5,1), C(1,0). Determine the point D such that the vectors \overrightarrow{AB} and \overrightarrow{CD} are equal. Write the number 2 in the field marked with point D. | 1. Given points A(5,2), B(3,0), C(3,2). Determine point D such that vectors \overrightarrow{AB} and \overrightarrow{CD} are equal. Write the number 2 in the field marked with point D. |
| 2. Given the points A(0,0), B(1,2), C(5,5). Determine the point D such that the vectors \overrightarrow{AD} and \overrightarrow{BC} are equal. Write the number 4 in the field marked with point D. | 2. Given the points A(0,0), B(4,5), C(1,1). Determine the point D such that the vectors \overrightarrow{DB} and \overrightarrow{AC} are equal. Write the number 1 in the field marked with point D. |
| 3. Given points A(3,3), B(2,4), C(2,1). Determine point D such that \overrightarrow{AB} and \overrightarrow{DC} are opposite vectors. Write the number 4 in the field marked with point D. | 3. Given points A(2,0), B(4,1), C(1,0). Determine point D such that \overrightarrow{AD} and \overrightarrow{BC} are opposite vectors. Write the number 5 in the field marked with point D. |
| 4. Given points A(3,2), B(3,3), C(0,4). Determine point D such that \overrightarrow{DA} and \overrightarrow{CB} are opposite vectors. Write the number 1 in the field marked with point D. | 4. Given points A(1,3), B(2,0), C(1,2). Determine point D such that \overrightarrow{AD} and \overrightarrow{BC} are opposite vectors. Write the number 5 in the field marked with point D. |
| 5. Given points A(2,1), B(2,5), C(2,0). Determine point D such that $2\overrightarrow{CD} = \overrightarrow{AB}$. Write the number 2 in the field marked with point D. | 5. Given the points A(2,1), B(2,3), C(0,3). Determine the point D such that $2\overrightarrow{AD} = \overrightarrow{BC}$. Write the number 1 in the field marked with point D. |
| 6. Given points A(3,0), B(3,4), C(1,3). Determine point D such that $4\overrightarrow{CD} = \overrightarrow{AB}$. Write the number 4 in the field marked with point D. | 6. Given points A(4,4), B(5,1), C(0,1). Determine point D such that $5\overrightarrow{DA} = \overrightarrow{BC}$. Write the number 3 in the field marked with point D. |
| 7. Given points A(2,2), B(2,4), C(4,1). Determine point D such that $\overrightarrow{DC} = -2\overrightarrow{AB}$. Write the number 6 in the field marked with point D. | 7. Given points A(5,3), B(3,2), C(2,2). Determine point D such that $\overrightarrow{AD} = -3\overrightarrow{CB}$. Write the number 3 in the field marked with point D. |
| 8. Given the points A(0,2), B(2,5), C(0,5). Determine the point D such that $\overrightarrow{AD} = -2\overrightarrow{BC}$. Write the number 1 in the field marked with point D. | 8. Given points A(5,0), B(2,5), C(5,2). Determine point D such that $\overrightarrow{BD} = -2\overrightarrow{AC}$. Write the number 4 in the field marked with point D. |

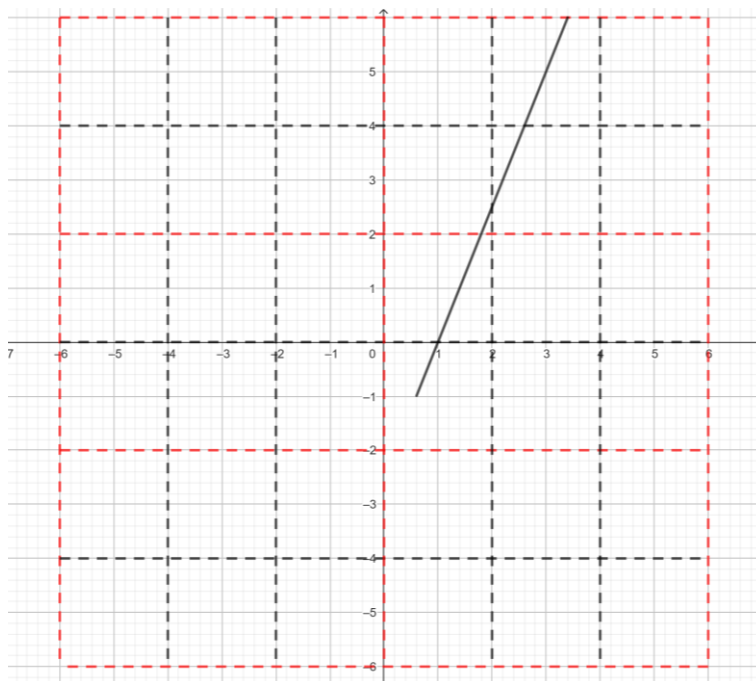
GAME 6_2 (6X6 SUDOKU)

| | | | | | |
|-------|--|--|--|--|-------|
| | | | | | (5.5) |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| (0.0) | | | | | |

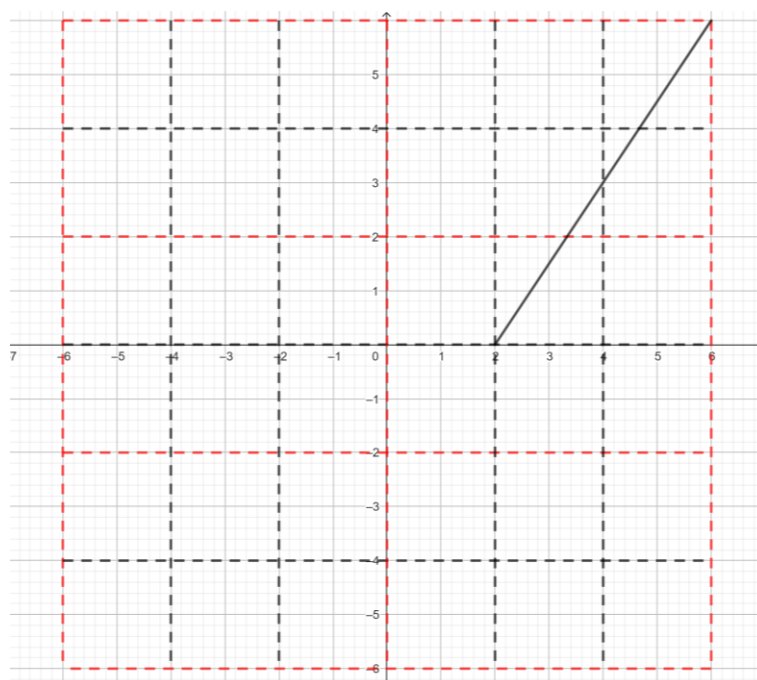
| A | B |
|--|---|
| <p>1. Given the points A(3,3), B(5,2), C(0,2). Determine the point D such that the vector \overrightarrow{AD} is equal to the vector $\overrightarrow{AB} + \overrightarrow{AC}$. Write the number 1 in the field marked with point D.</p> | <p>1. Given the points A(4,1), B(2,0), C(2,1). Determine the point D such that the vector \overrightarrow{AD} is equal to the vector $\overrightarrow{AB} + \overrightarrow{AC}$. In the field marked with point D, enter the number 4.</p> |
| <p>2. Given points A(3,4), B(2,3), C(3,2). Determine point D so that the vector \overrightarrow{BD} is equal to the vector $\overrightarrow{BC} + 2\overrightarrow{BA}$. Write the number 4 in the field marked with point D.</p> | <p>2. Given the points A(4,2), B(3,0), C(3,3). Determine the point D such that the vector \overrightarrow{AD} is equal to the vector $\overrightarrow{AB} + 2\overrightarrow{AC}$. Write the number 1 in the field marked with point D.</p> |
| <p>3. Given the points A(1,3), B(1,2), C(3,2). Determine the point D so that the vector \overrightarrow{BD} is equal to the vector $3\overrightarrow{BA} + \overrightarrow{BC}$. Write the number 5 in the field marked with point D.</p> | <p>3. Given points A(1,2), B(2,1), C(2,5). Determine point D so that the vector \overrightarrow{AD} is equal to the vector $2\overrightarrow{AB} + \overrightarrow{AC}$. Write the number 3 in the field marked with point D.</p> |
| <p>4. Given the points A(3,2), B(1,2), C(3,4). Determine the point D such that the vector \overrightarrow{AD} is equal to the vector $\overrightarrow{AB} - \overrightarrow{AC}$. Write the number 5 in the field marked with point D.</p> | <p>4. Given the points A(3,1), B(4,2), C(1,3). Determine the point D such that the vector \overrightarrow{AD} is equal to the vector $\overrightarrow{AC} - \overrightarrow{AB}$. Write the number 5 in the field marked with point D.</p> |
| <p>5. Given the points A(1,0), B(0,3), C(2,1). Determine the point D such that the vector \overrightarrow{CD} is equal to the vector $\overrightarrow{CB} - 2\overrightarrow{CA}$. In the field marked with point D, write the number 6.</p> | <p>5. Given the points A(1,0), B(2,2), C(2,1). Determine the point D such that the vector \overrightarrow{CD} is equal to the vector $\overrightarrow{CB} - 3\overrightarrow{CA}$. Write the number 3 in the field marked with point D.</p> |
| <p>6. Given the points A(1,3), B(0,2), C(2,2). Determine the point D so that the vector \overrightarrow{AD} is equal to the vector $2\overrightarrow{AC} - \overrightarrow{AB}$. Write the number 4 in the field marked with that point.</p> | <p>6. Given the points A(3,2), B(4,1), C(2,2). Determine the point D such that the vector \overrightarrow{AD} is equal to the vector $\overrightarrow{AC} - 2\overrightarrow{AB}$. Write the number 1 in the field marked with point D.</p> |

GAME 6_3 (6X6 SUDOKU)

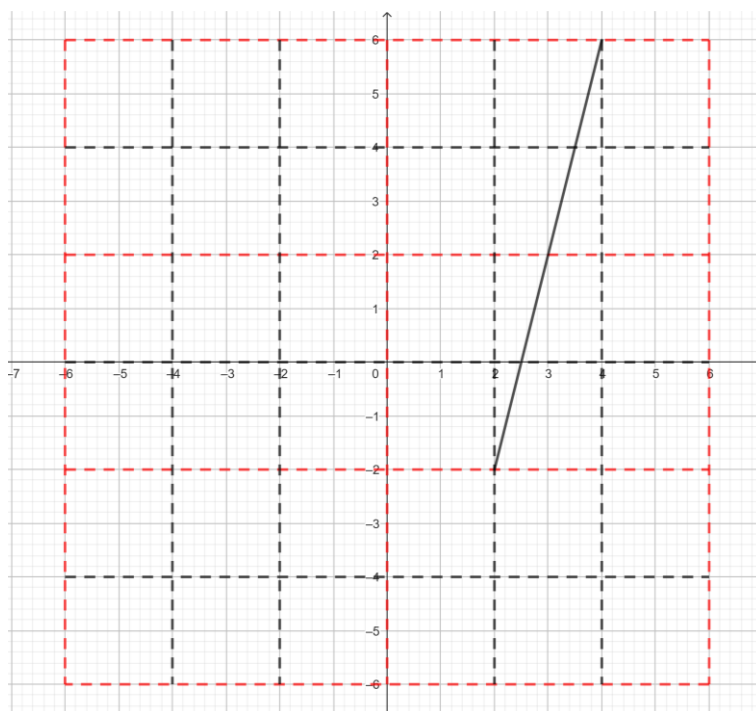
- The picture shows a part of the graph of an even function. In the field of the Sudoku table where the point of that graph with abscissa -3 is located, write the zero of that function, which is located in the segment $[0,3]$.



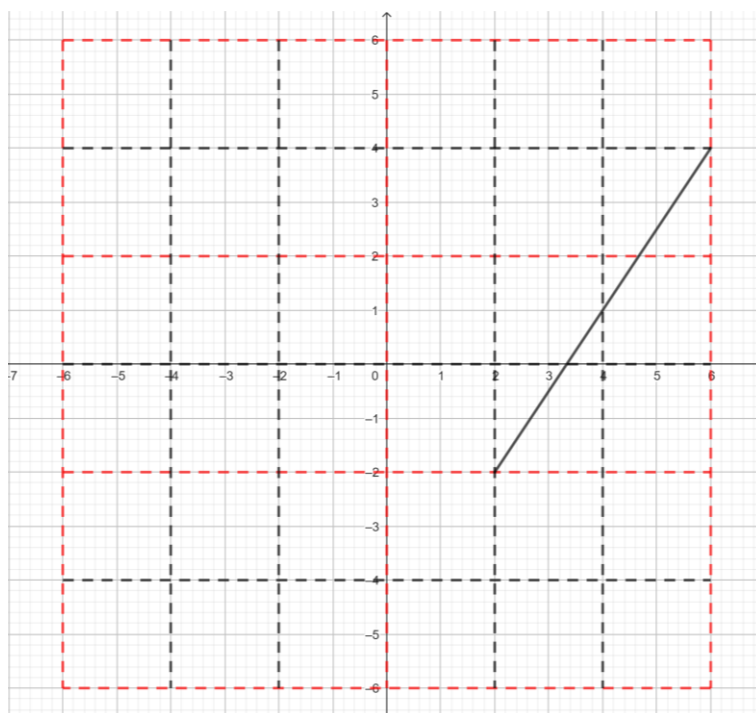
- The picture shows a part of the graph of an odd function. In the field of the Sudoku table where the point of that graph with abscissa -5 is located, enter the absolute value of the zero point of that function, which lies in the Sudoku table.



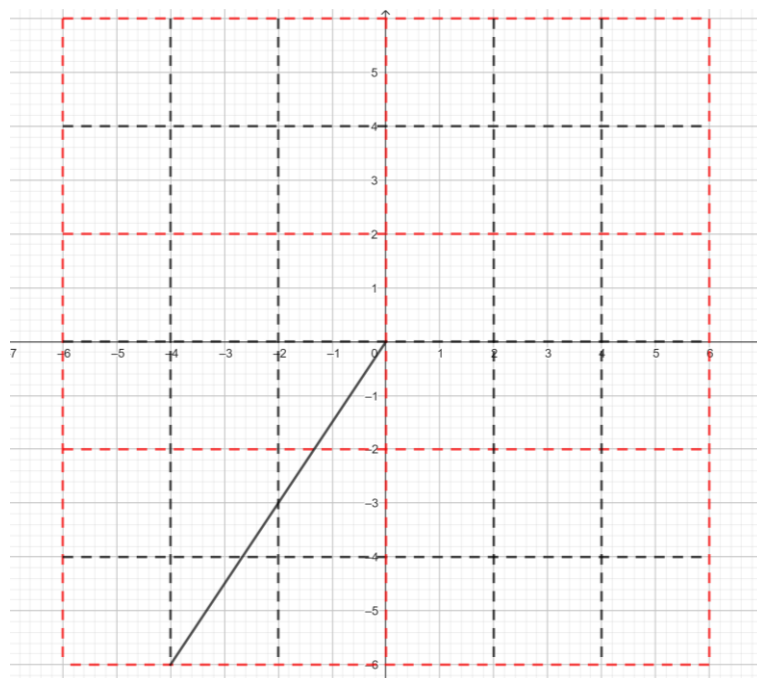
3. The picture shows part of the graph of a periodic function whose period is 2. At the point of that function with abscissa -0.5 , write a number two less than the number of zeros of that function on the interval $[-6,6]$.



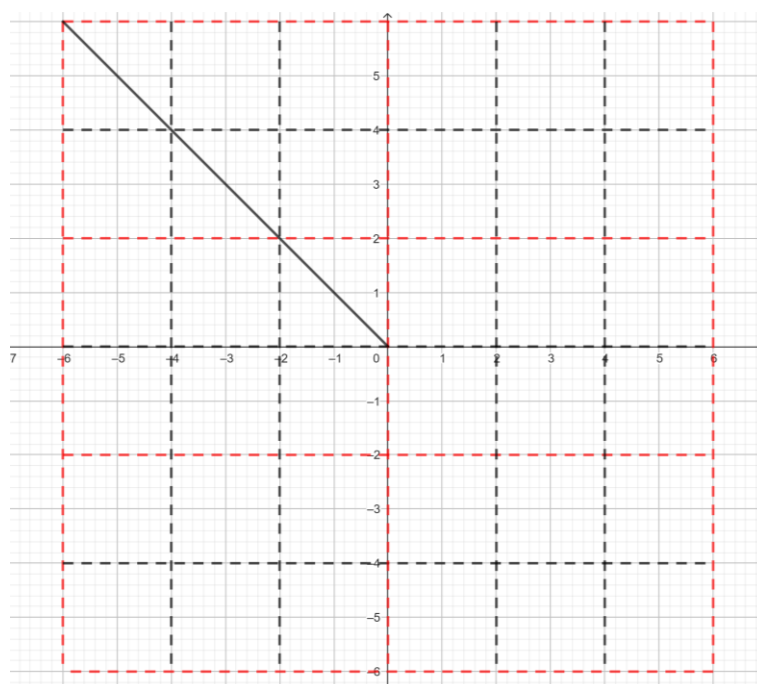
4. The picture shows part of the graph of a periodic function whose period is 4. At the point of that function with abscissa 1 , write a number 1 less than the number of zeros of that function on the interval $[-6,6]$.



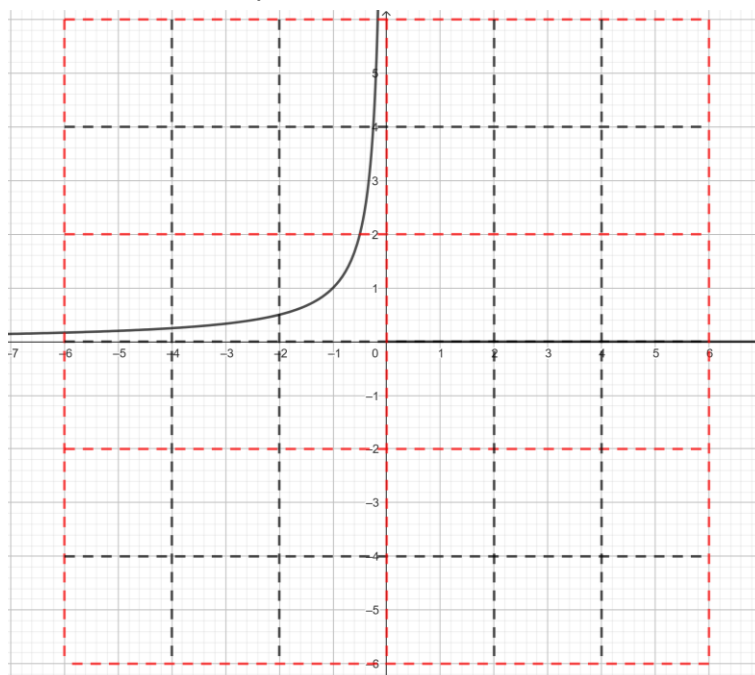
5. The picture shows part of the graph of a function that is monotone and either even or odd, and whose domain is from edge to edge of the sudoku table (including the edge!). In the point with abscissa 3, write the absolute value of the ordinate of the graph point for $x=4$ minus 1.



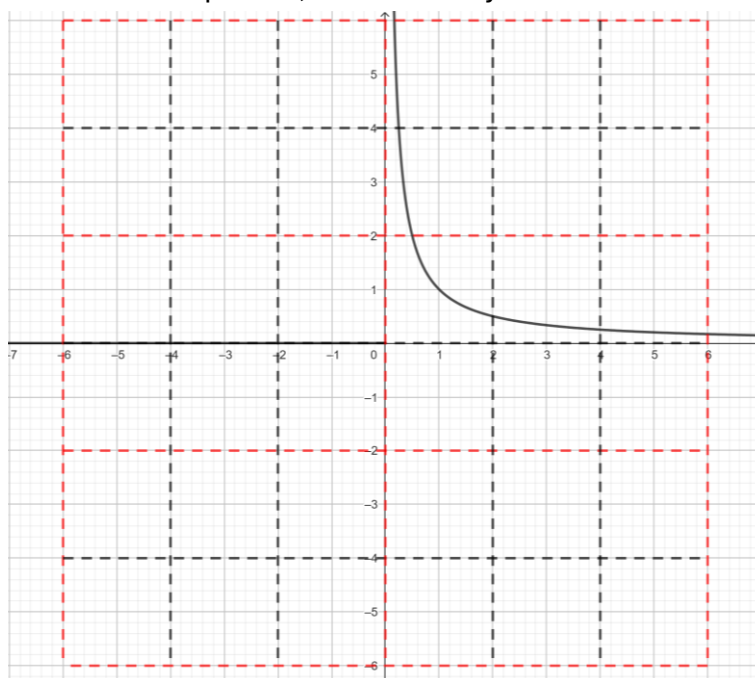
6. The picture shows a part of the graph of a function that is not monotone and is either even or odd, and whose domain is from edge to edge of the sudoku table (including the edge!). In the point with abscissa 1, enter the absolute value of the function value in point 5.



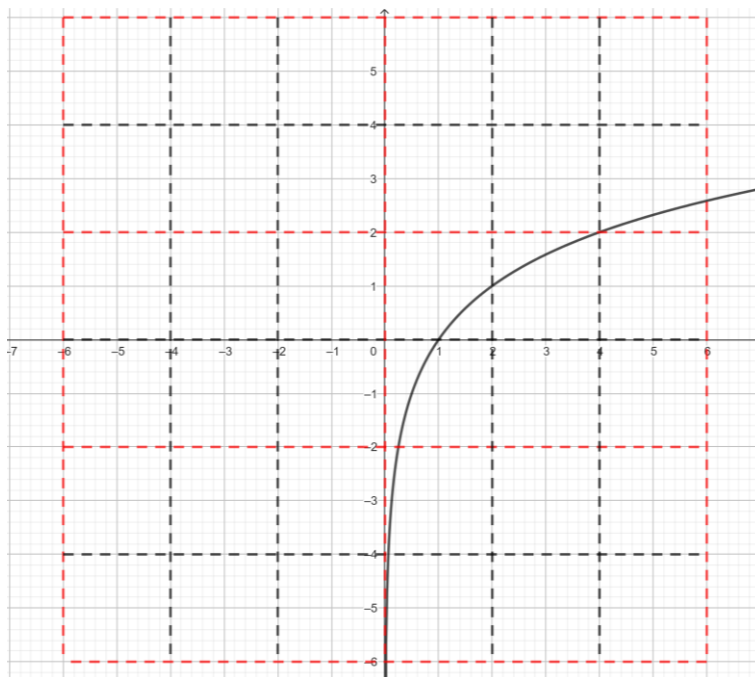
7. The figure shows a part of the graph of the function $f(x) = -\frac{1}{x}$. Draw the rest of the graph and in the field where the point with abscissa 3 is, enter the absolute value of the number that is the reciprocal of the function value at point 2.



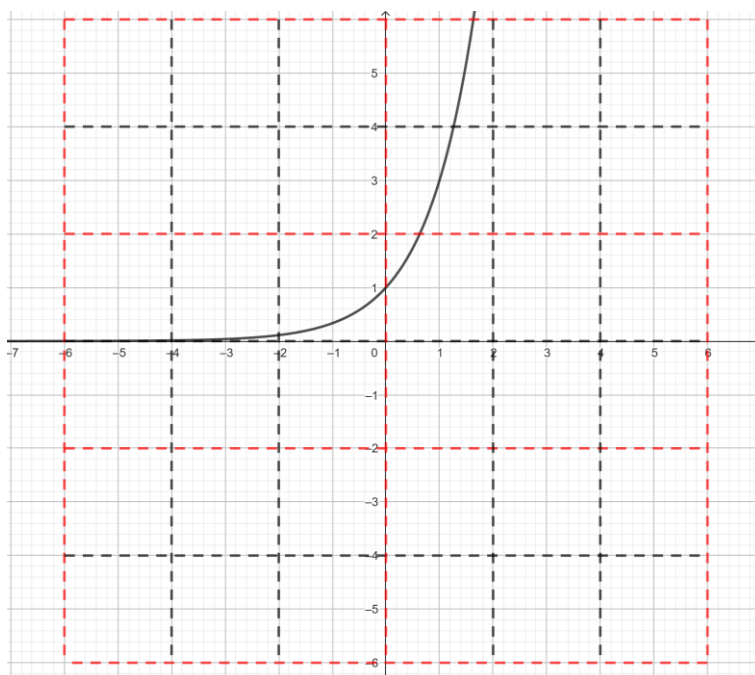
8. The figure shows a part of the graph of the function $f(x) = \frac{1}{x}$. Draw the rest of the graph and in the field where the point with abscissa -5 is, enter the absolute value of the number that is the reciprocal of the function value at point 2, decreased by 1.



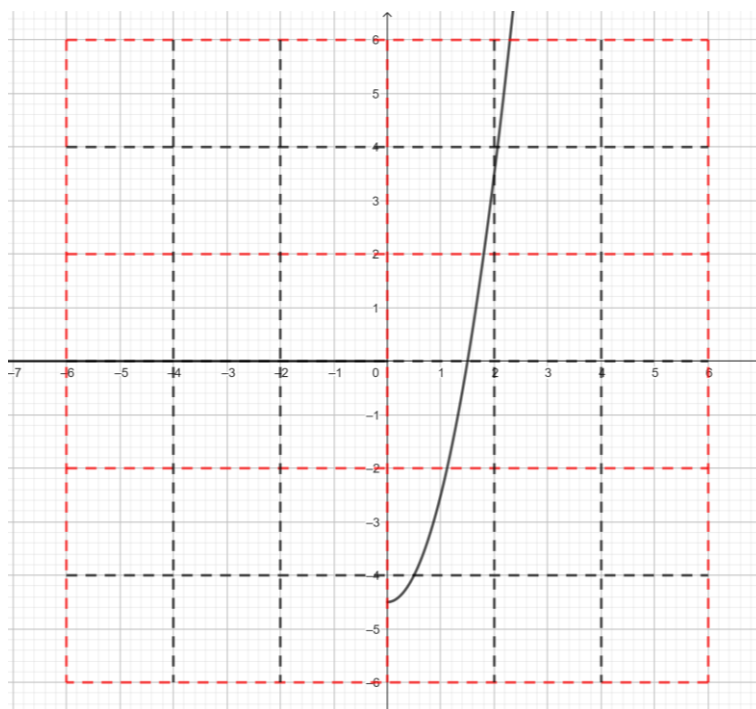
9. The graph of a logarithmic function is drawn in the figure. Draw the function that is the inverse of that function. In the field where the point of the inverse function with the abscissa -3 is located, enter the base of the logarithmic function.



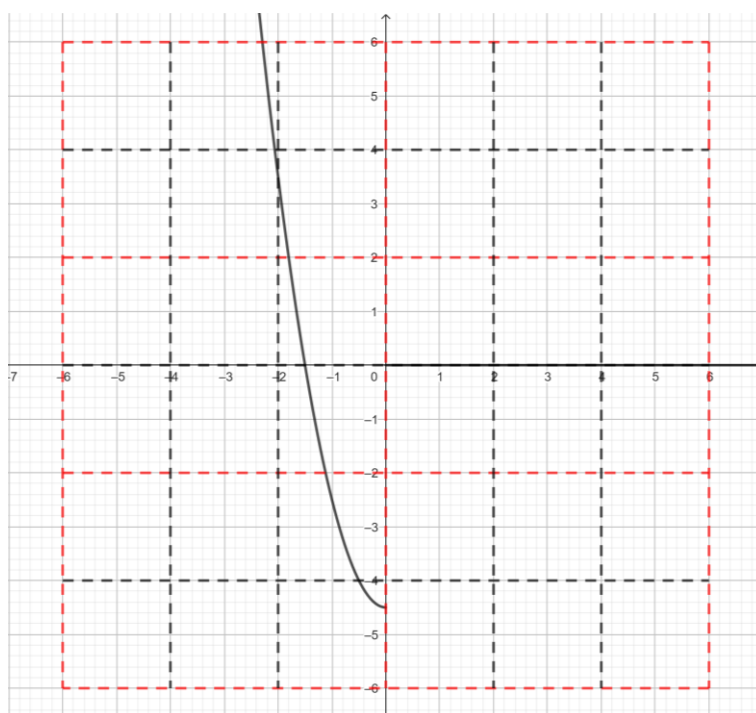
10. The graph of an exponential function is drawn in the figure. Draw the function that is the inverse of that function. In the field where the point of the graph of the inverse function with the abscissa 5 is located, enter a number one greater than the base of the exponential function.



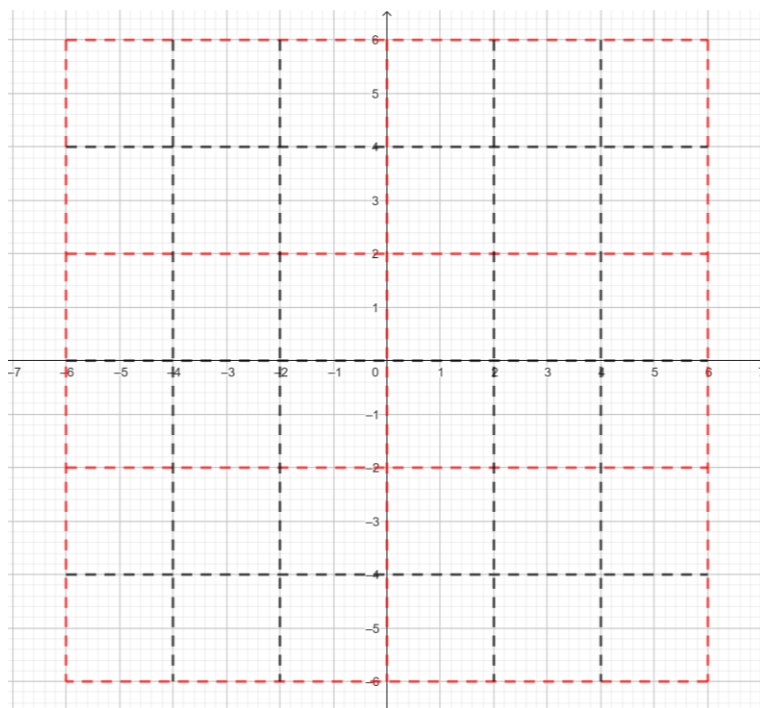
11. The figure shows part of the graph of the quadratic function $f(x) = 2(x-x_0)(x+x_0)$. In the field where the point of the graph of that function with abscissa is -1 , write the sum of the absolute values of the zero point minus 2.



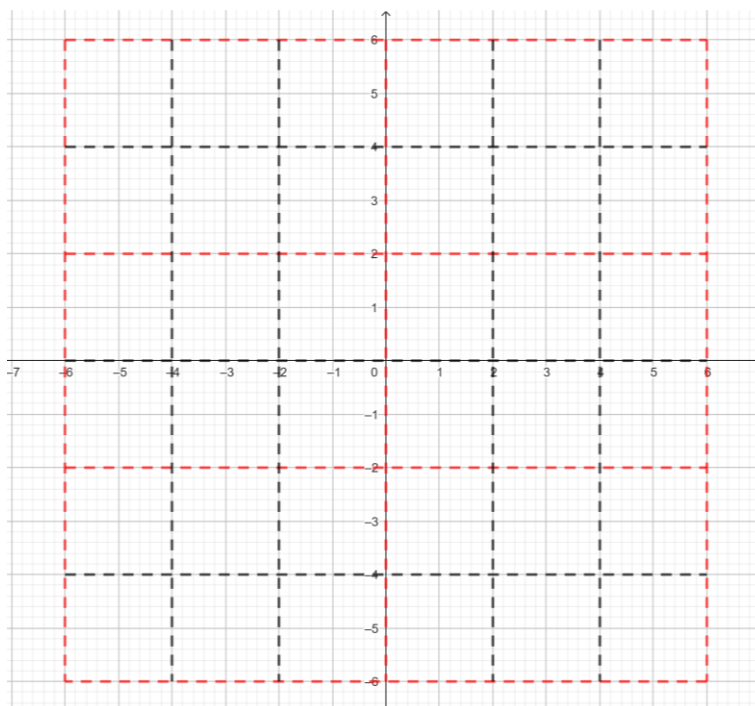
12. The figure shows part of the graph of the quadratic function $f(x) = 2(x-x_0)(x+x_0)$. In the field where the point of the graph of that function with the abscissa is 1 , write the sum of the absolute values of the zero point increased by 3.



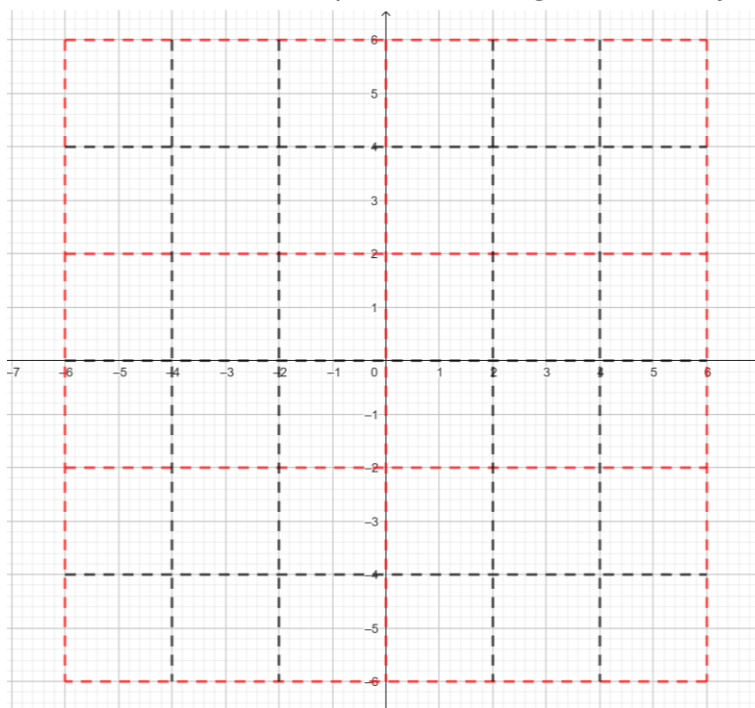
13. Draw a graph of a sinusoid with an amplitude 6 and a period 2π , where the phase shift and the shift along the y-axis are equal to 0. In the field where the point of the graph of that function with abscissa 5 is located, write the absolute value of the highest function value decreased by 1.



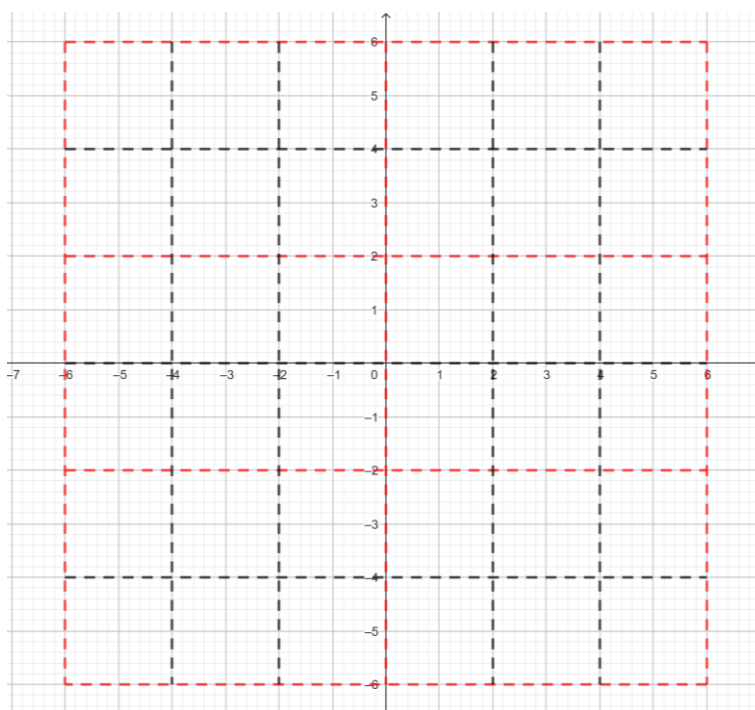
14. Draw a graph of a cosine with amplitude 6 and period 2π , where the phase shift and y-axis shift are equal to 0. In the box where the point on the graph of this function with abscissa 3 is located, enter the absolute value of the smallest function value decreased by 2.



15. Draw the graphs of the functions $f(x)=3$ and $g(x)=-x-2$. At the point of intersection of these graphs, write the absolute value of the zero-point function g increased by 3.

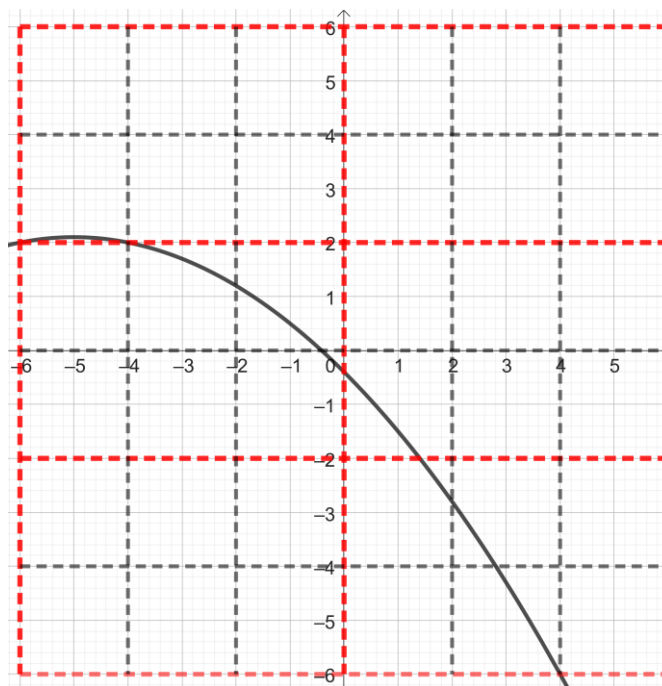


16. Draw the graphs of the linear functions $f(x)=-5$ and $g(x)=x-4$. At the point of intersection of these graphs, write the absolute value of the zero-point function g decreased by 1.

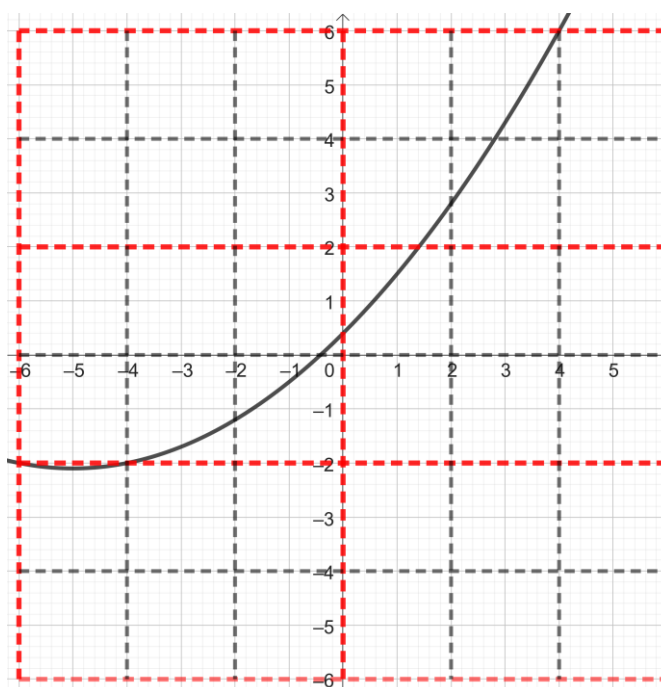


GAME 6_4 (6X6 SUDOKU) - numerical mathematics

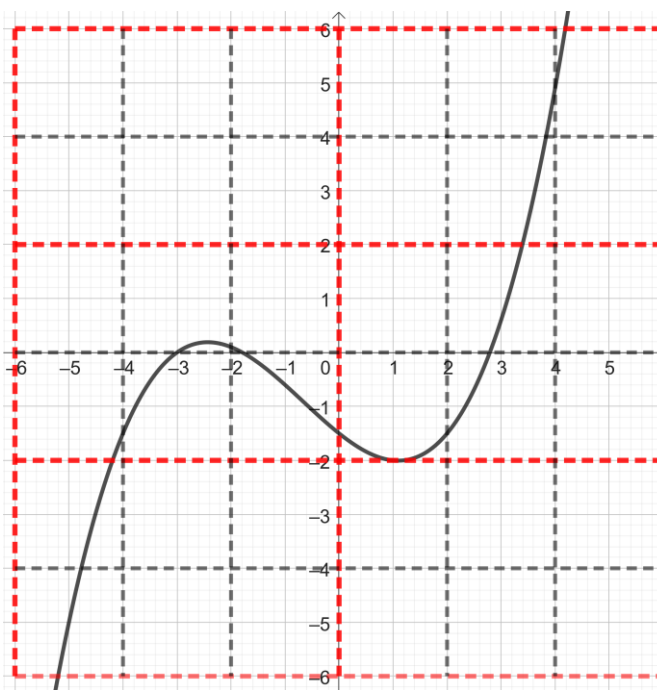
- The figure shows a part of the function f . On the segment $[-3,5]$, use the bisection method to find the zero of the function f . After 2 steps, you will determine the approximate zero of z . In the field where the point $(z, f(z))$ is located, enter the width of the interval determined by the bisection.



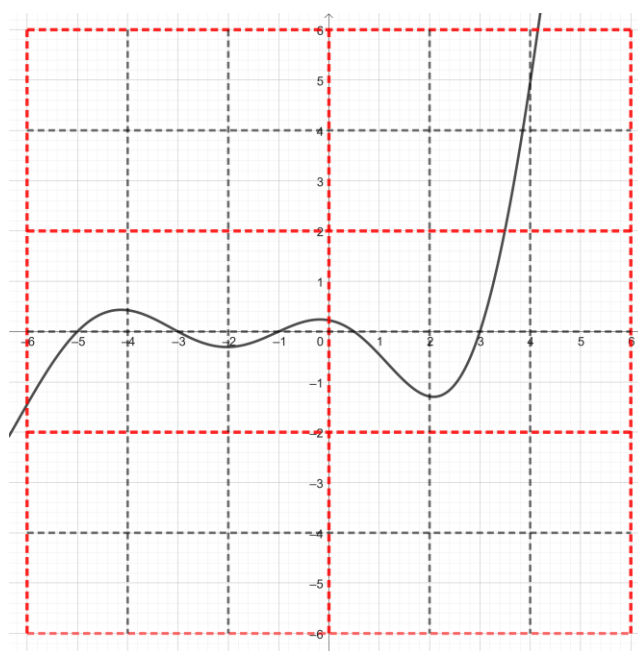
- The figure shows a part of the function f . For the initial values $x_1 = -5$, $x_2 = 4$, use the secant method to find the zero of the function f . After 1 step, you will approximately determine the zero of z . In the field containing the point $(z, f(z))$, enter the number of zeros of the function on the part of the graph shown.



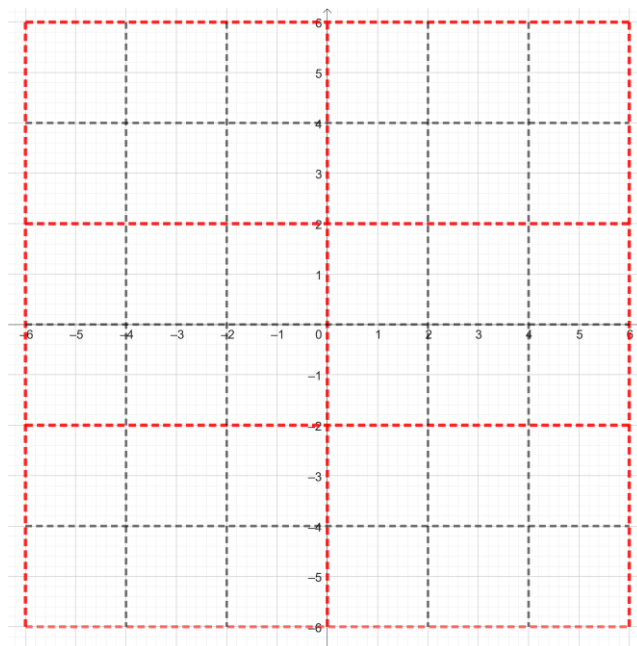
3. The figure shows a part of the function f . On the segment $[-5,3]$, use the bisection method to find the zero of the function f . After a few steps, it will be obvious which zero the bisection method tends towards. In the field above that zero, enter a number twice as large as the number of zeros you see on the graph of the function f .



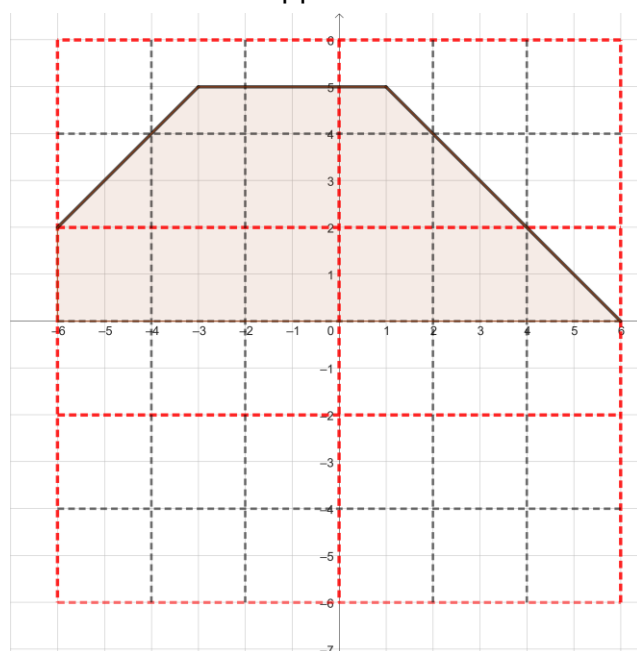
4. The figure shows a part of the function f . For the initial values $x_1=1, x_2=4$, use the secant method to find the zero of the function f . After 1 step, you will approximately determine the zero of z . In the field containing the point $(z, f(z))$, enter the number of zeros of the function on the part of the graph shown.



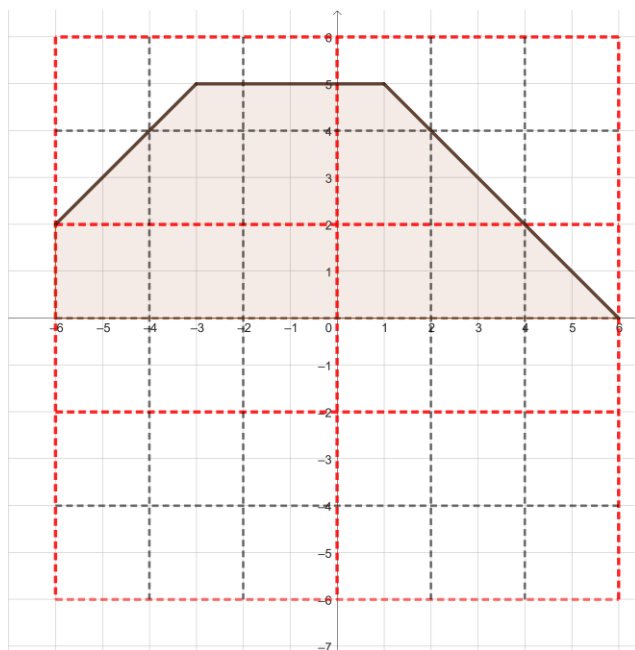
5. Plot the graphs of the functions $f(x)=x+2$ and $g(x)=(x-3)^2$ in the coordinate system. Determine the approximate intersection of the two graphs and enter the number 3 in the field where the intersection is located.



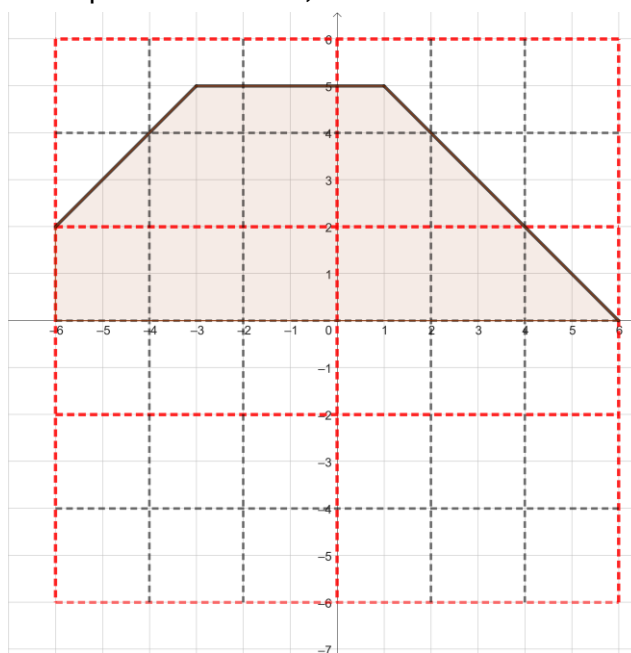
6. Calculate the exact area of the marked polygon in the image. Determine the tens digit of the result you got and enter it in the field in the upper left corner.



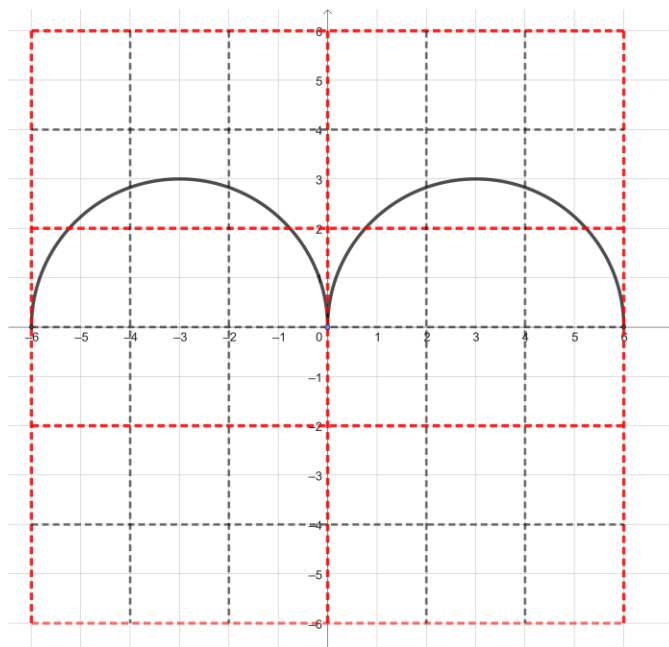
7. Use the extended trapezoid formula with a step of 6 and calculate approximately the area bounded by the curve and the x-axis. That is, approximately determine the area as the sum of the areas of the two trapezoids when the x-axis is divided into intervals of length 6. Divide the value you get by 18 and enter it in the field in the lower right corner.



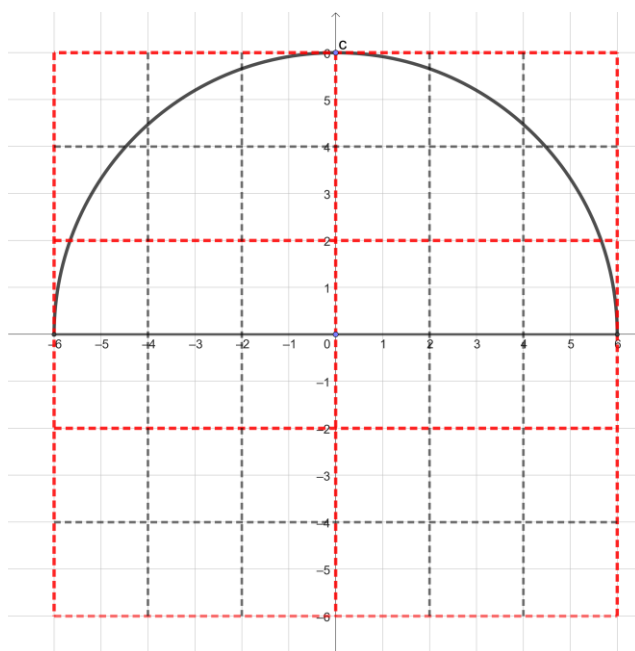
8. Use the extended trapezoid formula with step 3 and calculate approximately the area bounded by the curve and the x-axis. That is, approximately determine the area as the sum of the areas of the four trapezoids when the x-axis is divided into intervals of length 3. What is the error of this area approximation? Compare with task 6, and write the error value in the lower left corner.



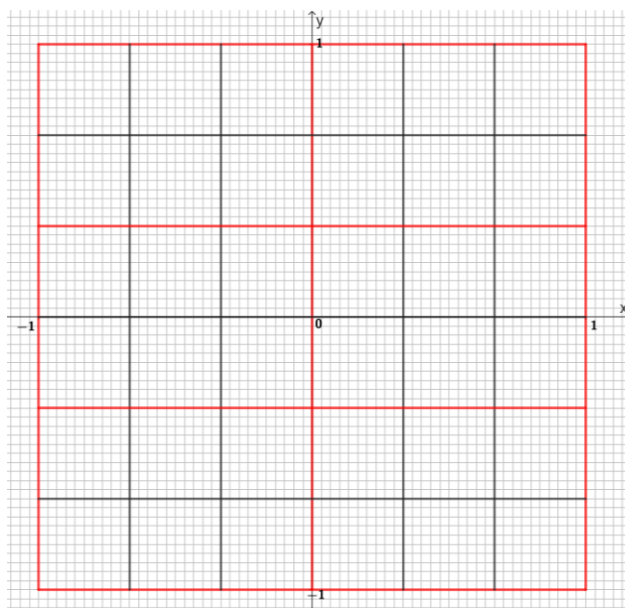
9. The graph of a function is drawn in the figure. Approximately calculate the area of the figure bounded by the graph of the function and the x-axis. Use the trapezoid formula with a step of 3. That is, approximately determine the area as the sum of the areas of four trapezoids when the x-axis is divided into intervals of length 3. Add 2 to the approximate area, and then divide the result by 4. Enter the final value in the field in the upper right corner.



10. The figure is drawn with a black curve and the x-axis. Using the trapezoidal formula with a step length of 6, determine the approximate area of the figure. Divide the value you get by the number 9 and enter the result in the field where the point $(-1, -3)$ belongs.

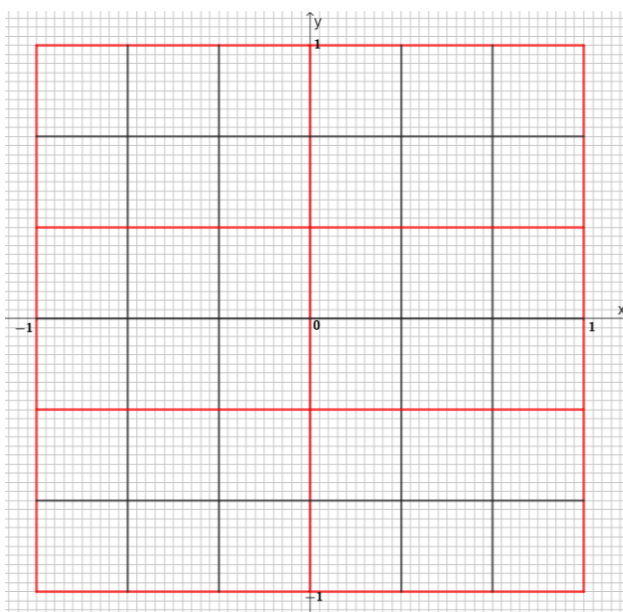


GAME 6_5 (6x6 SUDOKU) – coordinate system



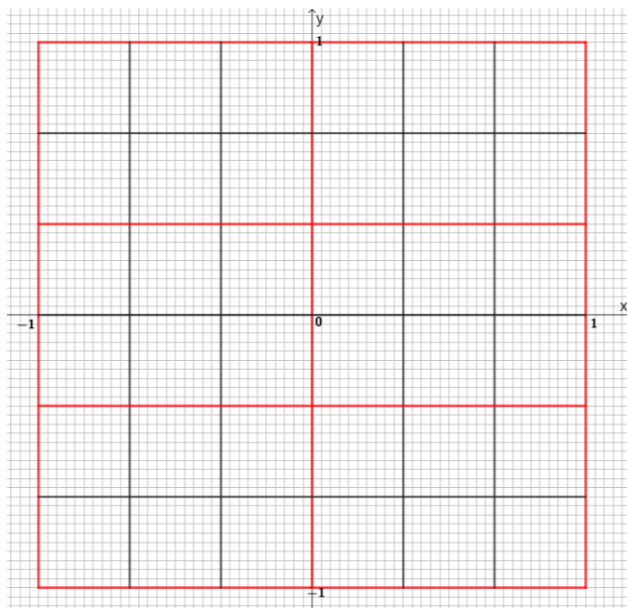
| <p style="text-align: center;">COORDINATE SYSTEM A</p> | <p style="text-align: center;">COORDINATE SYSTEM B</p> |
|--|---|
| <p>1. In the field in the third row and last column, enter the number 1.</p> | <p>1. In the field in the second row and last column, enter the number 4.</p> |
| <p>2. Enter the number 1 in the field in the first row and third column .</p> | <p>2. In the field in the first row and sixth column, enter the number 2.</p> |
| <p>3. In the field with the point $(\frac{5}{30}, -\frac{4}{30})$, enter the number 2.</p> | <p>3. In the field with the point $(\frac{5}{30}, -\frac{4}{30})$, enter the number 2.</p> |
| <p>4. In the field with the point $(-\frac{28}{30}, \frac{2}{30})$, enter the number 3.</p> | <p>4. In the field with the point $(-\frac{16}{30}, \frac{13}{30})$, enter the number 3.</p> |
| <p>5. In the field with the point $(-\frac{1}{6}, -\frac{5}{30})$, enter the number 4.</p> | <p>5. In the field with the point $(\frac{1}{2}, -\frac{25}{30})$, enter the number 1.</p> |
| <p>6. In the field with the point $(-\frac{1}{5}, -\frac{1}{2})$, enter the number 3.</p> | <p>6. In the field with the point $(\frac{1}{6}, \frac{9}{10})$, enter the number 5.</p> |

GAME 6_6 (6x6 SUDOKU) – directed lengths and vectors



| DIRECTIONAL LENGTHS AND VECTORS A | DIRECTIONAL LENGTHS AND VECTORS B |
|--|--|
| 1. Enter the number 4 in the field in the first row and third column. | 1. In the field in the second row and last column, enter the number 1. |
| 2. In the field in the last row and penultimate column, enter the number 4. | 2. In the field in the third row and first column, enter the number 5. |
| 3. Enter the number 6 in the field in the first row and last column. | 3. In the field in the second row and second column, enter the number 5. |
| 4. Given points $A(\frac{6}{30}, \frac{6}{30})$, $B(\frac{15}{30}, \frac{6}{30})$, $C(-\frac{24}{30}, -\frac{25}{30})$. Determine point D such that the directed lengths \overrightarrow{AB} and \overrightarrow{CD} determine the same vector. Write the number 6 in the field marked with point D. | 4. Given points $A(\frac{12}{30}, \frac{25}{30})$, $B(0, \frac{25}{30})$, $C(\frac{18}{30}, -\frac{5}{30})$. Determine point D such that the directed lengths \overrightarrow{AB} and \overrightarrow{CD} determine the same vector. Write the number 6 in the field marked with point D. |
| 5. Draw a vector \vec{a} with its starting point B $(0.5, \frac{1}{3})$ and its ending point A $(\frac{1}{15}, \frac{1}{3})$. Draw point C $(-\frac{23}{30}, -\frac{1}{6})$ and determine point D such that the directed length \overrightarrow{DC} determines the vector \vec{a} . In the field to the right of point D, write the number 1. | 5. Draw a vector \vec{a} with its starting point B $(0.5, \frac{1}{3})$ and its ending point A $(\frac{1}{15}, \frac{1}{3})$. Draw point C $(-\frac{3}{5}, -\frac{2}{3})$ and determine point D such that the directed length \overrightarrow{DC} determines the vector \vec{a} . In the field above point D, write the number 5. |
| 6. Draw a vector \vec{a} with its starting point A $(-1, -\frac{2}{3})$ and its ending point B $(-\frac{2}{3}, -\frac{2}{3})$. Draw point C $(0.5, 0)$ and determine point D such that the directed length \overrightarrow{CD} determines the vector \vec{a} . In the field above point D, write the number 4. | 6. Draw a vector \vec{a} with its starting point A $(-1, -\frac{2}{3})$ and its ending point B $(-\frac{2}{3}, -\frac{2}{3})$. Draw point C $(-0.5, 1)$ and determine point D such that the directed length \overrightarrow{CD} determines the vector \vec{a} . In the field below point D, write the number 4. |

GAME 6_7 (6x6 SUDOKU) – equal and opposite vectors

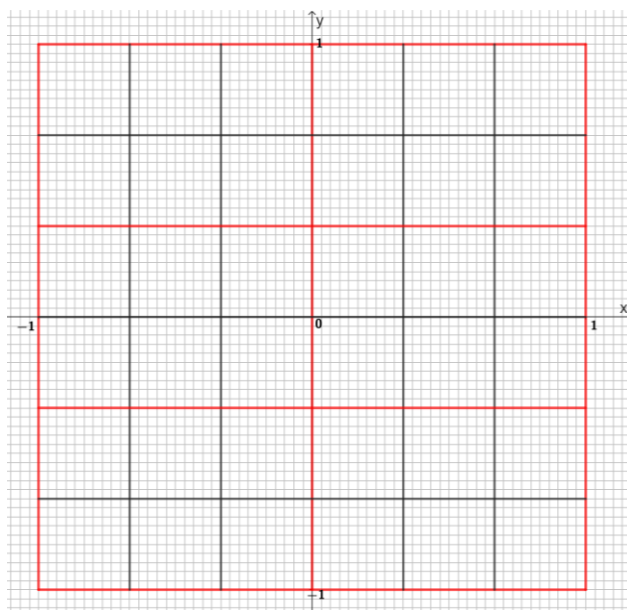


| EQUAL AND OPPOSITE VECTORS | EQUAL AND OPPOSITE VECTORS |
|--|---|
| A | B |
| <p>1. For given $A(-\frac{10}{30}, -\frac{20}{30})$, $B(-\frac{20}{30}, -\frac{20}{30})$ and $C(\frac{15}{30}, -\frac{5}{30})$, determine D such that \overrightarrow{AB} and \overrightarrow{CD} be two different directed lengths that determine the same vector. In the field marked with point D, write the number 5.</p> | <p>1. For given $A(\frac{10}{30}, \frac{20}{30})$, $B(\frac{20}{30}, \frac{20}{30})$ and $C(-\frac{14}{30}, \frac{15}{30})$, determine D such that \overrightarrow{AB} and \overrightarrow{CD} be two different directed lengths that determine the same vector. In the field marked with point D, write the number 1.</p> |
| <p>2. Given points $A(\frac{2}{15}, -\frac{1}{2})$, $B(-\frac{2}{15}, \frac{2}{15})$, $C(-\frac{19}{30}, \frac{4}{15})$. Determine point D such that directed lengths \overrightarrow{AB} and \overrightarrow{DC} determine opposite vectors. Write the number 3 in the field marked with point D.</p> | <p>2. Given points $A(-\frac{1}{3}, -\frac{2}{3})$, $B(-\frac{2}{5}, -\frac{2}{5})$, $C(-\frac{5}{6}, -\frac{1}{10})$. Determine point D such that directed lengths \overrightarrow{AB} and \overrightarrow{DC} determine opposite vectors. Write the number 2 in the field marked with point D.</p> |
| <p>3. Given points $A(\frac{11}{15}, \frac{4}{15})$, $B(\frac{14}{15}, -\frac{1}{10})$, $C(-\frac{11}{30}, -\frac{7}{15})$. Determine point D such that \overrightarrow{BA} and \overrightarrow{CD} are two different directed lengths that determine the same vector. Write the number 6 in the field marked with point D.</p> | <p>3. Given points $A(\frac{11}{15}, \frac{4}{15})$, $B(\frac{1}{15}, \frac{2}{15})$, $C(\frac{11}{30}, -\frac{8}{15})$. Determine point D such that \overrightarrow{BA} and \overrightarrow{CD} are two different directed lengths that determine the same vector. Write the number 1 in the field marked with point D.</p> |
| <p>4. Given $A(\frac{14}{15}, \frac{1}{5})$ and $B(\frac{14}{15}, -0.1)$ determine the point C such that the directed lengths \overrightarrow{AB} and \overrightarrow{AC} determine vectors of the same direction, the same length, and different orientations. In the field marked with point C, enter the number 4.</p> | <p>4. Given $A(\frac{1}{6}, -\frac{1}{6})$ and $B(\frac{1}{6}, 0.5)$ determine the point C such that the directed lengths \overrightarrow{AB} and \overrightarrow{AC} determine vectors of the same direction, the same length, and different orientations. In the field marked with point C, enter the number 3.</p> |
| <p>5. For given $A(-\frac{2}{3}, -\frac{1}{2})$, $B(-0.5, -0.5)$ and $C(-\frac{1}{3}, -\frac{1}{6})$, determine D so that \overrightarrow{AC} and \overrightarrow{BD} be two different directed lengths that determine opposite vectors. In the field marked with point D, write the number 4.</p> | <p>5. For given $A(\frac{7}{10}, -\frac{1}{2})$, $B(\frac{11}{15}, -\frac{23}{30})$ and $C(-\frac{8}{15}, -\frac{1}{3})$, determine D so that \overrightarrow{AC} and \overrightarrow{BD} be two different directed lengths that determine opposite vectors. In the field marked with point D, write the number 2.</p> |

6. Given $C(\frac{11}{15}, -\frac{2}{15})$ and $B(\frac{11}{15}, -\frac{8}{15})$ determine the point A such that the directed lengths \overrightarrow{BC} and \overrightarrow{AC} determine vectors of the same direction, the same length, and different orientations. In the field marked with point A, enter the number 4.

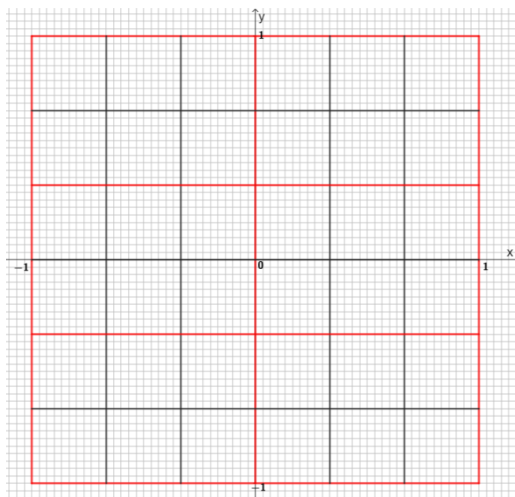
6. Given $C(\frac{1}{10}, -\frac{1}{2})$ and $B(\frac{11}{30}, -\frac{1}{2})$ determine the point A such that the directed lengths \overrightarrow{BC} and \overrightarrow{AC} determine vectors of the same direction, the same length, and different orientations. In the field marked with point A, enter the number 6.

GAME 6_8 (6x6 SUDOKU) – addition and subtraction of vectors



| ADDITION AND SUBTRACTION OF VECTORS A | ADDITION AND SUBTRACTION OF VECTORS B |
|---|--|
| 1. Given points $A(-\frac{19}{30}, -\frac{15}{30})$, $B(-\frac{4}{30}, -\frac{17}{30})$, $C(-\frac{2}{30}, -\frac{7}{30})$. Determine point D such that the directed length \overrightarrow{BD} determines the vector $\overrightarrow{BA} + \overrightarrow{BC}$. Write the number 1 in the field marked with point D. | 1. Given points $A(-\frac{6}{30}, -\frac{23}{30})$, $B(\frac{9}{30}, -\frac{25}{30})$, $C(\frac{11}{30}, -\frac{15}{30})$. Determine point D such that the directed length \overrightarrow{BD} determines the vector $\overrightarrow{BA} + \overrightarrow{BC}$. Write the number 1 in the field marked with point D. |
| 2. Given points $A(\frac{1}{5}, \frac{8}{15})$, $B(-\frac{4}{15}, \frac{1}{5})$, $C(\frac{9}{10}, \frac{8}{15})$. Determine point D such that the directed length \overrightarrow{AD} determines the vector $\overrightarrow{AC} + \overrightarrow{AB}$. Write the number 3 in the field marked with point D. | 2. Given points $A(\frac{1}{6}, \frac{1}{6})$, $B(-\frac{3}{10}, -\frac{1}{6})$, $C(\frac{13}{15}, \frac{1}{6})$. Determine point D such that the directed length \overrightarrow{AD} determines the vector $\overrightarrow{AC} + \overrightarrow{AB}$. Write the number 4 in the field marked with point D. |
| 3. Given points $B(0, \frac{1}{3})$, $C(-\frac{1}{6}, \frac{1}{6})$, $D(0, 1)$. Determine point A such that the directed length \overrightarrow{BA} determines the vector $\overrightarrow{BC} + \overrightarrow{BD}$. Write 6 in the field marked with point A. | 3. Given points $B(\frac{1}{3}, \frac{1}{3})$, $C(\frac{1}{6}, \frac{1}{6})$, $D(\frac{1}{3}, 1)$. Determine point A such that the directed length \overrightarrow{BA} determines the vector $\overrightarrow{BC} + \overrightarrow{BD}$. Write the number 5 in the field marked with point A. |
| 4. Given points $A(\frac{2}{15}, \frac{1}{3})$, $B(\frac{5}{6}, \frac{1}{5})$, $C(\frac{2}{15}, -\frac{1}{3})$. Determine point D such that the directed length \overrightarrow{AD} determines the vector $\overrightarrow{AB} - \overrightarrow{AC}$. Write the number 3 in the field marked with point D. | 4. Given points $A(\frac{1}{10}, 0)$, $B(\frac{4}{5}, -\frac{2}{15})$, $C(\frac{1}{10}, -\frac{2}{3})$. Determine point D such that the directed length \overrightarrow{AD} determines the vector $\overrightarrow{AB} - \overrightarrow{AC}$. Write the number 3 in the field marked with point D. |
| 5. Given points $A(-\frac{9}{10}, 0)$, $B(-\frac{1}{5}, -\frac{2}{15})$, $D(-\frac{1}{5}, \frac{8}{15})$. Determine point C such that the directed length \overrightarrow{DC} determines the vector $\overrightarrow{DA} - \overrightarrow{DB}$. Write the number 4 in the box below point C. | 5. Given points $A(-0.5, 0)$, $B(\frac{1}{5}, -\frac{2}{15})$, $D(\frac{1}{5}, \frac{8}{15})$. Determine point C such that the directed length \overrightarrow{DC} determines the vector $\overrightarrow{DA} - \overrightarrow{DB}$. Write the number 5 in the box below point C. |
| 6. Given points $A(-0.3, -\frac{17}{30})$, $C(-0.9, -\frac{17}{30})$ and $D(-0.3, -\frac{1}{6})$. Determine point B such that the directed length \overrightarrow{AB} determines the vector $\overrightarrow{AC} - \overrightarrow{DA}$. Write the number 5 in the field marked with point B. | 6. Given points $A(-0.3, \frac{1}{6})$, $C(-0.9, \frac{1}{6})$ and $D(-0.3, \frac{17}{30})$. Determine point B such that the directed length \overrightarrow{AB} determines the vector $\overrightarrow{AC} - \overrightarrow{DA}$. Write the number 1 in the field marked with point B. |

GAME 6_9 (6x6 SUDOKU) - translation

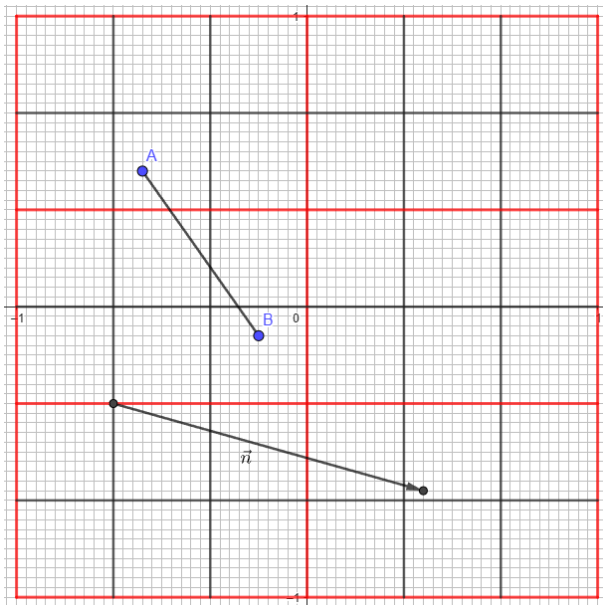


TRANSLATION

A

- Given points $A\left(-\frac{2}{10}, \frac{11}{30}\right)$, $B\left(-\frac{1}{10}, \frac{9}{10}\right)$, $C\left(\frac{1}{2}, \frac{1}{2}\right)$. Determine the point D, that is the image of point A with respect to the translation by the vector \overrightarrow{CB} . Write the number 3 in the field marked with point D.
- Given points $A\left(\frac{5}{6}, \frac{2}{3}\right)$, $B\left(\frac{23}{30}, \frac{16}{30}\right)$, $C\left(\frac{2}{15}, \frac{11}{30}\right)$, $M\left(\frac{1}{2}, \frac{5}{6}\right)$, $N\left(\frac{2}{2}, \frac{2}{3}\right)$. Translate triangle ABC with respect to the vector \overrightarrow{MN} . Write the number 4 in the cell to which the largest part of the resulting triangle belongs.

- Translate the length \overline{AB} for the given vector.



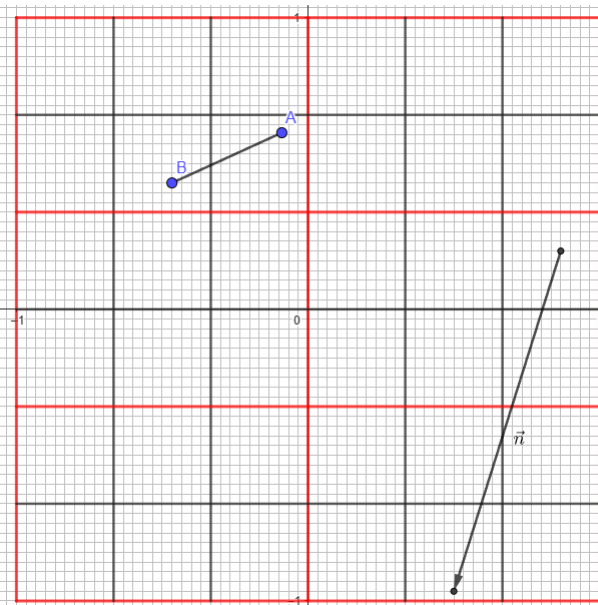
In the field where the image of point B is, given the given translation, write the number 1.

TRANSLATION

B

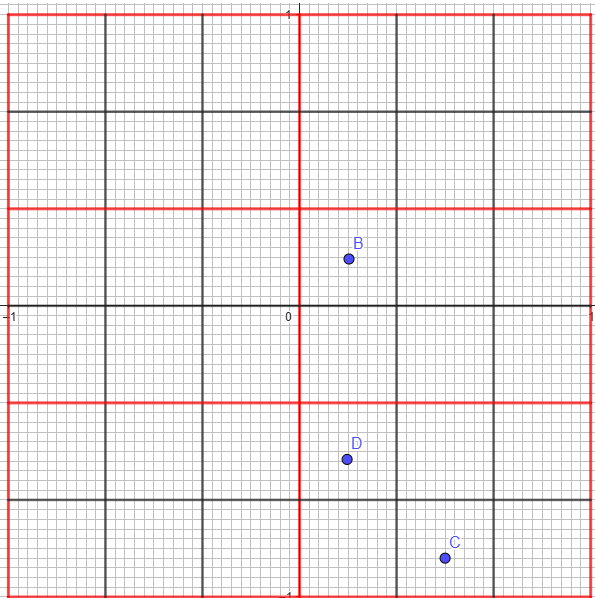
- Given points $A\left(-\frac{23}{30}, \frac{17}{30}\right)$, $B(0,1)$, $C\left(\frac{1}{2}, \frac{1}{2}\right)$. Determine the point D, that is the image of point A with respect to the translation by the vector \overrightarrow{CB} . Write the number 5 in the field marked with point D.
- Given points $A\left(\frac{2}{2}, -\frac{1}{5}\right)$, $B\left(\frac{1}{2}, -\frac{1}{2}\right)$, $C\left(-\frac{4}{30}, -\frac{2}{3}\right)$, $M\left(\frac{1}{2}, \frac{5}{6}\right)$, $N\left(\frac{2}{2}, \frac{2}{3}\right)$. Translate triangle ABC with respect to the vector \overrightarrow{MN} . Write the number 4 in the cell to which the largest part of the resulting triangle belongs.

- Translate the length \overline{AB} for the given vector.

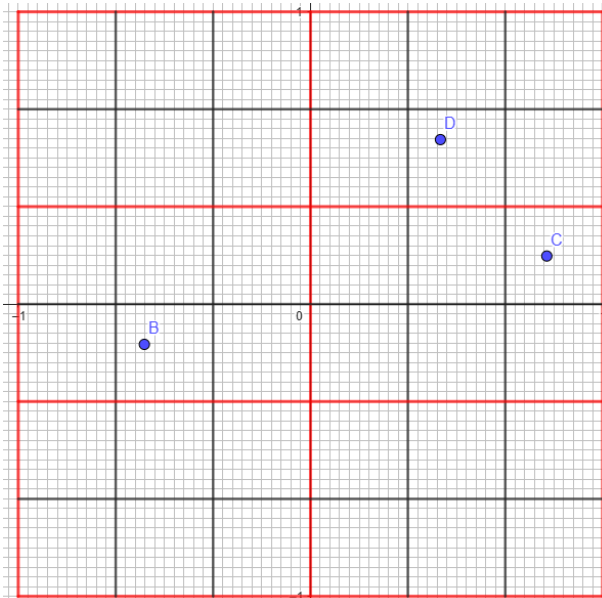


In the field where the picture of point B is, given the given translation, write the number 4.

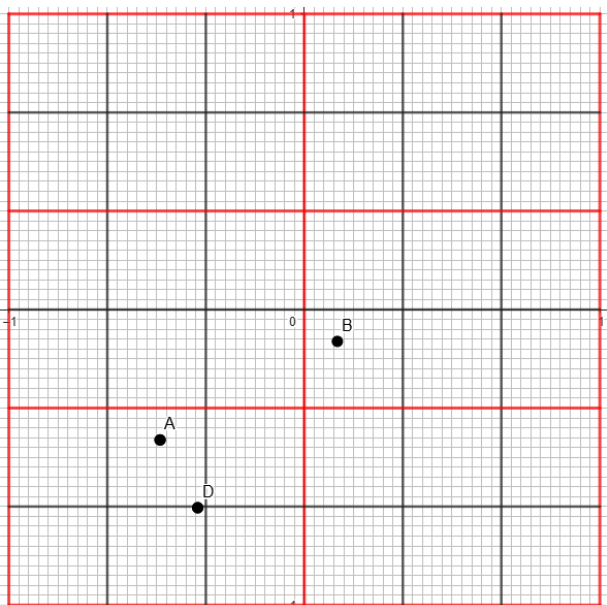
4. Determine the translation vector so that point D is the image of point C with respect to the given translation. Determine the image of point B with respect to the translation for the same vector. Enter the number 1 in the field marked with the picture of point B.



4. Determine the translation vector so that point D is the image of point C with respect to the given translation. Determine the image of point B with respect to the translation for the same vector. Enter the number 1 in the field marked with the picture of point B.

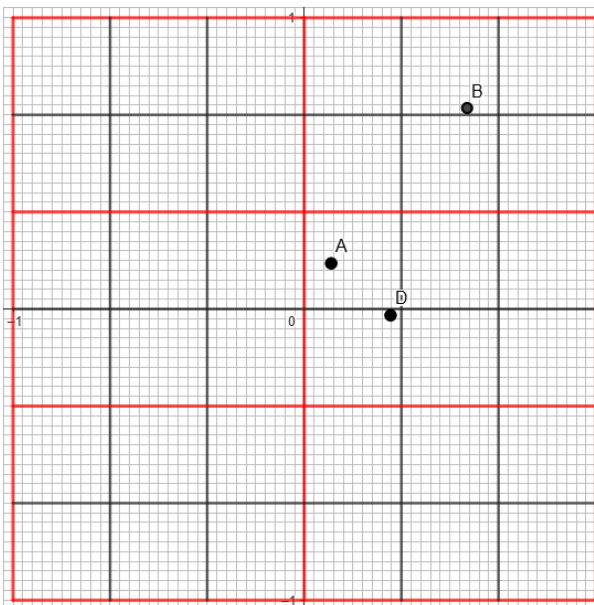


5. Given points A, B, D. Determine point C such that ABCD is a rectangle and translate rectangle ABCD by vector \vec{BC} .



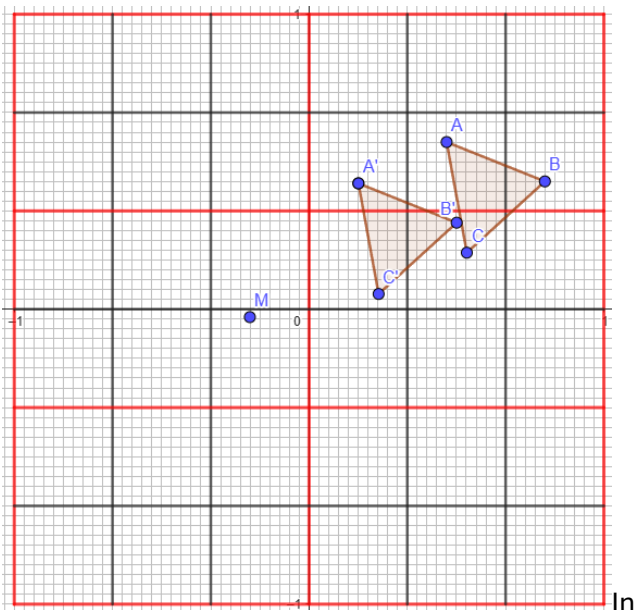
Let M and N be the images of points D and C with respect to the described translation. In the box containing the midpoint of the length, \overline{MN} enter the number 3.

5. Given points A, B, D. Determine point C such that ABCD is a rectangle and translate rectangle ABCD by the vector \vec{BC} .



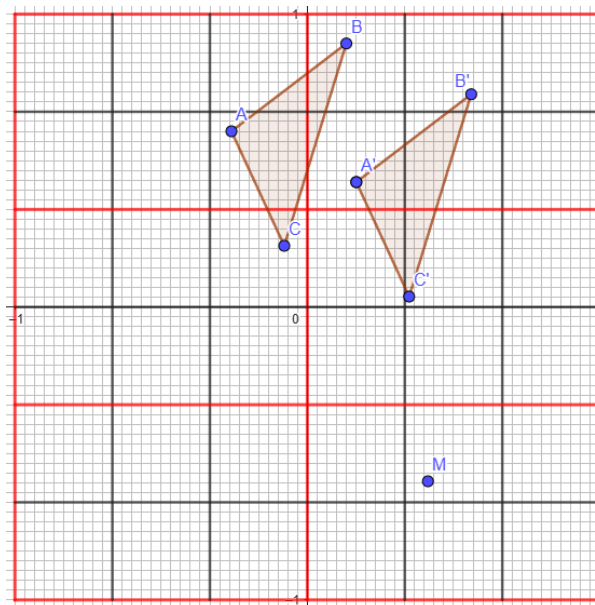
Let M and N be the images of points D and C with respect to the described translation. In the box containing the midpoint of the length, \overline{MN} enter the number 6.

6. Determine the translation vector \vec{a} , so that triangle A'B'C' is the image of triangle ABC. Then translate point M by the vector \vec{a} .



In the field containing the image of point M, enter the number 6.

6. Determine the translation vector \vec{a} , so that triangle A'B'C' is the image of triangle ABC. Then translate point M by the vector \vec{a} .



In the field containing the image of point M, enter the number 6.

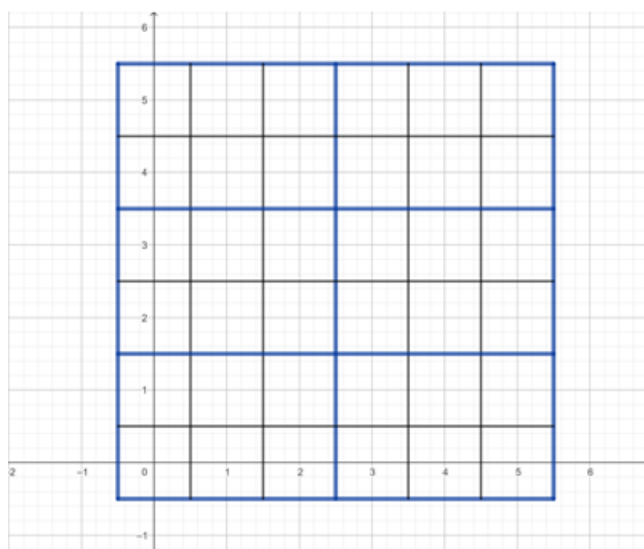
GAME 6_10 (6x6 SUDOKU)

| | | | | | |
|-------|--|--|--|--|-------|
| | | | | | (5.5) |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| (0.0) | | | | | |

| A | B |
|---|---|
| <p>1. Given the line $p=(4,1)+[(2,0)]$ and the point $A(2,0)$, determine the point B such that the vector \overrightarrow{BA} is the unit vector in the direction of the line p, oriented in the same way as the vector $(3,0)$. Write 5 in the field defined by point B.</p> | <p>1. Given the line $p=(-1,1)+[(4,0)]$ and the point $A(4,0)$. Determine the point B such that the vector \overrightarrow{BA} is the unit vector in the direction of the line p, oriented in the same way as the vector $(3,0)$. In the field defined by point B, write how many variants of Desargues' theorem exist in the Euclidean plane.</p> |
| <p>2. Given the line $p=(0,0)+[(-2,-1)]$ and the point $B(4,2)$, determine the point B such that the vector \overrightarrow{AB} is the direction vector of the line p, oriented in the same way as the vector $(6,3)$ and three times shorter than the vector $(6,3)$. In the field determined by point B, write how many points the line is determined by.</p> | <p>2. Given the line $p=(0,0)+[(-4,-1)]$ and the point $A(0,0)$, find the point B such that the vector \overrightarrow{AB} is the direction vector of the line p, oriented in the same way as the vector $(12,3)$ and three times shorter than the vector $(12,3)$. In the field marked with point B, enter 4.</p> |
| <p>3. Given the line $p=(3,4)+[(1,1)]$. Determine the point A whose abscissa is 0, and which belongs to the line p. In the field determined by point A, write how many variants of Desargues' theorem exist in the Euclidean plane.</p> | <p>3. Given the line $p=(1,1)+[(-1,1)]$. Determine the point A whose ordinate is 2, and which belongs to the line p. In the field marked by point A, write how many points define the plane.</p> |
| <p>4. Given the line $p=(2,3)+[(1,-1)]$ and the point $A(2,1)$, find the point B that belongs to the line p such that the vector \overrightarrow{AB} is the vector of the line perpendicular to the line p, of the same length as the vector $(1,-1)$. In the field defined by point B, write the number of points at which any two lines of the spherical plane intersect.</p> | <p>4. Given the line $p=(3,2)+[(1,-1)]$ and the point $A(1,2)$, find the point B that belongs to the line p such that the vector \overrightarrow{AB} is the vector of the line perpendicular to the line p, of the same length as the vector $(1,-1)$. In the field defined by point B, write at how many points every two lines of the projective plane intersect.</p> |

| | |
|--|--|
| <p>5. Let D be a point on the projective plane given by homogeneous coordinates $(2,8,8)$. Let us imagine that our Sudoku grid is drawn in the plane $z=4$. Determine the homogeneous coordinates of point D (x,y,z) such that (x,y,z) belongs to the plane defined by the Sudoku grid. In the field defined by point D, enter the value 3.</p> | <p>5. Let D be a point on the projective plane given by homogeneous coordinates $(6,8,8)$. Let us imagine that our Sudoku grid is drawn in the plane $z=4$. Determine the homogeneous coordinates of point D (x,y,z) such that (x,y,z) belongs to the plane defined by the Sudoku grid. In the field defined by point D, enter the value 4.</p> |
| <p>6. Let C be a point on the projective plane given by homogeneous coordinates $(0,-3,-15)$. Let us imagine that our Sudoku grid is drawn in the plane $y=1$. Determine the homogeneous coordinates of point C (x,y,z) such that (x,y,z) belongs to the plane defined by the Sudoku grid. In the field defined by point C, enter the value 5.</p> | <p>6. Let C be a point on the projective plane given by homogeneous coordinates $(-8,-8,-10)$. Let us imagine that our Sudoku grid is drawn in the plane $y=4$. Determine the homogeneous coordinates of point C (x,y,z) such that (x,y,z) belongs to the plane defined by the Sudoku grid. Write the value 1 in the field defined by point C.</p> |

GAME 6_11 (6x6 SUDOKU)



The solution to each problem is an ordered triple. (x, y, z) . The first two coordinates (x, y) will reveal the position in the sudoku table where you must enter the number you will get in the problem.

Additionally, if the solution is of the form $\frac{1}{\sqrt{5}}(1,2,0)$, the required position is (1,2).

| A | B |
|---|--|
| <p>1. Choose an ordered triple from R^3 which to determine a point on the spherical plane.</p> <p>a) $(2,1,0)$ b) $\frac{1}{\sqrt{3}}(1,3,-1)$ c) $\frac{1}{\sqrt{26}}(5,0,1)$</p> <p>In the appropriate field of the sudoku table, write the solution of $b((1,0,1), (0,0,-5))$.</p> | <p>1. Choose an ordered triple from R^3 which to determine the direction of the spherical plane.</p> <p>a) $(1,1,1)$ b) $\frac{1}{\sqrt{34}}(0,5,-3)$ c) $(0,2,-1)$</p> <p>Enter the number in the appropriate field of the sudoku table: $(1,2,1) \cdot (1,1,0)$.</p> |
| <p>2. Choose an ordered triple from R^3 which to determine a point on the hyperbolic plane.</p> <p>a) $\frac{1}{\sqrt{34}}(0,5,-3)$ b) $\frac{1}{5}(5,5,5\sqrt{3})$ c) $(1,0,1)$</p> <p>In the appropriate field of the sudoku table, enter how many points of the hyperbolic plane determine the unique line that contains them.</p> | <p>2. Select the ordered triple from R^3 which determines the direction of the hyperbolic plane.</p> <p>a) $\frac{1}{2}(3,2,-3)$ b) $\frac{1}{\sqrt{5}}(0,2,-1)$ c) $(0,1,1)$</p> <p>Enter the number in the appropriate field of the sudoku table: $(0,0,1) \cdot (2025,2,2)$.</p> |

| A | B |
|---|--|
| <p>3. Choose the pole of the spherical plane line containing the points $\frac{1}{\sqrt{2}}(0,5,-3)$ and $(0,1,0)$.</p> <p>a) $(1,0,0)$ b) $(0,1,0)$ c) $(0,0,1)$</p> <p>In the corresponding field of the sudoku table, write the number $2x$, where x of possible relations of lines in the hyperbolic plane.</p> | <p>3. Choose a point on the hyperbolic plane that belongs to the line whose normal vector is $\vec{n} = \frac{1}{5}(-3,4,0)$.</p> <p>a) $(4,3,\sqrt{26})$ b) $\frac{1}{3}(1,3,1)$ c) $\frac{1}{4}(0,4,0)$</p> <p>In the corresponding field of the sudoku table, write the largest possible number of intersections of two different lines of the hyperbolic plane.</p> |
| <p>4. Given points $A = \frac{1}{\sqrt{7}}(5,2,-6)$ and $B = (2,2,-3)$ on the hyperbolic plane, choose the normal vector to the line containing points A and B.</p> <p>a) $\frac{1}{2\sqrt{2}}(0,3,-1)$ b) $(2,1,-2)$ c) $\frac{1}{\sqrt{2}}(1,1,0)$</p> <p>In the appropriate field of the sudoku table, write the solution of $b((1,0,1), (0,1,-3))$.</p> | <p>4. Given lines of a spherical plane are determined by the poles $\vec{e} = (0,0,1)$ and $\vec{f} = \frac{1}{5}(4,-3,-0)$. Choose an ordered triple that determines the pole of the line perpendicular to the given lines.</p> <p>a) $\frac{1}{\sqrt{2}}(1,1,0)$ b) $(0,0,1)$ c) $\frac{1}{5}(3,4,0)$</p> <p>In the corresponding field of the Sudoku table, write the number $2x$, where x is the number of points where two lines of the spherical plane intersect.</p> |
| <p>5. Given a line p of a spherical plane, determine the pole. $\vec{e} = \frac{1}{\sqrt{3}}(1,-1,1)$. Determine the point $\frac{1}{\sqrt{13}}(x,3,1)$ that belongs to line p.</p> <p>In the appropriate field of the sudoku table, write the solution of $b((1,5,1), (1,1,1))$.</p> | <p>the hyperbolic plane and the direction determined by the normal vector $\vec{n} = (1,-1,-1)$ are given $T = (0, \frac{1}{\sqrt{3}}, \frac{2}{\sqrt{3}})$</p> <p>Choose an ordered triple that determines the normal vector of the line containing T and is perpendicular to the given line.</p> <p>a) $(1,0,0)$ b) $\frac{1}{2}(1,2,1)$ c) $\frac{1}{\sqrt{2}}(1,0,1)$</p> <p>In the appropriate field of the sudoku table, write the solution of $b((0,-2,2), (1,0,-3))$.</p> |

GAME 6_12 – SEQUENCE

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The next sequence is determined by repeating the first 6 natural numbers with a cyclic shift of 1. Like this: 1,2,3,4,5,6,2,3,4,5,6,1,3,4,5,6,1,2,...

- a) Write the first few elements of the given array in the form of a function (association rule):
 $a(1)=?$, $a(2)=?$, ...
- b) Write the next 18 terms of the sequence.
- c) What is the codomain of this sequence?
- d) Solve and play sudoku
 1. Solve the sudoku.
 - In the first line, in the first and last place, write $a(31)$ and $a(36)$.
 - In the second row and fourth column, enter the eighth number of the given sequence.
 - In the third row, in the third column, write $a(33)$, and in the fifth column, write $a(35)$.
 - In the fourth row, in the second column, write $a(73)$ and in the penultimate column, write $a(41)$.
 - In the fifth row and third column, enter $a(42)$.
 - In the last line, in the first and last place, write $a(68)$ and $a(69)$.

GAME 6_13 (MiliDabar - 3rd and 4th grade of elementary school)¹

The following Sudoku table contains the numbers of the problems whose solutions should be entered in the indicated position (in three colors). For example, in the position where it says **2 is in blue**, you should enter the solution to the second problem from the blue set of problems.

| | | | | | |
|----|----|----|----|----|----|
| 6. | | | 3. | | |
| | 1. | 4. | | 6. | 5. |
| | | 5. | 2. | | 1. |
| 2. | 3. | | | 2. | |
| | 4. | 1. | | 3. | |
| 5. | | | 6. | | 4. |

BLUE

Task 1

Robo moves around a square grid consisting of blue and green squares. Blue squares represent water, and green squares represent land. Robo must not enter the water, because he cannot swim!

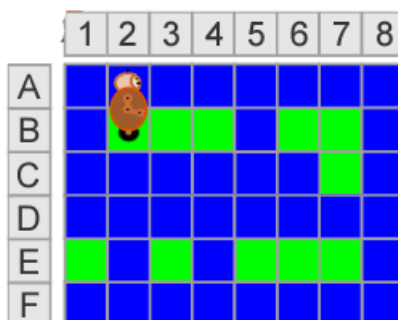
Robo can only walk on land squares. One step allows him to move to an adjacent square. The movement commands that Robo understands are:

- right (number of steps) - left (number of steps) - down (number of steps)

Likewise, Robo can execute a command to skip a field with water:

- jump (number of consecutive jumps).

The jump command allows Robo to jump exactly one square in the direction of the previous command. This means that if the previous command was to the right, Robo will jump to the right of the square he is on. Robo has reached a dangerous area – there is a lot of water around him, Robo is at position B2.



What sequence of commands allows Robo to safely reach field E1?

- 1) right (2), jump (1), right (1), down (1), jump (1), left (2), jump (2)
- 4) right (2), jump (1), right (1), down (1), left (1), jump (3)
- 3) right (2), jump (1), right (1), down (1), jump (1), left (2), jump (1)
- 6) right (2), jump (1), right (2), down (1), jump (1), left (2), jump (3)

¹The tasks were taken from the task repository for the Dabar competition (<https://ucitelji.hr/dabar/>)

BLUE

Task 2

A beaver is playing with his friends. He throws three balls into jars. He is very good at this game and all three balls always end up in the jars. It is possible to throw more than one ball into one jar. The result for each jar is shown in the picture.



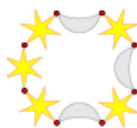
Which of the following results could NOT be achieved by a beaver?

- 1) 25
- 4) 33
- 2) 12
- 5) 28

BLUE

Task 3

Maja would like a bracelet like the one shown in the picture.

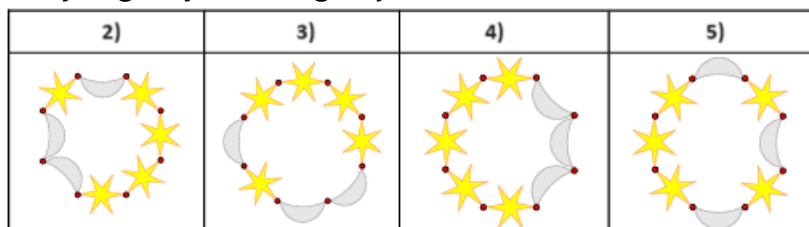


Therefore, he gives Ivan the following instructions:

- Take a star and a moon and put them together.
- Repeat the previous procedure two more times.
- Take the three pieces you made and connect them into one chain.
- Add two more stars to one end of the chain and connect both ends of the chain to make a bracelet.

Unfortunately, if Ivan doesn't have a picture of the bracelet, he might make a bracelet that looks completely different from the one Maja imagined, even if he follows the instructions exactly.

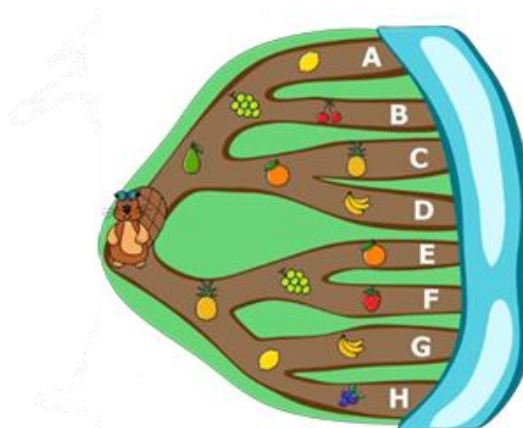
Of the four bracelets shown below, three could be the result of Ivan's work. Which bracelet CANNOT you get by following Maja's instructions?



BLUE

Task 4

Dabrica Ana walks from her house to the river along one of the possible paths and collects all the fruits on her way. At the end of the walk, she sits on the riverbank and eats each of the three fruits she has picked.



She wants to eat a pineapple, but not an orange. How many roads are there that will not satisfy Ana's desires?

BLUE

Task 5

The robotic arm takes packages from three moving belts (A, B and C) to transfer them to the conveyor belt (OUT). The robotic arm works as follows:

- first takes the package from lane A and moves it to lane OUTPUT,
- then takes the package from lane B and moves it to the OUTPUT lane,
- then takes the package from lane C and moves it to the OUTPUT lane, after which it starts again with the first step (taking the package from lane A).



When there are no more packages on a certain lane, the robot arm stops and waits until a new package arrives on that lane that it can pick up, because it cannot move on unless it takes one package from each lane in turn.

Given the situation shown in the figure, and knowing that no new packages will arrive on conveyors A, B, and C, how many packages in total will the robotic arm move before it stops?

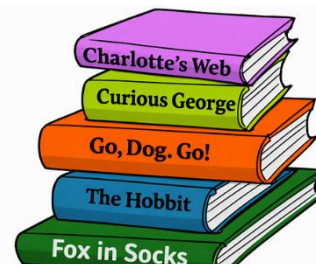
Divide that number by 6 and enter the remainder in the box you came to!

BLUE

Task 6

The library in Dabrograd doesn't have many books. When a beaver wants to borrow a book, the librarian writes down the beaver's name and takes the book from the top of the pile of books. When the beaver returns the book, the librarian writes down the beaver's name and puts the returned book on the top of the pile of books.

At the beginning of the week, the stack of books was arranged as in the picture on the right.



The librarian's lending book shows us the following information.

| | |
|----------|-----------|
| ANA | BORROWING |
| FILIP | BORROWING |
| ANA | RETURN |
| MARTA | BORROWING |
| FILIP | RETURN |
| KATARINA | BORROWING |

Which book did Katarina borrow?

- 3) Charlotte's Web
- 5) Curious George
- 6) Go, dog, go!
- 4) The Hobbit
- 1) the book returned by Marta

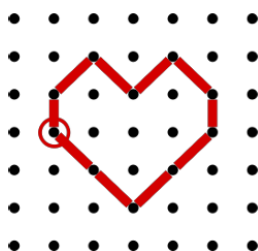
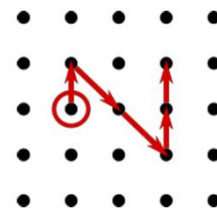
GREEN

Task 1









Emma plays with a robot that connects dots with a line. By pressing the arrow buttons, she sends the robot to the next dot. The robot starts drawing from the circled dot.

This series of arrows  tells the robot to draw the right drawing.

Let's help Emma draw a picture with a heart.



Which of the following command sequences can draw the shown drawing?

- 4)  ; 
- 1)  ; 
- 6)  ; 
- 5)  ; 

GREEN

Task 2

Sometimes it's hard to create a strong and secure password. We want a password that is hard for others to guess, but easy for us to remember. Magdalena's school has the following rules for creating a password:

- A valid password must contain at least one lowercase letter, at least one uppercase letter, at least one symbol, and at least one number.
- Between two valid passwords, the longer password is stronger.

The school recommends that passwords be created based on a song to which symbols and numbers are added. For example, if we use the song "Nije lako Bubamarcu " written in 1978 to create a password, the password could be "NijeLB_1978" or "NLakoB!78".

Magdalena wants to create a password based on the song "Kad Si Sretan." She came up with four different passwords.

- 3) !KSSRETAN1938!!
- 1) K4dS1Sr3T4n!
- 4) xsretan38!
- 2) 1938KADsS!

Which of the four passwords is the strongest, if the school's password rules are followed?

GREEN

Task 3

A beaver takes pictures of butterflies, but after each picture is taken, half of the butterflies fly away. The first picture has 64 butterflies, and the last picture only has two butterflies. How many pictures did the beaver take?

GREEN

Task 4

Beavers have a special way of sending messages. They use a table to convert characters into numbers and then send the numbers to each other.

| A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 |

If a beaver wanted to send "HEY" to his friend, he would send her: "72.69.74".

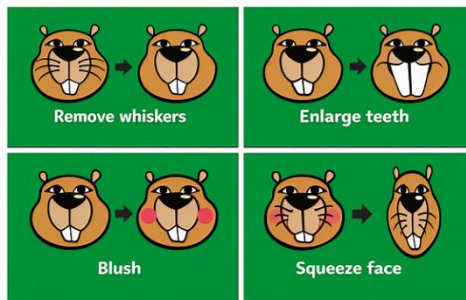
If a beaver sends his friend "72.69.74 78.73.78.65", what is his friend's name?

- 1) NELA
- 2) NEDA
- 3) NINA
- 4) NIKA

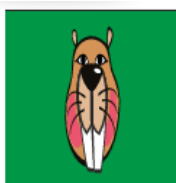
GREEN

Task 5

The photo app has four funny filters. Each filter has its own effect, shown in the image.



Dabrić took a photo of himself. After applying two filters to the photo: "blush" and "squeeze face", the photo looks like this.



What did the photo of Dabrić look like before the filter was applied?



2)



3)



4)



5)

GREEN

Task 6

Vid has two balls: one in drawer A and the other in drawer B. Drawer C is empty. Vid has programmed the robotic arm to perform the following steps in order: a) Pick up the ball from A and put it in C b) Pick up the ball from B and put it in A c) Pick up the ball from C and put it in B

After the robotic arm has performed all the steps, which of the following statements will be true and which will be false?

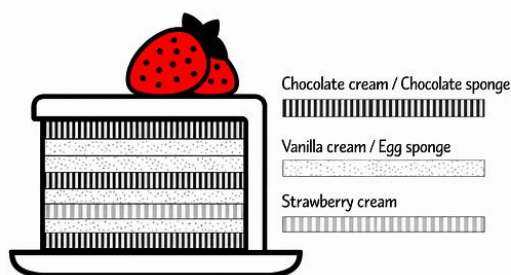
- The balls have switched places.
- There are two balls in drawer A.
- There are two balls in drawer B.
- Tray A is empty.
- Tray C is empty.
- Nothing has changed.

Write the number of true statements in the space you have reached!

RED

Task 1

Darko and Darka want to buy a cake for their birthday. The cake they intend to buy consists of alternating layers of sponge cake and cream, starting with the sponge cake on the bottom layer. Three types of cream are used in birthday cakes: chocolate, vanilla and strawberry, and two types of sponge cake: chocolate and egg sponge. In the picture below you can see an example of a cake with layers according to the above rules.



Darko does not like chocolate cream, so he does not want to buy a cake that contains chocolate cream. Which of the following cakes will Darko buy, 1, 2, 3 or 4?



RED

Task 2

Darko the Beaver visits a self-help or self-diagnosis website because he is not feeling well. He is given a list of questions to answer. Depending on his answer to a particular question, he will receive some advice or be directed to another question. He starts with question 1.





1. Have you had a fever in the last three days?
 - If your answer is YES, move on to question 2.
 - If your answer is NO, go to question 4.
2. Do you feel pain in any part of your body?
 - If your answer is YES, go to tip 3.
 - If your answer is NO, go to question 5.
3. See a doctor immediately!
4. Can you count backwards from 20 to 1?
 - If your answer is YES, go to tip 7.
 - If your answer is NO, go to tip 8.
5. Do you feel dizzy?
 - If your answer is YES, go to tip 6.
 - If your answer is NO, go to question 4.
6. Something is wrong, you should rest immediately!
7. Your concentration is good, but you should still rest.
8. You seem to be losing concentration, ask a friend to sit next to you.

Darko's answers are: YES, NO, NO, NO. What advice did he receive?
Write the remainder when dividing that number by 6.

RED

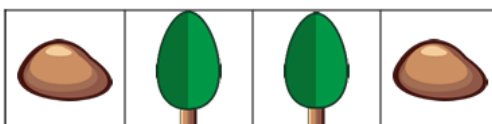
Task 3

The beaver's teacher wants to send the test results in a different way. The teacher sends each beaver a score sheet containing pictures of rocks and trees. Beavers can earn a total of 15 points on the test. The beaver calculates his test score using the table shown as follows.

| Cell 1 | Cell 2 | Cell 3 | Cell 4 | TOTAL SCORE |
|---|---|---|---|-------------|
| 8 points | 4 points | 2 points | 1 point | |
|  |  |  |  | = 9 |

The beaver needs to add up the points from those cells that contain a picture of a tree.

What is the total exam score of the beaver who got the following picture?

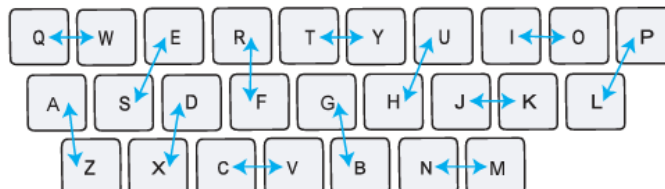


RED

Task 4

RJ:

Jan has a special keyboard for writing secret messages. When he presses a key, a different letter appears on the screen, as shown in the following image.



The arrows show which letter is displayed when a key is pressed. For example, when Jan presses the S key, E appears on the screen, when Jan presses E, the letter S will be displayed.

On Jan's screen, a secret message is written consisting of the letters: "LIEYIPZF".

What message did Jan originally write?

- 3) POSTOTAK
- 4) POSTUPAK
- 5) POSTULAT
- 6) POSTOLAR

RED

Task 5

RJ:

Kevin asked Sarah: Floki is a cat and Koko is a dog, right ?

Maja answers: No, that's not true!

Which of the following statements is true?

- 2) Floki is not a cat and Koko is not a dog.
- 1) Floki is not a cat or Koko is not a dog.
- 4) Floki is not a cat and Koko is a dog.
- 3) Floki is a cat and Koko is not a dog.
- 5) We can't claim anything about Floki or Koko.

RED

Task 6

RJ:

Every house has a house number. Beavers mark their houses with symbols, instead of numbers, according to the following table.

| | | | | | |
|---|---|---|---|---|---|
| | - | = | ≡ | ▷ | ▷ |
| □ | 0 | 1 | 2 | 3 | 4 |
| ◻ | 5 | 6 | 7 | 8 | 9 |

They write a digit by first finding it in the table, and then combining the row symbol and the column symbol to create a new symbol that represents that digit.

The picture of David's house shows the house number using the symbols used by beavers. What digits make up this house number?




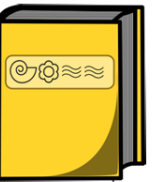
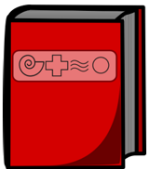


Add up the digits of David's house number, divide that number by 4, and enter the result of the division in the space provided.

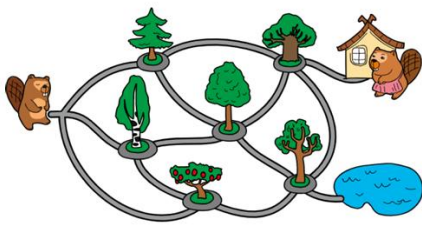




GAME 6_14 (MiliDabar - 3rd and 4th grade of elementary school)²





The following Sudoku table contains the numbers of the problems whose solutions should be entered in the indicated position (in three colors). For example, in the position where it says **2 in blue**, you should enter the solution to the second problem from the blue set of problems.


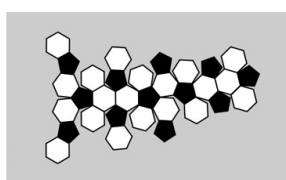
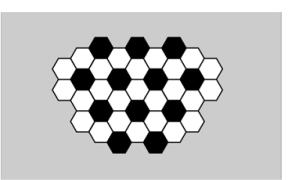
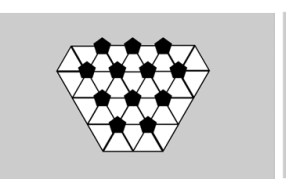
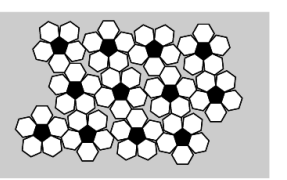
| | | | | | |
|----|----|----|----|----|----|
| 2. | 3. | 1. | 4. | | |
| | | | | | |
| 4. | | | | 2. | |
| | | 1. | | | 3. |
| | 1. | | 2. | | |
| 4. | | | | | 3. |

| BLUE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|--------|---|---|---|---|---|---|---|---|--|----------|---|---|---|---|---|---|---|---|--|--------|---|---|---|---|---|---|---|---|--|----------|---|---|---|---|---|---|---|---|--|
| Task 1 | | | | | | | | | RJ: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Dabro librarian Ana collects precious books written in Dabro language. To store books, the Dabar library has 10 cabinets, and each cabinet has 10 shelves. Dabro librarian Ana assigns each book a unique number that represents their location so that they can quickly find the books. A unique number is assigned to each book based on the symbol in the book's title, according to the table below.</p> <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <tr> <td>Symbol</td> <td>□</td> <td>△</td> <td>☆</td> <td>○</td> <td>⊙</td> <td>◇</td> <td>♥</td> <td>☁</td> <td></td> </tr> <tr> <td>Location</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td></td> </tr> <tr> <td>Symbol</td> <td>+</td> <td>⊗</td> <td>☾</td> <td>∞</td> <td>▲</td> <td>≈</td> <td>💧</td> <td>🌀</td> <td></td> </tr> <tr> <td>Location</td> <td>9</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td></td> </tr> </table> | | | | | | | | | Symbol | □ | △ | ☆ | ○ | ⊙ | ◇ | ♥ | ☁ | | Location | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | Symbol | + | ⊗ | ☾ | ∞ | ▲ | ≈ | 💧 | 🌀 | | Location | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| Symbol | □ | △ | ☆ | ○ | ⊙ | ◇ | ♥ | ☁ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Location | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Symbol | + | ⊗ | ☾ | ∞ | ▲ | ≈ | 💧 | 🌀 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Location | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Which of the following books will have the same special number as the red book?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>6)</p> </div> <div style="text-align: center;">  <p>5)</p> </div> <div style="text-align: center;">  <p>4)</p> </div> <div style="text-align: center;">  <p>3)</p> </div> </div> <div style="text-align: right; margin-top: 20px;">  </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

²The tasks were taken from the task repository for the Dabar competition (<https://ucitelji.hr/dabar/>)

| BLUE | |
|--|--|
| Task 2 | RJ: |
| <p>As shown, Mirko the beaver is going to visit his grandmother. There are several different paths to his grandmother's house.</p> <div style="display: flex; justify-content: space-around; align-items: center;">  </div> <p>Which of the following paths can lead the beaver Mirko to his grandmother's house?</p> | <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="display: flex; align-items: center;"> 5)  </div> <div style="display: flex; align-items: center;"> 1)  </div> <div style="display: flex; align-items: center;"> 3)  </div> <div style="display: flex; align-items: center;"> 6)  </div> </div> |

| BLUE | |
|---|------------|
| Task 3 | RJ: |
| <p>Some fruit (apples and bananas) and some vegetables (broccoli and carrots) were placed on four plates.</p> <div style="display: flex; justify-content: space-around; align-items: center; margin: 10px 0;">     </div> <p>The following steps are then performed, in the order listed:</p> <ol style="list-style-type: none"> 1. One banana is added to each plate. 2. Any plate with fewer than four pieces of fruit or vegetables is removed. 3. Remove all fruit from all four plates. 4. Plates with only carrots on them are removed. <p>How many plates are left after all the steps have been completed?</p> | |







| BLUE | |
|--|---|
| Task 4 | RJ: |
| <p>Beaver Matko wants to make a soccer ball. He has four different patterns available.</p> <p>What pattern will he use to make the ball if he wants it to look like the ball in the picture?</p> |  |
| <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>2)</p> </div> <div style="text-align: center;">  <p>6)</p> </div> <div style="text-align: center;">  <p>1)</p> </div> <div style="text-align: center;">  <p>4)</p> </div> </div> | |

GREEN

Task 1

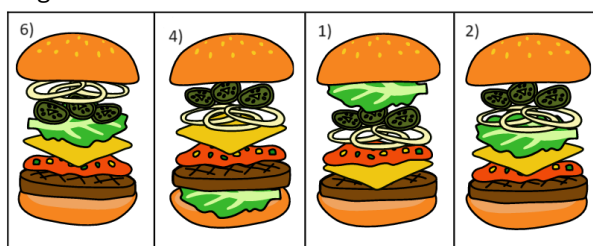
RJ:

Ivanka makes hamburgers according to the rules below. Ingredients for the hamburger:

| Buns | Meat | Sauce | Pickles | Lettuce | Onion | Cheese |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |

1. The sauce should be right above the meat.
2. The meat and cheese should be underneath the pickles, lettuce, and onions.
3. The onion should not be in contact with the pastry.
4. All ingredients must be between the rolls.

Which hamburger is made according to the above rules?







GREEN

Task 2

RJ:

Four friends collect stickers with pictures of things they love. Each of them loves only one thing. Today they received four new stickers and want to divide them among themselves so that each of them gets a sticker for their collection.

| FLOWER | DOG | HAMBURGER | CAR |
|---|---|---|---|
|  |  |  |  |

- Abel doesn't like cars, but he likes snacks.
- Darija doesn't like flowers.
- Roko exchanged his car sticker with Daria.
- Sanja loves animals.

In the field you came to, write the letter number of the sticker that Darija received.

GREEN

Task 3

RJ:

Beaver Darko is planning a birthday party. He has made a list of tasks that need to be done before the party (see picture).

| | | | | | |
|--|--------------------------------|--------------------|--------------------|----------------------------|---------------------------|
| Tasks that need to be completed | Determine the number of guests | Buy cupcakes | Set the party date | Calculate the party budget | Choose the party location |
| Tasks that need to be completed before this task | Set the party date | Set the party date | None | Calculate the party budget | Choose the party location |

Darko noticed that some tasks needed to be completed before he could move on to the next tasks. For example, before deciding how many guests to invite, the date of the party should be decided. In what order does Darko have to complete the tasks?

- 3) → → → →
- 4) → → → →
- 1) → → → →
- 2) → → → →

GREEN

Task 4

RJ:

The robot bee knows these commands: forward (move one space forward), backward (move one space back), right (turn right), left (turn left).

What commands will lead the robot bee to the field with the yellow hive?

| | | | |
|--|--|--|--|
| | | | |
| | | | |
| | | | |
| | | | |

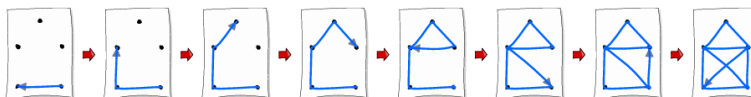
- 6)
- 4)
- 2)
- 3)

RED

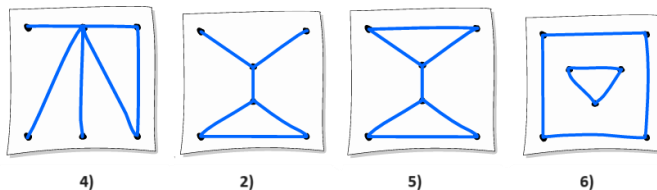
Task 1

RJ:

You want to draw a picture without lifting your pencil from the paper. You create the picture by drawing lines from one point to another. You cannot go over the same line twice. For example, you can draw a picture of a house without lifting your pencil from the paper by following these steps.



Which picture can you draw without lifting your pencil from the paper?



RED





Task 2

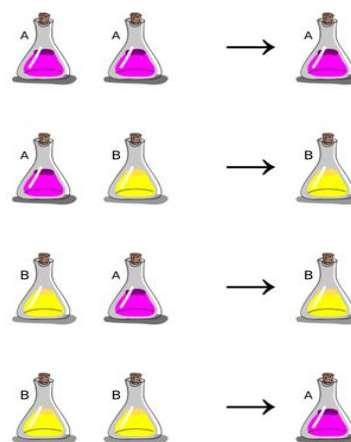
RJ:

The wizard has two types of potions, A and B. If he pours two bottles into the cauldron, one after the other, and says the magic words, the potion changes color as shown in the picture on the right.

The wizard mixed exactly 4 bottles of his potion. The resulting mixture became type B (yellow).

In what order did he pour the bottles?

- 3) 
- 5) 
- 4) 
- 1) 



RED

Task 3

RJ:

Milan and Maja filled out a questionnaire with 4 questions.













Milan's answers are as follows.

Question 1. Answer A.

Question 2. Answer B.

Question 3. Answer C.

Question 4. Answer A.

| | A | B | C |
|--------------------------|---|---|---|
| 1 st question |  |  |  |
| 2 nd question |  |  |  |
| 3 rd question |  |  |  |
| 4 th question |  |  |  |

Following the rules in the picture on the right, Milan received a card



representing his answers.

Maja's answers are as follows.

Question 1. Answer B.

Question 2. Answer B.

Question 3. Answer A.

Question 4. Answer B.

Which card represents Maya's answers?



1)

6)

5)

2)

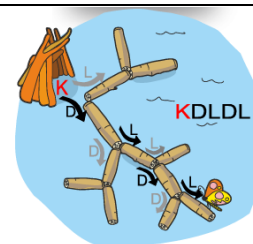
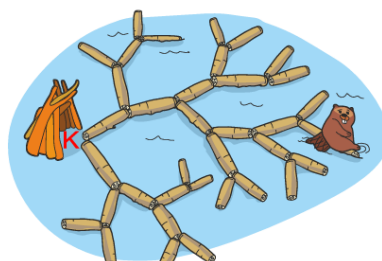
RED

Task 4

RJ:

The beavers, using logs, built an incredible structure, starting with their hut K. The path to each log can be described using two directions: L (for left) and D (for right). For example, the path to the butterfly is KDLDL.

What is the route from Cabin K to the relaxing beaver?




In the field you came to, write how many times you have to turn right.

GAME 6_15 (KiloDabar - 5th and 6th grade of elementary school)³

The following Sudoku table contains the numbers of the problems whose solutions should be entered in the indicated position (in three colors). For example, in the position where it says **2 in blue**, you should enter the solution to the second problem from the blue set of problems.

| | | | | | |
|----|----|----|----|----|----|
| | | 3. | 4. | | 4. |
| | 1. | | | | 1. |
| 1. | | | | | 3. |
| | | 2. | 3. | | |
| | | 2. | | | |
| | 2. | | | 4. | |





| BLUE | |
|--|--|
| TASK 1 | |
| <p>A little bit of fruit (apple and banana), and a little bit of vegetables (broccoli and carrot) are placed on four plates:</p> <div style="text-align: center;">  </div> <p>The following steps are taken, as indicated:</p> <ol style="list-style-type: none"> 1. On each plate one banana is added. 2. Every plate which has less than four pieces (fruit, vegetables or mixed) is removed. 3. From remaining plates, all fruits are removed. 4. Every plate containing only carrots is removed. <p>How many plates are left after all steps are taken? Write the number only.</p> | |

³The tasks were taken from the task repository for the Dabar competition (<https://ucitelji.hr/dabar/>)

BLUE

TASK 2

Katarina wants a red, electric car. The car must travel at least 150 kilometers without needing to recharge the battery.

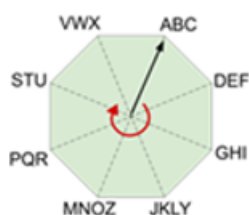
| | |
|---|---|
| <p style="text-align: center;">Herbie</p>  <p>Color: red Range: 120 km Fuel: electricity</p> | <p style="text-align: center;">Comet</p>  <p>Color: black Range: 250 km Fuel: electricity</p> |
| <p style="text-align: center;">AG12</p>  <p>Color: red Range: 200 km Fuel: electricity</p> | <p style="text-align: center;">IT car</p>  <p>Color: red Range: 350 km Fuel: gasoline</p> |

Which car will Katarina choose?

- 1) Herb
- 3) Comet
- 5) AG12
- 6) IT car

BLUE

TASK 3



The vertices of the octagon are marked with three or four letters. At the beginning of the encryption of **a new message**, the arrow always points to the letters ABC. The arrow rotates only clockwise as shown in the figure. We encrypt the message using the arrow and the octagon.

We encrypt each letter of the message so that:

- **The first number** indicates how many vertices of the octagon the arrow should be rotated from its current location.
- **Second number** indicates the position of the coded letter in the group of letters pointed to by the arrow
- Encrypted letters are **separated by** the sign "-".

For example, the message "TRI" is encrypted with the sequence 62-73-53.

How do we encrypt the message "VODA"?

- 1) 72-53-41-31
- 2) 62-53-62-51
- 3) 71-43-26-22
- 4) 71-53-51-71

BLUE**TASK 4**

Tina started making a drawing with one circle and one square.



After that, she made a heart shape out of these characters.



Tina only used these actions with characters:

Rotation: rotate the character in any direction and by any angle

Scrolling: scroll anywhere, characters can overlap

Duplication: making a copy of a character in the same place

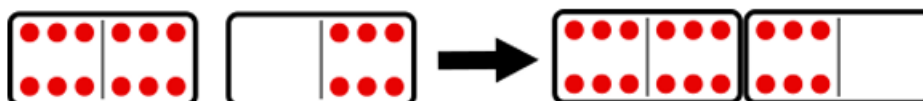
What actions did Tina use to make the heart?

- 3) Duplicating a circle. Rotating a square. Moving a circle. Moving a circle.
- 1) Duplicating a square. Rotating a square. Moving a square. Moving a square.
- 2) Duplicating a circle. Rotating a circle. Moving a circle. Moving a square.
- 4) Moving a circle. Moving a circle. Duplicating a circle. Moving a square.

GREEN

TASK 1

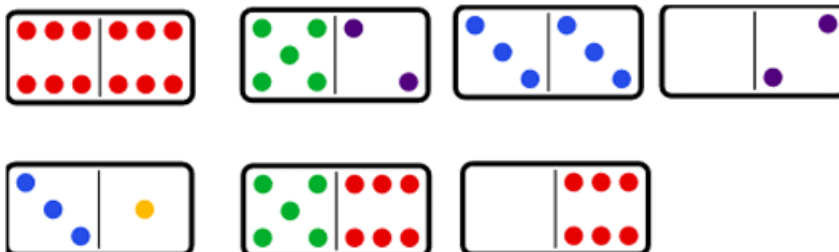
Dominoes consist of two halves, each half can have 0,1,2,3,4,5 or 6 dots. In a game of dominoes, it is possible to make a row of tiles by placing them next to each other, as long as the edges that touch have the same number of dots. The player is allowed to rotate the domino tile (as in the example in the picture).



In the above example, the string can be increased to 3 dominoes as follows:

- Adding a new domino with six dots to the left of the first in the row
- Adding a new domino tile without dots to the right of the last one in the row.

You are given seven dominoes. What is the longest sequence of dominoes that can be achieved?



Just enter **the number** of tiles in the row!

GREEN

TASK 2



The picture shows a beaver's bag of coins. There are only 4 types of coins in Beaver's Land. The pictures below show each coin from both sides.



The beaver's bag got mixed up with 3 other bags during the walk.

What is Beaver's bag?



5)



2)



1)

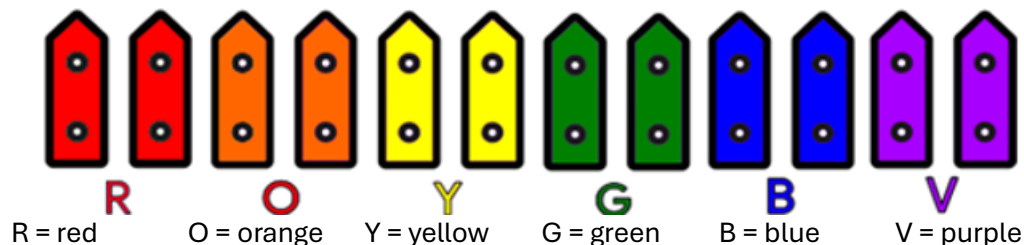


3)

GREEN

TASK 3

Ivan wants to paint his 12-slat fence. He wants to paint the fence red, orange, yellow, green, blue, purple, with each color assigned to two slats.



There are three buckets full of red, yellow and blue paint and three empty buckets for mixing.

Empty bins are marked with three lines. Each line represents one quarter of the bin.



With one full bucket, he can paint four fence posts. To get orange, green, and purple, he can mix the paint by following these rules:

- red + yellow = orange
- yellow + blue = green
- red + blue = purple



How many fence slats can Ivan paint according to his wishes?

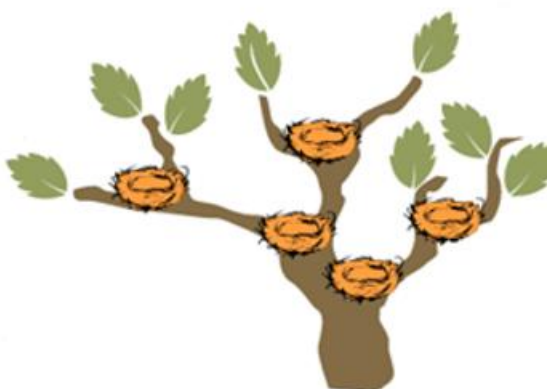
- 3) can paint 8 slats
- 4) can paint 10 slats
- 6) can paint 12 slats
- 5) can paint 6 slats

GREEN

TASK 4

Spotted cuckoos do not build nests. Instead, they move into empty nests. When a spotted cuckoo finds a tree with empty nests, it moves to the nest in the following way: it starts at the bottom of the tree and repeats the following steps until it finds the right nest.

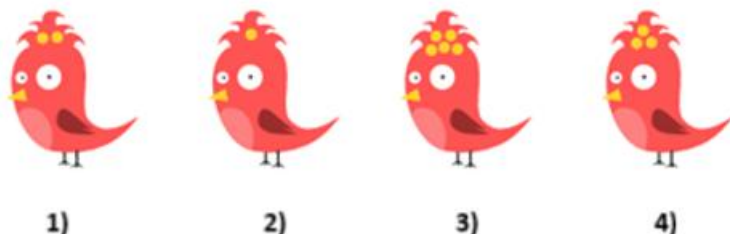
1. It climbs until it comes across a nest.
2. If the nest is empty, it is moved to the nest. Done.
3. If the nest is occupied, the bird looks at the cuckoo in the nest:
 - If the other bird has **more dots**, the bird continues **to the left**.
 - If the other bird has **the same number of dots or fewer**, the bird continues to the right.



Given a tree with five empty nests. Five are cuckoo birds. The birds move into the empty nests in order from left to right; the bird with four dots goes first.



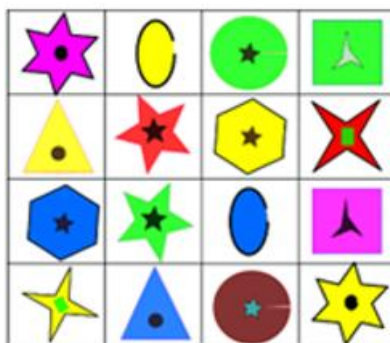
Which bird will reach the highest nest?



RED


TASK 1


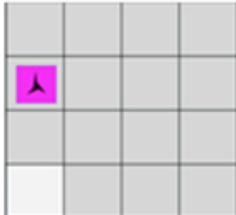

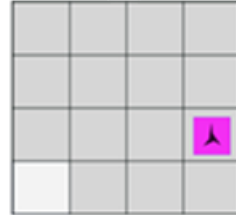
Rinka was playing with a board game made of shapes. The board was divided into squares. At first, she placed the shapes in each square, as in the picture.



Then she swapped pairs of shapes, so that two shapes swapped positions. She made four swaps, in this order:



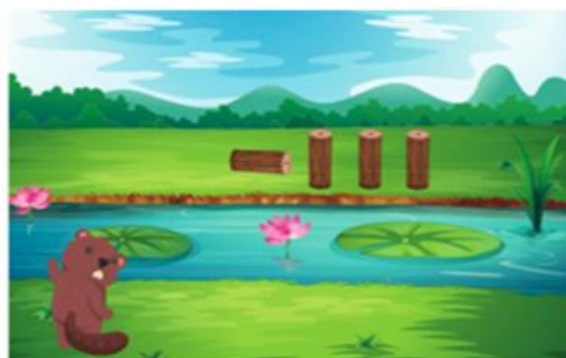
What will be the position of this shape  after the last substitution?

| | | | |
|---|---|---|---|
| 3) | 4) | 5) | 6) |
|  |  |  |  |

RED

TASK 2




Beaver Wise lives on the south bank of the Wooden River and sometimes visits his friends on the north bank. However, the north bank is quite dangerous due to dangerous enemies! To reduce this danger, the beavers must meet in different places each time, depending on which day is the safest to meet. In total, they have 16 different safe places where they can meet.



To let Beaver Wise know which of the 16 places he should go to on a given day, one of his friends on the north shore leaves a message next to the river with the number of the place (Place 0, Place 1, Place 2, ... or Place 15), using a very special code that they have cleverly devised.

They use four logs that are placed vertically or horizontally, in a specific order. Each log has a different value. Starting from the far right, the first log is worth 1, the second log is worth 2, the third log is worth 4, and the fourth (far left) is worth 8. When a log is standing upright, the amount it represents should be added to the total. When a log is placed horizontally, the amount it represents should be ignored. The image above shows Beaver Wise looking at the code. The safe place that day is Place 7, because the far-left log is laid down, and the other three are upright ($0+4+2+1=7$).

If the safe spot is 11, what day code should the beaver set?

- 1) 
- 6) 
- 3) 

RED

TASK 3

Ela is heading home, but first she has to make an appointment with the dentist. Ela will first go to the dentist, and then go home. Due to safety regulations, she can only move in 2 ways: go straight or turn right.

If Ela can reach the goal according to the given criteria, enter the number of right turns. If she still cannot, enter zero.

Enter only the turn number.



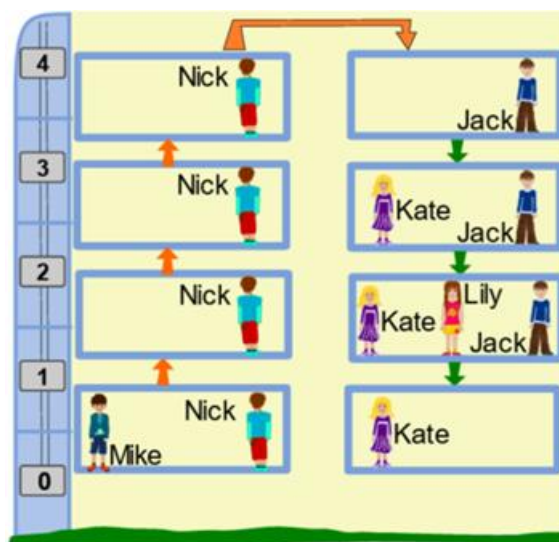
RED

TASK 4

There is an elevator at school. On a recent trip, the elevator started from the ground floor (floor 0) and went up to the top floor (floor 4) and then went back down to the ground floor (floor 0). It made several stops along the way. Look who was in the elevator between floors.

Which of these statements is correct?

- 1) Jack went from the 4th floor to the ground floor (floor 0).
- 4) Mike is the only one who only went up one floor in the elevator.
- 5) Two people got out of the elevator on the 1st floor.
- 6) Jack and Kate went up 3 floors in the elevator.



GAME 6_16 (MegaDabar - 7th and 8th graders)⁴

The following Sudoku table contains the numbers of the problems whose solutions should be entered in the indicated position (in three colors). For example, in the position where it says 2 in blue, you should enter the solution to the second problem from the blue set of problems.

| | | | | | |
|----|----|----|----|----|----|
| | 2. | | | 1. | |
| 3. | | | | | 4. |
| | | 4. | 3. | | |
| | 4. | | | | 2. |
| | | 1. | | | |
| 3. | | 2. | | 1. | |

⁴The tasks were taken from the task repository for the Dabar competition (<https://ucitelji.hr/dabar/>)

BLUE

TASK 1



Zvonko is employed at Dabar's metal parts factory, on the assembly line for screws and nuts. The following is a description of Zvonko's job:







- The belt stands at one end of a movable shaft containing a series of nuts and bolts.
- Takes a nut or bolt, off the conveyor belt.
- If he has taken a nut, he places it in the bucket next to him.
- If he took a bolt, he takes a nut from the bucket, connects the bolt and nut, and after connecting them, puts them in a large box.

However, there are two possible situations in which work may be interrupted:

1. If Zvonko takes a screw from the conveyor belt, and there is no nut in the bin to connect it to.
2. If there are no more bolts or nuts on the conveyor belt, but there are still buckets next to it.

Which set of nuts  and bolts  , if taken from left to right, **WILL NOT** cause a malfunction?

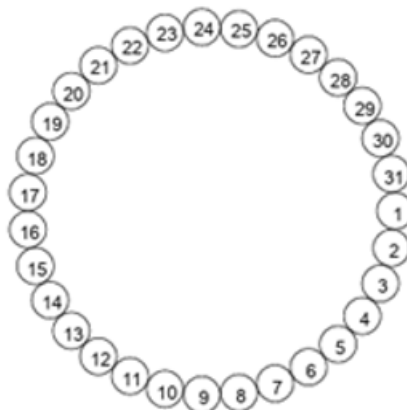
- 2) 
- 3) 
- 4) 
- 5) 

BLUE

TASK 2

The picture shows the arrangement of chairs in the hall. Students play the game Find the Chair. They must follow the following rules in the game:

- Students always enter the hall one at a time.
- They occupy the very chair that is marked with a number that represents the date (day) of their birth.
- If their chair happens to be already taken, they continue walking in a circle (clockwise) until they reach the first free chair and sit on it.



For example, suppose that students Marta and Iva are twins who were born on April 20, student Antun was born on January 21, and student Stjepan was born on September 22. If they enter the hall in the following order: Marta, Iva, Stjepan, Antun, then Marta will sit on chair number 20, Iva on chair number 21, Stjepan on chair number 22, and Antun on chair number 23.

But if Iva, Antun, Stjepan, Marta come according to the schedule, then Iva will sit on chair number 20, Antun on chair number 21, Stjepan on chair number 22, and Marta on chair number 23.

Six students entered the hall and took their places in the manner indicated on the table.

| Student's name | Date of birth | Seat occupied |
|----------------|----------------|-----------------|
| Andrija | May 11th | Chair number 13 |
| Mihael | February 12th | Chair number 12 |
| Patrik | September 14th | Chair number 14 |
| Roko | August 11th | Chair number 11 |
| Lukre | April 13th | Chair number 15 |
| Matea | July 12th | Chair number 16 |

Which of the following statements **cannot** be true?





- 3) Patrik is the first student to take the chair.
- 1) Matea is the last student to take the chair.
- 5) Lukre took the chair before Andrew.
- 6) Mihael took the chair before Roko.

BLUE

TASK 3

A factory in Dabrograd produces robots that can perform household chores. The robot consists of three parts: a head, a body, and legs. The individual parts of the robot can have different shapes (designs). There are 4 different shapes (designs) for the body, and three different shapes (designs) for the head and legs, as shown in the table below. The machine builds robots, selecting the parts (head, body, legs) according to the rules:

| | | | | |
|------|---|--|---|----------------|
| HEAD |  blue |  green |  orange | (repeat again) |
|------|---|--|---|----------------|

| | | | | | |
|------|--|---|---|--|----------------|
| BODY |  lap |  square |  triangle |  pentagon | (repeat again) |
|------|--|---|---|--|----------------|

| | | | | |
|------|---|--|--|----------------|
| LEGS |  two legs |  four legs |  one leg | (repeat again) |
|------|---|--|--|----------------|

Every day the machine starts making robots in the same way according to the table: the first robot has a blue head, a round body and two legs.

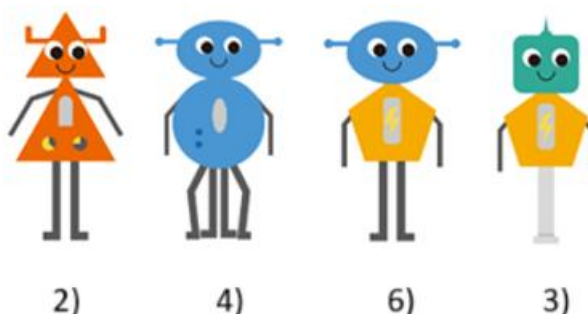
Last night there was a power outage at the factory, which caused a machine malfunction. After assembling the first robot as usual, a malfunction occurred. Instead of selecting the next shape (design) according to the table, the machine does the following:

- For the robot's head and legs – skips one section forward in the rules table
- For the robot body – skips two sections forward in the rules table

Therefore, the second robot looks like this (picture on the right):



The factory workers realized that the machine was broken and turned it off, but only after the tenth robot had been built. What did that tenth robot look like?



BLUE

TASK 4

Professor Nikolina organized a video conference for seven students.

| Student | Jakov | Marina | Hrvoje | Monika | Jure | Sara | Ema |
|-----------------------|-------|--------|--------|--------|-------|-------|-------|
| Date of birth (DD/MM) | 12/24 | 05/01 | 08/02 | 16/04 | 09/09 | 02/12 | 30/01 |

They will be placed in the library at the table shown in the picture below.



Before starting, she set the rules for the seating arrangement:

- 1. Birthday rule:** each student must sit on a chair with a specific number. The chair number will be calculated by adding the date and month of their birth and dividing the resulting number by 7. The remainder of the division is the number of the chair they should sit on.

For example, Jakov sits on chair number 1 because after dividing the sum of the date and month of his birth $21+12$ by 7, he got 1 as the remainder.
- 2. Collision rule:** If the chair a student is supposed to sit on is already occupied, they should sit on the next available chair.

For example, if chair number 2 is occupied, then you should sit on chair number 3. And if chairs numbers 2 and 3 are occupied, then you should sit on chair number 4. Also, if chair number 6 is occupied, then you should sit on chair number 0.

Students enter in the following order: Marina, Hrvoje, Ema, Jure, Jakov, Monika, Sara.

Which chair will Sara sit on? Choose the correct answer!

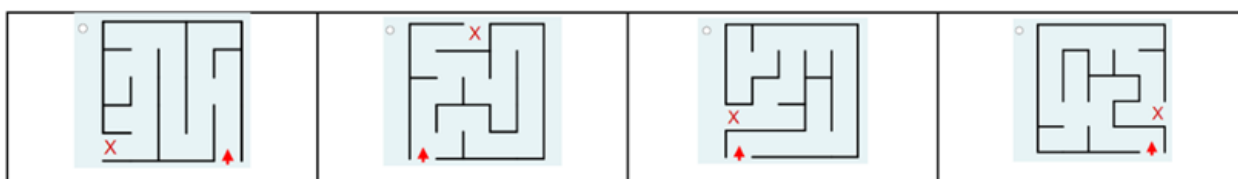
- 5) chair 4
- 4) chair 5
- 6) chair 0
- 1) chair 2

GREEN

TASK 1

Mario loves exploring garden mazes. However, Mario always wonders if he has gone through the entire maze. One day, he discovers the “right-hand rule.” This rule means that as you walk through a maze, you always touch the right side of the wall with your right hand, no matter what happens. The right-hand rule guarantees that once you enter a maze, you can always find your way out. However, the right-hand rule does not guarantee that you will visit every path in the maze; it only guarantees that you will find your way out of the maze. The picture below shows four mazes. The arrow shows where Mario enters the maze, and **the X** shows the exit.

Choose a maze where Mario will walk every path within the maze when following the right-hand rule.



2)

1)

5)

6)

GREEN

TASK 2

Beaver's GPT is a chat bot that was recently developed to create three-word sentences by predicting the next word based on the previous string of words. The words are selected one at a time, with each subsequent word being selected based on its probability. The table shows some of these probabilities.

| <i>Probability for the second word</i> | | | <i>Probability for the third word</i> | |
|--|---------|---------|---------------------------------------|-----------|
| | "likes" | "hates" | "swimming" | "running" |
| "Cat" | 0.7 | 0.3 | 0.2 | 0.8 |
| "Beaver" | 0.6 | 0.4 | 0.9 | 0.1 |
| | | | 0.7 | 0.3 |
| | | | 0.1 | 0.9 |

For example, if a sentence begins with the word “Cat,” the probability that the three-word sentence is “Cat likes running” is 0.56 because:

- The probability that the second word is "likes" is 0.7 and
- the probability that the next word will be "running" is 0.8.
- So, since the model predicts **words one at a time, the probability is $0.7 \times 0.8 = 0.56$.**

If the sentence begins with the word "Beaver", what is the most likely result of Beaver's GPT?

- 5) "Beaver hates swimming"
- 3) "Beaver hates running"
- 1) "Beaver loves to swim"
- 4) "Beaver loves to run"

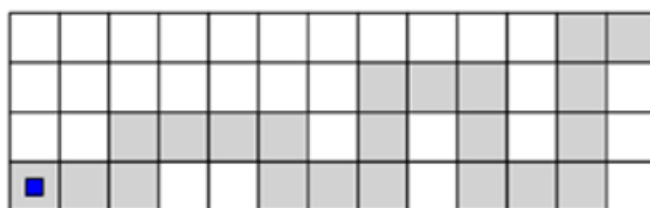
GREEN

TASK 3

Alen wants to program a robot that will move along a path in the park. The path is shown in grey squares in the picture. The robot starts from the left edge of the path, from the square marked in blue in the picture.

The robot can execute the following commands:

- G move up one place
- U Move one place to the right.
- D move down one place



What sequence of commands will bring the robot to the right edge of the park while crossing the fewest possible white squares?

- 4) GUUUD
- 1) UUUGU
- 5) UUGUU
- 3) UGUUU

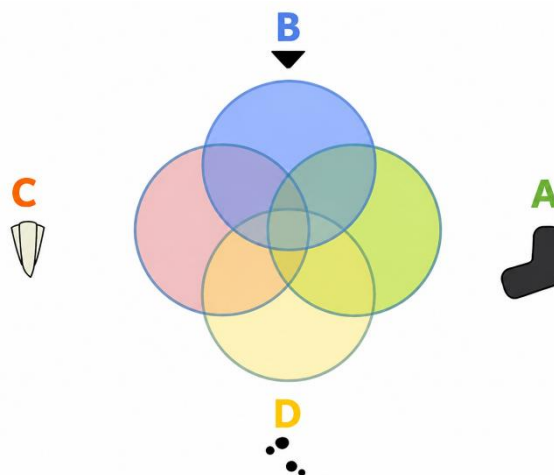
GREEN

TASK 3





Beaver Venn wants to show all beavers with their common characteristics, so he writes down the characteristics of each beaver. He presents the result of his work in the following graphic representation (diagram). He places each beaver in the appropriate place in the diagram according to the characteristics it possesses.

Beavers in the village have one or more of the following characteristics:

- A: long tail
- B: big nose
- C: sharp teeth
- D: black spots



Unfortunately, Beaver Venn made a mistake, and all the beavers cannot be placed in his diagram. Which of the beavers shown below cannot be placed in the Venn diagram?

| | | | |
|---|---|--|---|
| 6) | 5) | 4) | 3) |
|  |  |  |  |

RED

TASK 1

Four beavers Ada, Berta, Cezar and Dan took a scale and decided to play with it a little. A new game in which Ada, Berta, Cezar and Dan compare weights reveals a lot. While measuring, they took several photos that help us conclude who is heavier and who is lighter. Three such photos are shown (right).

Look at these photos and conclude which of the following photos could have also been taken by beavers?

3) A photograph showing that Ada and Cezar are the same weight.



5) A photograph showing that Berta and Dan are the same weight.



1) A photograph showing that Cezar is lighter than Ada.



2) A photograph showing that Berta is heavier than Dan.



RED

TASK 2

Beavers from Gornje Selo send messages down the river to Donje Selo by writing single-digit numbers on wooden plates and letting them float downstream. Sometimes the river current and rapids turn the wooden plate over and ruin the numerical writing, but the order of the sent wooden plates is not disturbed.

If the writing on one of the wooden tablets becomes damaged, the recipient can correctly decipher the message with the help of a pad sent at the end of the message, the so-called "check digit".

This check digit is calculated by multiplying every other value on the wooden pad, starting with the first one, by 3. The results obtained and the digits in the remaining (even) places are then added together. Finally, the last digit of the result obtained is the "check digit".

Example:



| | | | | |
|-------|----|--------|----|-------|
| 1. | 2. | 3. | 4. | TOTAL |
| (8*3) | +4 | +(2*3) | +5 | =39 |

To get the check digit (9) for the message in the image, it is necessary to calculate $(8 \cdot 3) + 4 + (2 \cdot 3) + 5 = 39$.

According to the given rule, we multiply the first digit (8) and the third digit (2) by the number 3 and add them to the second digit (4) and the fourth digit (5). The result obtained is the number 39, from which we read the check digit, which is the number 9.

In the message that arrived in Donje Selo, the third digit is not readable. What digit is it?



RED

TASK 3

Ben and Tom exchange messages consisting of 12 digits 0 and 1. Since Bonnie understands their messages, and Ben and Tom want to keep the messages secret, they decide to encrypt them. In the first step of encryption, they replace a pair of consecutive digits with the character A, B, C, or D:

| | | | |
|----|----|----|----|
| 00 | 01 | 10 | 11 |
| A | B | C | D |

In the second step, they replace a pair of consecutive characters using the following system:

| | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| AA | AB | AC | AD | BA | BB | BC | BD | CA | CS | CC | CD | DA | DS | DC | DD |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |

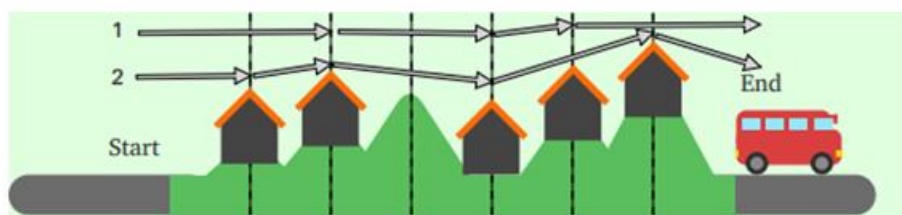
In this way, they created the final message. If the final message that Ben and Tom encoded is C13, what was their initial message represented by the 12 digits 0 and 1?

- 5) 110000010011
- 2) 101010101111
- 1) 101010111011
- 6) 101011001001

RED

TASK 4

Tea likes to spend her holidays taking long walks in nature. She takes the opportunity to spend the night in a new place every night. The picture shows the path that Tea plans to take for her next holiday. In one day, she plans to cover only one or two sections marked with vertical dashed lines and spend the night at the marked places. The picture shows the beginning and end of the path and all the places where Tea can spend the night. There are several ways to get from the beginning to the end of the path, and two ways (routes) are shown in the picture.



Route 1 will have three overnight stays in different locations (overnight stops).
 Route 2 will have four overnight stays in different locations (overnight stops).

How many different routes (including the two shown) could Tea choose to hike on her vacation? Circle the correct number!

- 7 5 4 6

GAME 6_17 (2nd grade of elementary school)

The following Sudoku table contains the numbers of the problems whose solutions should be entered in the indicated position (in three colors). For example, in the position where it says 2 in blue, you should enter the solution to the second problem from the blue set of problems.

| | | | | | |
|--|----|----|----|----|----|
| | 3. | | 2. | | |
| | | 8. | 1. | | 1. |
| | | | 6. | | |
| | 4. | | 7. | | 2. |
| | 5. | 7. | | 5. | 8. |
| | | 6. | | 4. | 3. |

BLUE - TASKS

1. ANA IMAGINED A NUMBER, ADDED 2 TO IT AND ADDED 1 TO THE NUMBER SHE OBTAINED. THE RESULT SHE OBTAINED WAS THE NUMBER 6. DETERMINE WHICH NUMBER ANA IMAGINED.
2. SANJA IMAGINED A NUMBER. SHE SUBTRACTED 1 FROM IT AND ADDED HER FAVORITE NUMBER TO IT: 4. SHE GOT THE NUMBER 8. WHAT NUMBER DID SANJA IMAGINE?
3. ADD 2 TO THE NUMBER OF SEASONS.
4. HOW MANY TIMES DO YOU HAVE TO TURN TO THE RIGHT TO GET BACK TO THE SAME POSITION?
5. HOW MANY CANDY DID MARTA HAVE LEFT IF SHE HAD 6 CANDY AND HER SISTER ATE 3?
6. WHAT IS THE SMALLEST NUMBER YOU CAN ENTER IN A SUDOKU TABLE?
7. HOW MANY DAYS OF THE WEEK ARE THERE THAT DO NOT HAVE THE LETTER T IN THEIR NAME?

GREEN - TASKS

1. ANA IMAGINED A NUMBER, ADDED 1 TO IT AND ADDED 3 TO THE NUMBER SHE OBTAINED. THE RESULT SHE OBTAINED WAS THE NUMBER 10. DETERMINE WHICH NUMBER ANA IMAGINED.
2. SANJA IMAGINED A NUMBER. SHE ADDED HER FAVORITE NUMBER TO IT: 3 AND SUBTRACTED 1 FROM THE NUMBER SHE OBTAINED. SHE OBTAINED THE NUMBER 6. WHAT NUMBER DID SANJA IMAGINE?
3. HOW MANY DAYS OF THE WEEK HAVE THE LETTER O IN THEIR NAME?
4. WHAT IS THE LOWEST GRADE SOMEONE CAN GET IN SCHOOL?
5. WRITE IN THE NUMBER OF BALLOONS MARKU HAS LEFT IF HE HAD 4 BALLOONS AND 3 WERE PUNCTURED.
6. HOW MANY LETTERS DOES THE COLDEST SEASON HAVE?
7. ENTER A NUMBER THAT YOU HAVE NOT YET ENTERED BUT IS NOT 2.

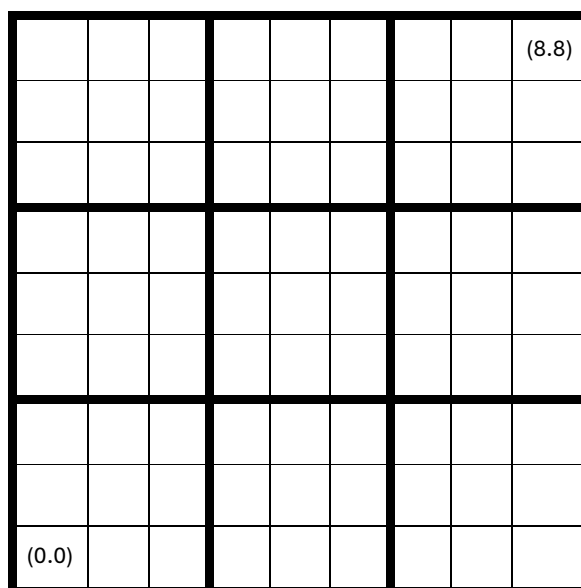
GAME 9_1 (9X9 SUDOKU) – vectors in the coordinate system

| | | | | | | | | |
|-------|--|--|--|--|--|--|--|-------|
| | | | | | | | | (8.8) |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| (0.0) | | | | | | | | |

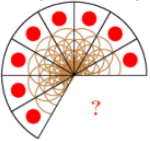
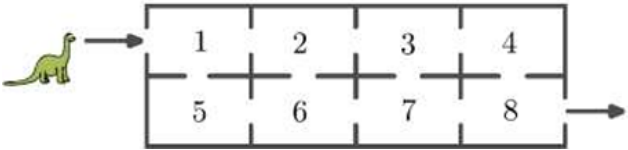
| TEAM 1 | TEAM 2 |
|--|--|
| 1. In the field marked with the point (6,1), enter the ordinate of that point. | 1. The abscissa of the point is the smallest odd natural number, and the ordinate is equal to the abscissa. Enter the value 7 in the field marked with that point. |
| 2. In the field marked with the point (3,2), enter a number that is twice the ordinate of that point. | 2. The abscissa of the point is the smallest natural number divisible by 3, and the ordinate is 2 times the abscissa. In the field marked with that point, write the sum of the ordinate and abscissa. |
| 3. Given points A(2,5), B(4,7) and C(3,4), find point D such that vectors \overrightarrow{AB} and \overrightarrow{CD} are equal. Write the number 2 in the box marked with point D. | 3. Given the points A(5,5), B(4,1) and C(4,5). Determine the point D such that the vectors \overrightarrow{AB} and \overrightarrow{CD} are equal. Write the number 6 in the box marked with point D. |
| 4. Given points A(3,2), B(1,0) and C(3,5), find the point D such that the vectors \overrightarrow{AB} and \overrightarrow{DC} are equal. In the field marked with point D, enter the number 6. | 4. Given points A(3,5), B(1,7) and C(4,5). Determine point D such that vectors \overrightarrow{AB} and \overrightarrow{CD} are equal. Write the number 4 in the box marked with point D. |
| 5. Given the points A(1,6), B(1,8), C(2,6). Determine the point D such that the vector \overrightarrow{AD} is equal to the vector $\overrightarrow{AB} + \overrightarrow{AC}$. Write the number 2 in the field marked with that point. | 5. Given points A(1,5), B(1,8), C(4,3). Determine point D so that the vector \overrightarrow{AD} is equal to the vector $\overrightarrow{AB} + \overrightarrow{AC}$. Write the number 1 in the field marked with that point. |
| 6. Given the points A(0,5), B(3,4), C(1,2). Determine the point D so that the vector \overrightarrow{AD} is equal to the vector $\overrightarrow{AB} + \overrightarrow{AC}$. Write the number 2 in the box marked with that point. | 6. Given points A(3,1), B(4,4) and C(0,5), find point D such that \overrightarrow{AB} and \overrightarrow{DC} are opposite vectors. Write the number 3 in the box marked with point D. |
| 7. Given points A(4,4), B(3,8) and C(0,4), find point D such that \overrightarrow{AB} and \overrightarrow{CD} are opposite vectors. Write the number 2 in the box marked with point D. | 7. Given points A(6,4), B(2,4) and C(6,5), determine point D so that \overrightarrow{AB} it is a vector with the same direction and orientation as vector \overrightarrow{CD} , but twice as long as vector \overrightarrow{CD} . Write the number 3 in the box marked with point D. |
| 8. Given points A(7,6), B(5,6) and C(1,8), determine point D so that \overrightarrow{CD} it is a vector of the same direction, orientation and length as vector \overrightarrow{BA} . Write the number 5 in the field marked with point D. | 8. Given points A(3,1), B(3,3) and C(0,1), determine point D so that \overrightarrow{DC} it is a vector with the same direction and orientation as \overrightarrow{BA} , but twice as long as \overrightarrow{BA} . Write the number 6 in the box marked with point D. |

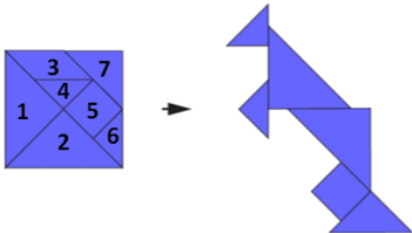
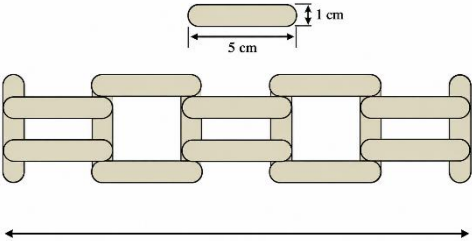
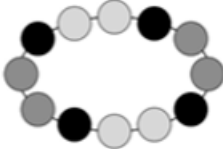





| TEAM 3 | TEAM 4 | TEAM 5 |
|--|---|--|
| 1. In the field marked with the point (1,5), enter the abscissa of that point. | 1. The abscissa and ordinate of a point are equal numbers that add up to 10. In the field marked with that point, write the number that is the abscissa of that point. | 1. The abscissa of the point is a number that is 5 times greater than the smallest odd natural number, and the ordinate is 0. Write the smallest odd natural number in the field marked by that point. |
| 2. In the field marked (8,7), write the difference between the abscissa and the ordinate. | 2. In the field marked (6,0), write the smallest natural number divisible by 5. | 2. The abscissa of the point is the number of days in the week, and the ordinate is 1 less than the abscissa. Enter the number 5 in the field marked with that point. |
| 3. Given points A(1,7), B(5,6) and C(4,5), find point D so that vectors \overrightarrow{AB} and \overrightarrow{CD} are equal. Write the number 6 in the box marked with point D. | 3. Given points A(0,6), B(4,5) and C(0,3), find point D so that vectors \overrightarrow{AB} and \overrightarrow{CD} are equal. Write the number 5 in the box marked with point D. | 3. Given the points A(8,1), B(2,1) and C(2,6), find the point D such that the vectors \overrightarrow{AB} and \overrightarrow{DC} are equal. Write the number 4 in the box marked with point D. |
| 4. Given points A(8,8), B(4,4) and C(2,3), find point D such that vectors \overrightarrow{AD} and \overrightarrow{BC} are equal. Write the number 2 in the box marked with point D. | 4. Given points A(1,2), B(6,7) and C(5,4), find point D such that vectors \overrightarrow{AD} and \overrightarrow{CB} are equal. Write the number 9 in the box marked with point D. | 4. Given points A(4,2), B(3,8) and C(7,4). Determine point D such that vectors \overrightarrow{AC} and \overrightarrow{DB} are equal. Write 7 in the box marked point D. |
| 5. Given the points A(2,8), B(6,8), C(2,5). Determine the point D so that the vector \overrightarrow{AD} is equal to the vector $\overrightarrow{AB} + \overrightarrow{AC}$. Write the number 4 in the box marked with that point. | 5. Given points A(7,2), B(5,1), C(4,4). Determine point D so that the vector \overrightarrow{AD} is equal to the vector $\overrightarrow{AB} + \overrightarrow{AC}$. Write the number 7 in the box marked with that point. | 5. Given points A(3,4), B(4,1), C(6,3). Determine point D so that the vector \overrightarrow{AD} is equal to the vector $\overrightarrow{AB} + \overrightarrow{AC}$. Write the number 4 in the box marked with that point. |
| 6. Given points A(2,3), B(8,5) and C(4,6), find point D such that \overrightarrow{AD} and \overrightarrow{BC} are opposite vectors. Write the number 7 in the box marked with point D. | 6. Given points A(2,5), B(7,7) and C(3,1), find point D such that \overrightarrow{AC} and \overrightarrow{DB} are opposite vectors. Write the number 5 in the box marked with point D. | 6. Given points A(3,5), B(1,3) and C(2,4), find point D such that \overrightarrow{BA} and \overrightarrow{CD} are opposite vectors. Write the number 8 in the box marked with point D. |
| 7. Given points A(3,7), B(3,5) and C(0,2), determine point D such that \overrightarrow{DC} is a vector with the same direction as \overrightarrow{BA} , opposite orientation to \overrightarrow{BA} and twice as short as \overrightarrow{BA} . Write the number 2 in the field marked with point D. | 7. Given points A(2,3), B(2,1) and C(0,6), determine point D such that \overrightarrow{AB} is a vector with the same direction as \overrightarrow{CD} , opposite orientation to \overrightarrow{CD} and twice as long as \overrightarrow{CD} . Write the number 9 in the field marked with point D. | 7. Given points A(1,5), B(1,3) and C(7,4). Determine point D such that \overrightarrow{DC} is a vector with the same direction and orientation as \overrightarrow{AB} , but twice as long as the vector \overrightarrow{AB} . In the field marked with point D, write 7. |

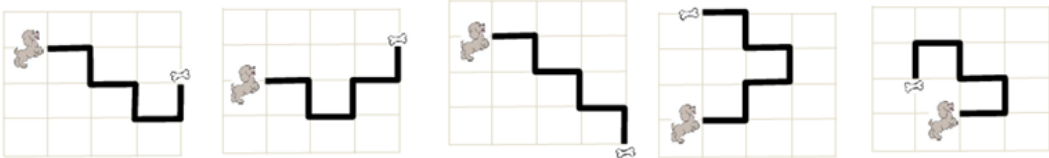


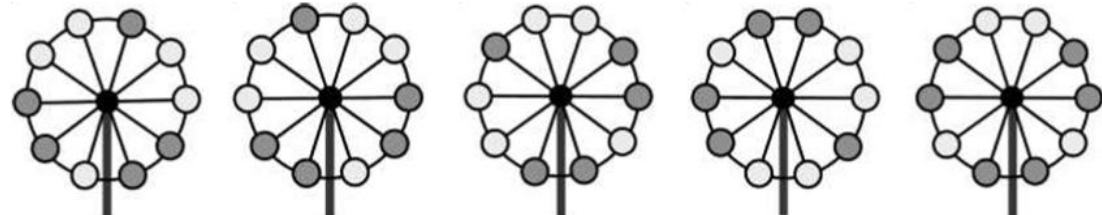
GAME 9_2 (9X9 SUDOKU) – kangaroo 3r⁵

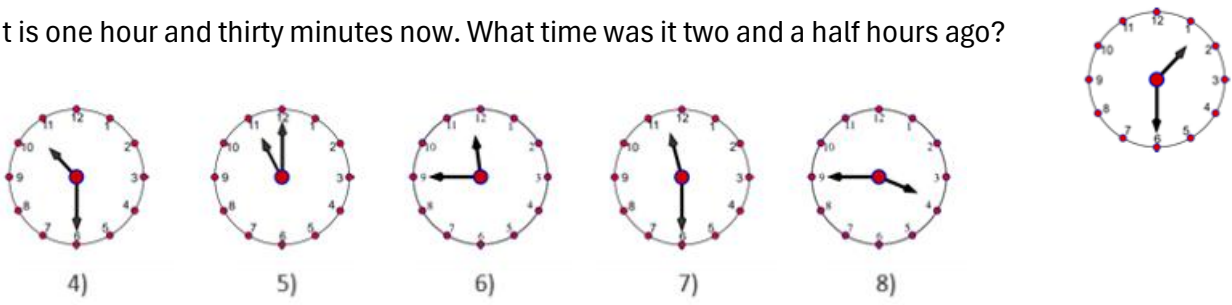
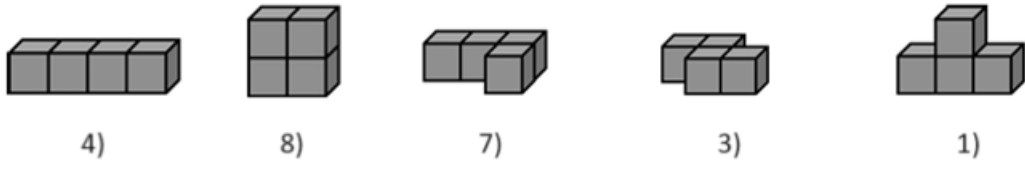
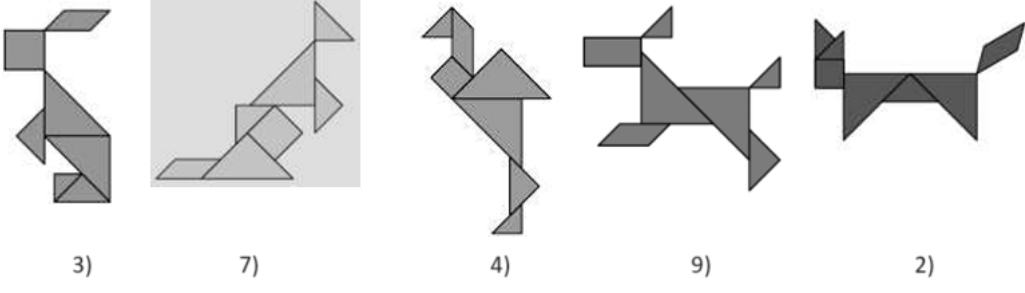


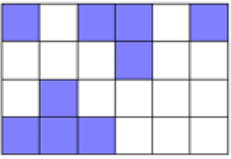


INITIAL CONDITIONS

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| (2,8) | <p>The pizza is cut into equal pieces. How many pieces are missing?</p>  |
| (4,8) | <p>Dino goes through the rooms from the entrance to the exit. He can only go through each room once. As he goes through the rooms, he collects the numbers in the rooms and adds them up. What is the largest sum Dino can get?</p>  <p>Add up the digits of the correct answer!</p> |
| (0,7) | <p>Filip and Neven are standing in line for theater tickets. Filip knows that there are 7 people in front of him, and Neven has counted that there are 11 people in the entire line, including him. If Filip is the first in front of Neven, how many people are behind Neven?</p> |

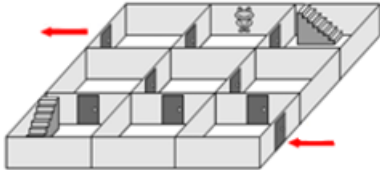
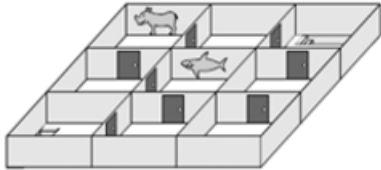





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| <p>(8,7)</p> | <p>We rearranged the numbered parts into the shape of a kangaroo. What number is the missing part?</p>  |
| <p>(1,6)</p> | <p>Students have several identical rods 5 cm long and 1 cm wide. With these rods they built the fence shown. What is the length of the fence?</p> <p>5) 20 cm 9) 21 cm 4) 22 cm 6) 23 cm 7) 25 cm</p>  |
| <p>(3,6)</p> | <p>Which of the lower parts of the necklace is the part of the necklace in the picture on the right?</p>  <p>2)  9)  8)  4)  3) </p> |
| <p>(5,6)</p> | <p>There are either two-humped or one-humped camels in the zoo. There are 10 of them in total, and the total number of their humps is 14. How many two-humped camels are there in the zoo?</p> |
| <p>(7,6)</p> | <p>Teo, Boris, Ana, Davor, Edo and Fabijan roll a die. They all get different numbers. Teo's number on the die is twice as big as Boris's number and three times as big as Ana's. Davor's number is four times as big as Edo's. Which number did Fabijan get by rolling the dice?</p> |


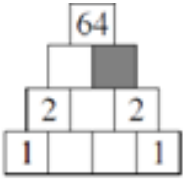
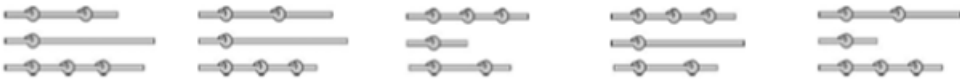
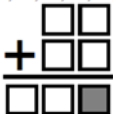
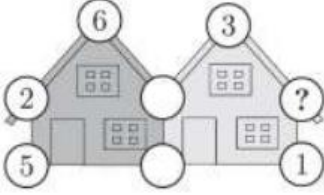
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| (2,5) | Two horses traveled 9 km. How many kilometers did each horse travel? |
| (6,5) | Marko has 9 chocolate bars and Tomislav has 17. How many chocolate bars must Tomislav give Marko so that both boys have the same number of chocolate bars? |
| (5,4) | <p>A dog walks towards food following a path. Every time it comes to a crossroads it turns either left or right. Which path did the dog follow if it turned right 3 times and left 2 times?</p>  <p>4) 3) 1) 5) 6)</p> |
| (1,3) | <p>A black pepper with two holes is placed on a wall clock, as shown in the picture.</p>  <p>Which of the following images can be obtained by rotating black paper?</p>  <p>Write the difference of the numbers in the circles of the correct answer.</p> |
| (3,3) | <p>Which wheel is different from the others?</p>  <p>1) 3) 7) 5) 6)</p> |


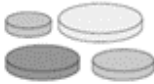
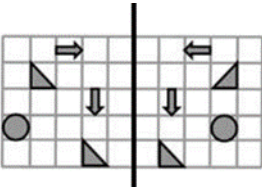
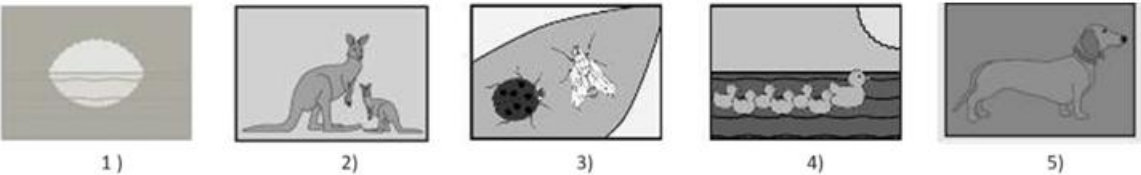

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| <p>(5,3)</p> | <p>It is one hour and thirty minutes now. What time was it two and a half hours ago?</p>  |
| <p>(7,3)</p> | <p>Each of the solids in the pictures below was made by gluing together four identical cubes, and then these solids were colored. Which of these bodies had the smallest area to color?</p>  |
| <p>(4,2)</p> | <p>In one of the pictures below there is a geometric figure that is not in the other pictures. In which picture is this geometric figure found?</p>  |
| <p>(7,2)</p> | <p>A figure was cut into three parts. After cutting, the shapes obtained were as shown in the picture on the right. Which of the figures below was cut in this way?</p>   |
| <p>(2,1)</p> | <p>How many more squares do we need to color so that the number of colored and uncolored squares is equal?</p>  |


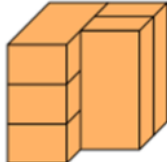
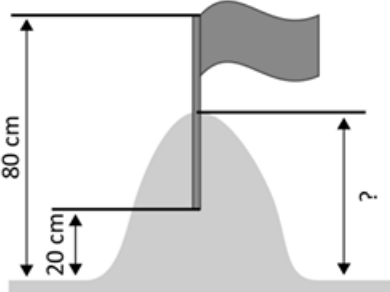






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| (3,1) | <p>The age difference between Adam and his older sister Lucia is 7 years. However, Adam is 8 years younger than their sister Monica. Which of the following sequences shows the order of the ages of the three children, starting with the oldest child?</p> <p>1) Adam, Lucia, Monica 7) Monica, Lucia, Adam 4) Monica, Adam, Lucia 5) Adam, Monica, Lucia 3) Lucia, Monica, Adam</p> |
| (5,1) | <p>Jan stores eggs in boxes of 6 and boxes of 12 eggs. What is the smallest number of boxes needed to store 66 eggs?</p> |
| (8,1) | <p>The question marks on the chips hide the same numbers. What are these numbers if the sum of the numbers on all the chips is 51?</p> $\textcircled{20} + \textcircled{10} + \textcircled{10} + \textcircled{?} + \textcircled{?} + \textcircled{1} = 51$ |
| (1,0) | <p>Three frogs live in a small pond. Every evening, one frog sings a song to the other two. After 9 evenings, one frog has sung a total of two songs, and the other frog has listened to a total of 5 songs. How many songs has the third frog listened to after those 9 evenings?</p> |
| (4,0) | <p>Grandma Barbara made 11 delicious cookies for her grandchildren. First she decorated 5 cookies with raisins, then 7 cookies with hazelnuts. How many cookies did she decorate with both hazelnuts and raisins?</p> |




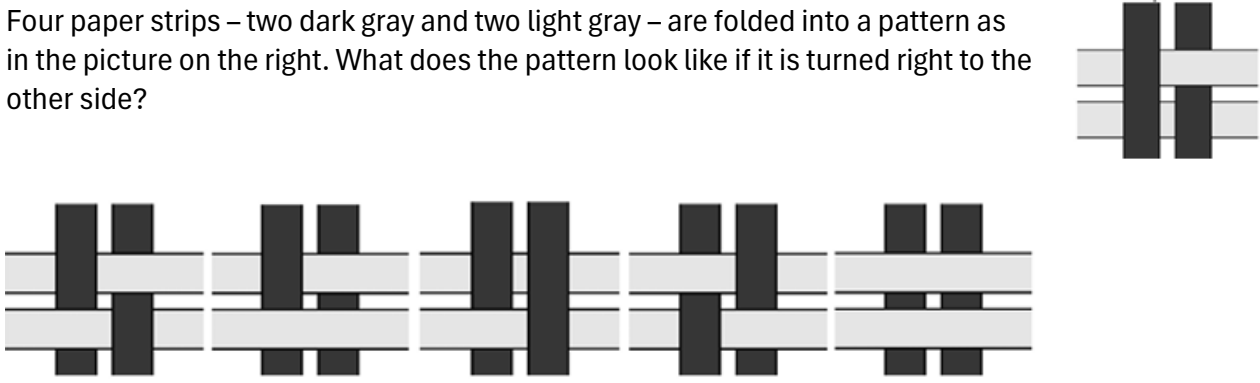
THE REST OF THE SUDOKU TABLE

| | | | | | | | |
|-------|--|---|---|---|---|---|---|
| (0,8) | <p>Six peasants were going to the city. On the way, they met two peasants. How many peasants were going to the city in total?</p> | | | | | | |
| (1,8) | <p>Three football teams participate in the tournament. Each team plays one game with the rest. In each game, the winner gets 3 points, and the loser gets 0 points. In case of a tie, both teams get 1 point. What is the smallest number of points that a team cannot achieve at the end of the tournament?</p> | | | | | | |
| (3,8) | <p>The question marks on the chips hide the same numbers. What are those numbers if the sum of the numbers on all the chips is 18?</p> $\textcircled{10} + \textcircled{?} + \textcircled{?} + \textcircled{2} = 18$ | | | | | | |
| (5,8) | <p>Borna is going through a maze that has two floors, with the entrance and exit on the first floor. In what order will she encounter the wall stickers?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>1</p> </div> <div style="text-align: center;">  <p>2</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>1)</p> </div> <div style="text-align: center;">  <p>2)</p> </div> <div style="text-align: center;">  <p>3)</p> </div> <div style="text-align: center;">  <p>4)</p> </div> <div style="text-align: center;">  <p>5)</p> </div> </div> | | | | | | |
| (6,8) | <p>Out of the 7 cards in the picture, Ljiljana chose three with numbers that sum to 13. What is the largest possible number that Ljiljana can have on the card?</p> <div style="display: flex; justify-content: center; gap: 10px; margin-top: 10px;"> <div style="border: 1px solid black; border-radius: 10px; padding: 5px 15px;">1</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px 15px;">3</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px 15px;">5</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px 15px;">7</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px 15px;">9</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px 15px;">11</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px 15px;">13</div> </div> | | | | | | |
| (7,8) | <p>Stanko wants to write the numbers 1, 2, 3, 4, 5 and 6 in all the squares of the rectangle in the picture on the right, each number in one square. He wants the sum of the numbers in the squares with circles to be equal to the sum of the numbers in the squares with triangles and to be 10. What number will he write in the square with the question mark?</p> <div style="text-align: center; margin-top: 10px;"> <table border="1" style="border-collapse: collapse; width: 60px; height: 60px;"> <tr> <td style="text-align: center; vertical-align: middle;">●</td> <td style="text-align: center; vertical-align: middle;">▲</td> <td style="text-align: center; vertical-align: middle;">▲</td> </tr> <tr> <td style="text-align: center; vertical-align: middle;">●</td> <td style="text-align: center; vertical-align: middle;">●</td> <td style="text-align: center; vertical-align: middle;">?</td> </tr> </table> </div> | ● | ▲ | ▲ | ● | ● | ? |
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| (8,8) | <p>The price of a sandwich and juice together is HRK 28, and a sandwich and two juices HRK 36. What is the price of one juice?</p> |
| (1,7) | <p>How many triangles are there in the picture on the right?</p>  <p>1) 18 triangles 3) 10 triangles 5) 9 triangles 7) 11 triangles 9) 12 triangles</p> |
| (2,7) | <p>Monica writes the numbers in the "pyramid" so that each number is from the square of the top row. The product of the two numbers is immediately located below in the squares of the bottom row. What number should be written in the gray square?</p>  |
| (3,7) | <p>Karlo cut the rope into three equal parts and then made one or more equal knots on each part. Each time he made a knot, the rope got a little shorter. Which picture correctly shows all three parts with knots?</p>  <p>4) 1) 6) 8) 9)</p> |
| (4,7) | <p>In each square, you need to write one of the digits: 0, 1, 2, 3, 4, 5 and 6 so that the calculation is correct. Which digit will be in the gray square?</p>  |
| (5,7) | <p>The sum of the 5 numbers in the circles on each house is 20. Some of the circles are painted white so the numbers are not visible. What number is in the circle marked with a question mark?</p>  |

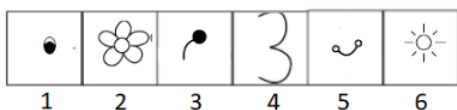
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| <p>(6,7)</p> | <p>Marina has an equal number of white, pink and red chips. She has put some of the chips in a pile, as shown in the picture. She has 5 chips left outside the pile.</p> <p>How many red chips does Marina have?</p> |  |
| <p>(7,7)</p> | <p>Amadea has 4 circular tiles of different sizes. He wants to build towers made up of three tiles so that each top tile is smaller than the tile below it. How many different towers can Amadea build?</p> |  |
| <p>(0,6)</p> | <p>Several figures are drawn on a sheet of paper. Mak folded the paper along the highlighted line. How many figures on the left will completely overlap the figures on the right?</p> |  |
| <p>(2,6)</p> | <p>During the summer holidays, Ivana sent five postcards to her friends. There are no ducks on Marta's postcard. There is a sun on Katarina's postcard. There are exactly two living things on Petra's postcard. There is a dog on Lara's postcard. There are kangaroos on Helena's postcard. Which postcard did Marta receive?</p> |  |
| <p>(4,6)</p> | <p>How many circles are there in the picture of the girl?</p> |  |
| <p>(6,6)</p> | <p>For little Vera's birthday, her mother ordered two large pizzas, each cut into 8 pieces. There were 14 children at the birthday party, including Vera. How many pieces of pizza will the mother have left if she gives 1 piece to each child?</p> | |

| | |
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| (8,6) | <p>Bunny Vanya really likes cabbage and carrots. He eats either 9 carrots or 2 cabbages or 1 cabbage and 4 carrots every day. Last week he ate 30 carrots. How much cabbage did he eat that week?</p> |
| (0,5) | <p>In a family, each of the four sisters has one brother. How many brothers and sisters are there in total in that family?</p> |
| (1,5) | <p>Five numbered cards, as shown in the figure below, are placed on a table. Only two cards can be swapped in each step. What is the smallest number of steps required to arrange the cards so that the numbers are in order from lowest to highest?</p> <div style="text-align: center;">  </div> |
| (3,5) | <p>There are 5 identical bricks in the picture. How many of them touch exactly 3 bricks?</p> <div style="text-align: right;">  </div> |
| (4,5) | <p>Din and Don built a sandcastle and decorated it with a flag. They placed the flag on the highest part of the castle so that half of the stick is in the sand, as shown in the picture. The highest point of the stick is 80 centimeters, and the bottom (lowest) part of the stick is 20 centimeters above the ground. How tall is the castle?</p> <div style="text-align: right;">  </div> <p>5) 40cm 1) 45 cm 8) 50cm 6) 55 cm 2) 60 cm</p> |
| (5,5) | <p>We place two transparent squares with lines drawn on them, as in the pictures on the right, one above the other. Which of the pictures can we see?</p> <div style="text-align: right;">  </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;">  8) </div> <div style="text-align: center;">  5) </div> <div style="text-align: center;">  3) </div> <div style="text-align: center;">  1) </div> <div style="text-align: center;">  7) </div> </div> |

| | |
|-------|---|
| (7,5) | <p>There are 6 candles burning. Four have gone out. How many candles are left?</p> |
| (8,5) | <p>Lea has 4 puzzle pieces, but she can only fit 3 into the frame. Which puzzle piece will remain outside the frame?</p>  <p>1) blue 2) pink 3) green 4) black</p> |
| (0,4) | <p>How many dots does a ladybug have that must fly away for the sum of dots on the other ladybugs to be 20?</p>  |
| (1,4) | <p>How many circles are there in the picture?</p>  |
| (2,4) | <p>Five children have their birthdays on the same day. They are 4, 5, 6, 7 and 8 years old. Lea is two years older than Josip, but one year younger than Ana. Vito is the youngest. How old is Sara?</p> |
| (3,4) | <p>Four paper strips – two dark gray and two light gray – are folded into a pattern as in the picture on the right. What does the pattern look like if it is turned right to the other side?</p>  <p>7) 9) 2) 6) 3)</p> |

(4,4)

Mara wants to complete the bee on the left according to the model on the right. She needs to collect points to win individual parts of the picture. For example, she needs 2 points to win the flower. How many points does Mara need to collect to successfully complete the bee on the left?



If the answer has multiple digits, add up the digits!

(6,4)

Tommy's ship has decorations in the shape of a circle, a square, and a triangle. His ship has more than one circle and two triangles more than squares. Which ship is Tommy's?



1)



2)



3)



4)



5)

(7,4)

Lovro filled the table with numbers with the intention that the sums of the three numbers in all rows and columns would be the same. But he made one mistake. Which number should be corrected?

| | | |
|---|---|---|
| 9 | 1 | 5 |
| 3 | 7 | 6 |
| 4 | 7 | 4 |

(8,4)

The picture shows a "building" made of 5 identical cubes in three different colors, shown from the front. What does this building look like when viewed from above?



7)



2)



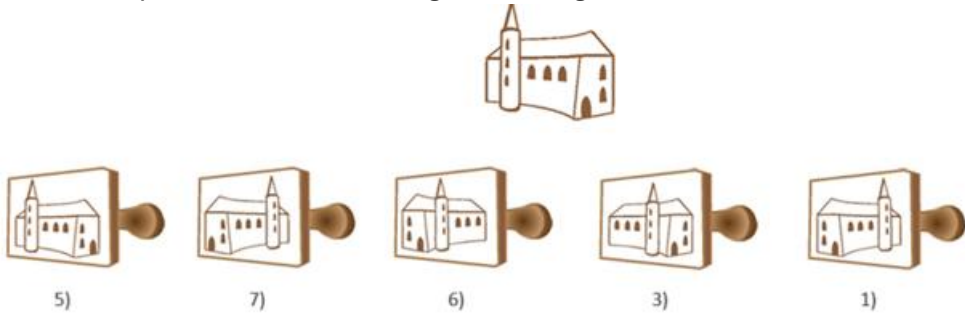
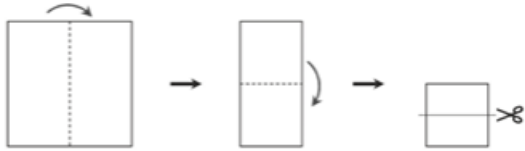
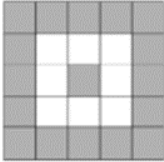
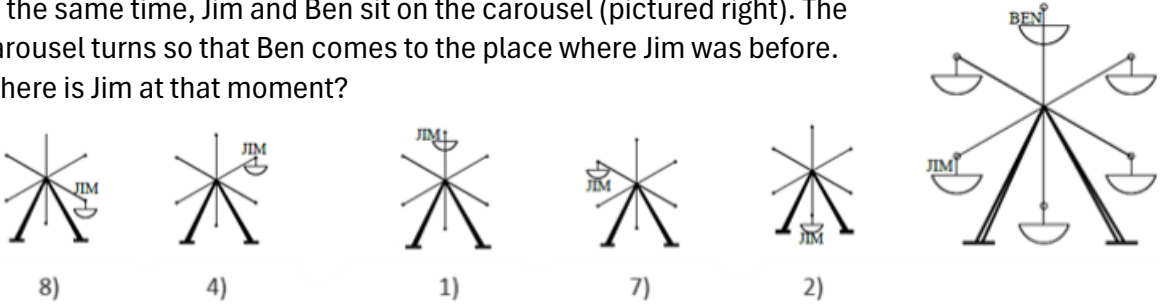
1)

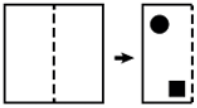


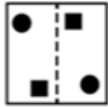



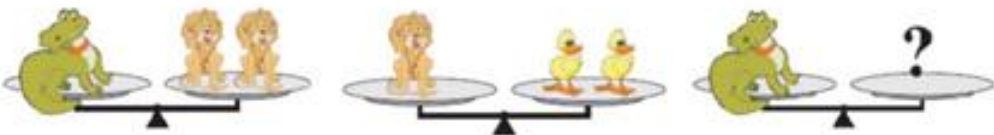

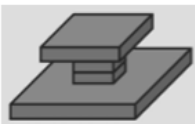


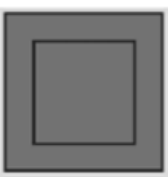

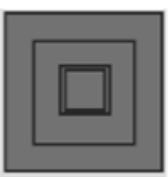


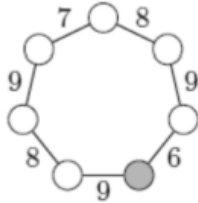






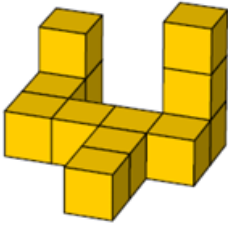
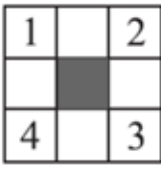
4)

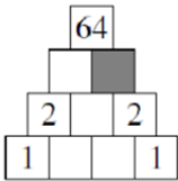


5)

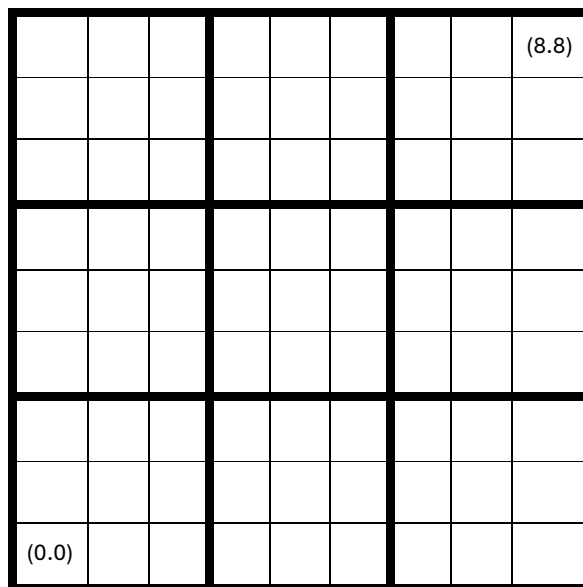
| | |
|--------------|--|
| <p>(0,3)</p> | <p>What stamp do we need to use to get this image?</p>  |
| <p>(2,3)</p> | <p>Which place are you if you overtake another runner in a race?</p> |
| <p>(4,3)</p> | <p>Patricia folded the paper twice and then cut it as shown in the picture. How many pieces of paper did she get by cutting it?</p>  |
| <p>(6,3)</p> | <p>In the solo dance competition, Ema finished in third place. There were three competitors between her and the last competitor. How many competitors were there in total in the solo dance competition?</p> |
| <p>(8,3)</p> | <p>How many more gray squares are there in a large square than white squares?</p>  |
| <p>(0,2)</p> | <p>At the same time, Jim and Ben sit on the carousel (pictured right). The carousel turns so that Ben comes to the place where Jim was before. Where is Jim at that moment?</p>  |

| | |
|--------------|--|
| <p>(1,2)</p> | <p>Sanja folded a piece of paper in half, then punched a square and a circular hole in the folded paper (as shown in the picture on the right). What will the paper look like when it is unfolded again?</p>  <p>1)  2)  3)  4)  5) </p> |
| <p>(2,2)</p> | <p>How many times does the right hand appear in the entire picture?</p>  |
| <p>(3,2)</p> | <p>How many ducks will be in balance with the crocodile?</p>  |
| <p>(5,2)</p> | <p>Vanya chose some of the characters from the picture and announced: "Among the characters I chose, 2 are large, 2 are colored, and 2 are curved in shape."</p>  <p>What is the smallest possible number of characters that Vanja chose that meets all the conditions she outlined?</p> |
| <p>(6,2)</p> | <p>Ivo built a building like the one in the picture on the right. What will Ivo see if he looks at the building from above?</p>  <p>7)  9)  1)  8)  4) </p> |



| | |
|-------|--|
| (8,2) | How many odd numbers are there between 9 and 22? |
| (0,1) | <p>Mihaela wants to write the numbers 1, 2, 3, 4, 5, 6 and 7 in the circles, one number in each circle, but in such a way that the sum of the numbers in the adjacent circles is equal to the number on the line connecting the two circles. What number should be written in the shaded circle?</p>  |
| (1,1) | <p>Nine squares were arranged in a row as in the picture on the right. First, Ana replaced each black square with a new white square. A little later, Boris replaced each gray square with a new black square. Finally, Kristijan replaced each white square with a new gray square. What row of squares did they end up with?</p>  <p>Options:</p>      |
| (4.1) | <p>Toma used 12 identical cubes to assemble the "building" in the picture. He connected each two cubes that share a common side with one drop of glue. How many drops of glue did he use?</p>  <p>If the answer is multi-digit, add up the digits!</p> |
| (6,1) | Four people can sit at a square table. For a school party, the students put three of these tables together to form a long rectangular table. How many people can sit at such a long table, provided that no more than one person sits on each side of each square table? |
| (7,1) | <p>Nikola wrote each of the numbers 1 to 9 in a 3 x 3 square. Only 4 of these numbers can be seen in the picture. Nikola noticed that the sum of the number 5 and the number from the square with which it shares the vertex is 13. He noticed the same thing for the number 6. What number did Nikola write in the gray square?</p>  |

| | |
|-------|--|
| (0,0) | <p>Pelican Peli caught at least two frogs. Pelican Kan caught no more than 4 frogs. Pelican Lik caught more frogs than Peli, but fewer than Kan. How many frogs did all three pelicans catch?</p> |
| (2,0) | <p>Eva and Alice visited sick Irena in the hospital. Eva brought 12 candies and Alice brought 9. They shared all the candies with Irena so that each of the girls received the same number of candies. How many candies did each of them receive?</p> |
| (3,0) | <p>There are 8 cars in the queue to board the ferry. There are two or three people in each car. A total of 19 people are waiting to board the ferry. In how many cars are there exactly two people?</p> |
| (5,0) | <p>Monica writes numbers in a "pyramid" so that each number in the square on the top row is the product of the two numbers directly below it in the squares on the bottom row. What number should be written in the gray square?</p>  |
| (6,0) | <p>Thirteen children were playing hide and seek. In one of the hiding places, Marko, who was squinting at the time, found nine of his friends. How many children remained hidden?</p> |
| (7,0) | <p>Three squirrels, Ani, Ali and Eli, collected 7 hazelnuts. Each of them collected a different number of hazelnuts, and each collected at least 1. Ani collected the least, Ali the most of all. How many hazelnuts did Eli collect?</p> |
| (8,0) | <p>In each square, write (only once) one of the numbers 1, 3, 4, 5 and 7 so that the equation is correct. Which number is not used?</p> $\square + \square = \square + \square$ |

GAME 9_3 (9X9 SUDOKU) – Kangaroo 4th and 5th grade⁶









INITIAL CONDITIONS

| | | |
|--------------|---|---|
| <p>(7,0)</p> | <p>Ida first built a tower of 8 disks as shown in the picture on the right. Then she gradually built a new, smaller tower by removing disks from the large tower. She pulled a second disk from the bottom of the large tower, then a third disk from the bottom of the newly formed tower. From the resulting tower, she pulled a fourth disk from the bottom, then a fifth disk from the bottom of the newly formed tower. What did Ida's tower look like in the end?</p> |  |
| <p>(8,0)</p> | <p>Black and white pieces of paper are stuck to the inside of the classroom window, as shown in the picture on the right. Each piece of paper is black on one side and white on the other. What can Marko see from the outside, on the outside of the window?</p> |  |
| <p>(3,1)</p> | <p>Every day, Penguin Pero fishes until he catches 9 fish for lunch for his two chicks. He gives 5 fish to the first chick he sees that day, and 4 to the second. In the last few days, one of his chicks has eaten 26 fish. How many fish has the other chick eaten in that time?</p> | <p>9) 19 2) 22 6) 25 7) 28 3) 31</p> |






⁶The tasks were taken from the task repository for the Kangaroo Without Borders competition (<https://www.aksf.org/>)

(2,2)

There are 5 different pieces of fruit in the bowl:  .
 The picture below shows which fruit each of the 5 friends likes. Each of them got one fruit they like from a bowl.


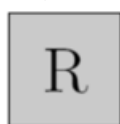


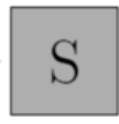

Ana 
 Ben 
 Katja 
 Deni 
 Eli 

What did Ben get?


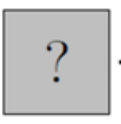



1)  4)  3)  5)  9) 

(3,2)

Elsa has two machines. When she loads paper into machine R, it prints it rotated once clockwise, as shown in the picture. When she loads paper into machine S, it prints an upright clover on it, as shown in the picture.

 →  →   →  → 

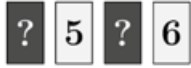
In what order were the R and S machines used to obtain the product as shown in the picture below?

 →  →  →  → 

7) SRR 9) RSR 3) RSS 2) RRS 5) SRS


(0,3)


Ivica wrote the numbers 1 to 4 on the dark side of the paper. Then he turned the paper to the light side and wrote the numbers 5 to 8, as shown in the picture on the right. After that, he cut the paper into 4 rectangular cards and arranged them in a row:

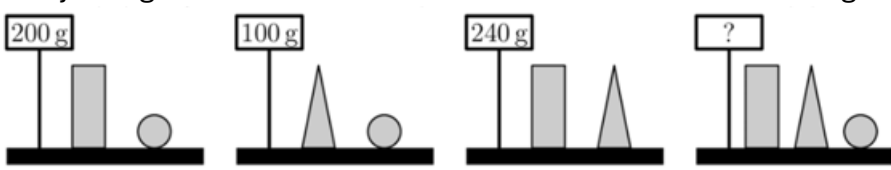
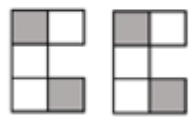
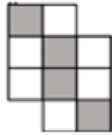


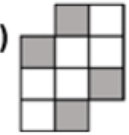

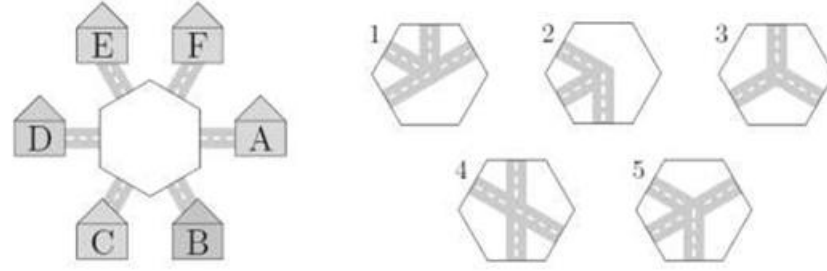


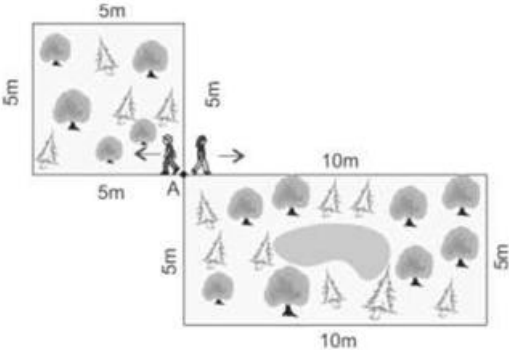
What is the sum of the numbers hidden behind the question mark?

3 4 5 6 7

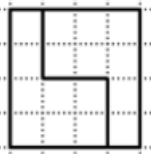
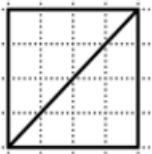
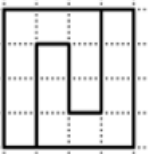
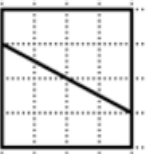
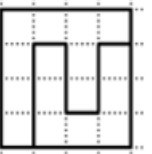
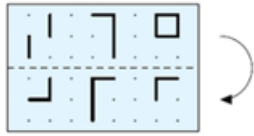
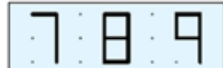





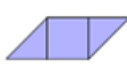




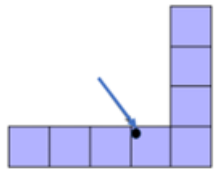


| | |
|--------------|---|
| <p>(1,3)</p> | <p>Maria shaded exactly 5 squares in a 4x4 grid. She challenged five of her friends to guess which squares she shaded. The grids they drew are shown in the picture below. Maria looked at all the grids and said, "One of you has the correct answer, and the rest of you have 4 correctly shaded squares."</p> <p>Which drawing is correct?</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;"> <p>7)</p> </div> <div style="text-align: center;"> <p>9)</p> </div> <div style="text-align: center;"> <p>3)</p> </div> <div style="text-align: center;"> <p>2)</p> </div> <div style="text-align: center;"> <p>6)</p> </div> </div> |
| <p>(2,3)</p> | <p>Three girls, one after the other, went to the table on which there was a tray of cakes (see picture) and took a few cakes each.</p> <div style="text-align: center; border: 1px solid gray; padding: 5px; width: fit-content; margin: 0 auto;"> </div> <p>One of the girls took all the hearts on the tray. Another took all the white cakes, and the third took all the large cakes. However, they did not take the cakes in this exact order. One of them took 3, the other 6, and the third 7 cakes (not necessarily in that order). Which of the following sets of cakes did one of these girls take?</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;"> <p>1)</p> </div> <div style="text-align: center;"> <p>2)</p> </div> <div style="text-align: center;"> <p>3)</p> </div> <div style="text-align: center;"> <p>4)</p> </div> <div style="text-align: center;"> <p>5)</p> </div> </div> |
| <p>(6,4)</p> | <p>There are two types of blocks: white and gray .</p> <p>A smaller cube can be built from 4 white blocks or from one white and one gray block. The large cube shown in the image on the right is made up of smaller cubes.</p>  <p>What is the smallest number of white blocks needed to assemble the large cube in the picture?</p> <div style="display: flex; justify-content: center; gap: 20px;"> <p>6) 8</p> <p>2) 11</p> <p>1) 13</p> <p>7) 14</p> <p>9) 23</p> </div> |
| <p>(8,4)</p> | <p>There are five clocks on the wall. One of them is 1 hour late, one is 1 hour "fast", one shows the correct time, and two have stopped. Which clock shows the correct time?</p> <div style="display: flex; justify-content: center; align-items: center; gap: 20px;"> <div style="text-align: center;"> <p>9</p> </div> <div style="text-align: center;"> <p>1</p> </div> <div style="text-align: center;"> <p>4</p> </div> <div style="text-align: center;"> <p>2</p> </div> <div style="text-align: center;"> <p>7</p> </div> </div> |

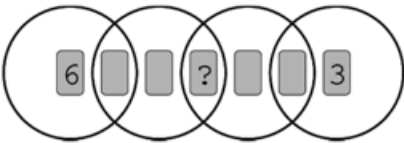
| | |
|--------------|--|
| <p>(2,5)</p> | <p>Lucija weighed some blocks. Their masses are shown in the figure below.</p>  <p>What is the total mass of the three different blocks?</p> <p>3) 270 g 4) 280 g 5) 290 g 6) 300 g 7) 310 g</p> |
| <p>(0,6)</p> | <p>Mate wrote three consecutive four-digit numbers in a row. For example, 231, 232, 233 are three consecutive three-digit numbers. His sister then erased some of the digits of these numbers, as shown in the picture.</p> <p style="text-align: center;"> _ _ _7, _898, 48_ _ </p> <p>What numbers are missing from the picture (from left to right)?</p> <p>7) 389, 3, 99 8) 489, 3, 96 6) 489, 4, 98 9) 489, 4, 99 1) 488, 4, 99</p> |
| <p>(6,6)</p> | <p>Sunny wants to join the two pieces of paper shown in the picture on the right. She is allowed to rotate them while joining them, but she is not allowed to cover one piece of paper with part of the other. Which of the following shapes cannot be obtained by joining these two pieces of paper?</p>  <p>1)  2)  4)  6)  8) </p> |
| <p>(0,7)</p> | <p>Alma wants to place one of the pieces 1, 2, 3, 4, or 5 in the center of the picture so that a person from house A can travel to houses B and E, but not to house D. The pieces can be rotated.</p>  <p>What two parts can Alma use?</p> <p>6) parts 1 and 2 5) parts 2 and 3 4) parts 1 and 4 3) parts 4 and 5 2) parts 1 and 5</p> |

| | |
|---------------------|---|
| <p>(4,7)</p> | <p>In the following calculations, the same digits are hidden under the same characters. Different digits are hidden under different characters.</p> $\triangle + \triangle = \square \bigcirc$ $\bigcirc + \triangle = \square \square$ <p>What is the value of the expression $\triangle \cdot \bigcirc \cdot \square$?</p> <p>3) 0 5) 15 1) 18 6) 28 7) 30</p> |
| <p>(5,7)</p> | <p>Mirko and Slavko started from point A at the same speed, each in their own direction, as in the picture. Mirko went around the square-shaped garden, and Slavko went around the rectangular-shaped garden, until they met again at point A.</p>  <p>What is the smallest number of times Mirko can walk around the square garden in order to meet Slavko again at point A at the same time for the first time after the start?</p> <p>1 2 3 4 5</p> |
| <p>(4,8)</p> | <p>There were 60 students on the field trip. As they lined up, one after the other, the colors of their reflective vests were arranged in a pattern: yellow, green, yellow, green, ...</p> <p>The colors of their backpacks were arranged in a different pattern: red, brown, orange, red, brown, orange, ...</p> <p>How many students had a yellow reflective vest and an orange backpack?</p> <p>3) 8 5) 10 1) 12 6) 15 7) 20</p> |

THE REST OF THE SUDOK TABLE

| | |
|--------------|---|
| <p>(0,0)</p> | <p>Which of the squares in the picture is divided into two different parts?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>1)</p> </div> <div style="text-align: center;">  <p>5)</p> </div> <div style="text-align: center;">  <p>4)</p> </div> <div style="text-align: center;">  <p>3)</p> </div> <div style="text-align: center;">  <p>8)</p> </div> </div> |
| <p>(1,0)</p> | <p>Christian folded the transparent paper along the dotted lines, as in the picture.</p> <div style="text-align: right;">  </div> <p>What could he have seen then?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>2)</p> </div> <div style="text-align: center;">  <p>6)</p> </div> <div style="text-align: center;">  <p>8)</p> </div> <div style="text-align: center;">  <p>9)</p> </div> <div style="text-align: center;">  <p>7)</p> </div> </div> |
| <p>(2,0)</p> | <p>A dark gray circle with two circular holes is placed across the front of the wall clock, as shown in the picture.</p> <div style="text-align: center;">  </div> <p>Then the circle is rotated around its center. What two numbers can be seen at the same time?</p> <p style="text-align: center;"> 1) 4 and 9 2) 5 and 9 5) 5 and 10 8) 6 and 9 9) 7 and 12 </p> |
| <p>(3,0)</p> | <p>The figure on the right is covered by 5 lower parts. Which part is covered by the black circle?</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="display: flex; gap: 20px;"> <div style="text-align: center;">  <p>5)</p> </div> <div style="text-align: center;">  <p>6)</p> </div> <div style="text-align: center;">  <p>8)</p> </div> <div style="text-align: center;">  <p>9)</p> </div> <div style="text-align: center;">  <p>7)</p> </div> </div> <div style="text-align: right; margin-top: 20px;">  </div> </div> |


(4,0) Seven cards, numbered 1 to 7, are placed in 4 overlapping circles as shown.



The sum of the numbers on the cards in each round is 10. What number is hidden under the card marked with a question mark?

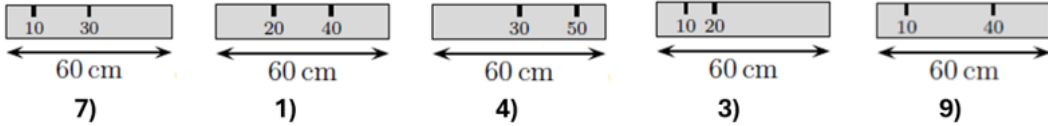
1 2 4 5 7

(5,0) Ružica has 6 weights of mass 1 kg, 2 kg, 3 kg, 4 kg, 5 kg and 6 kg. She placed five of them on two sides of the scale and thus achieved balance. One weight remained outside the scale. Which one?






4) 1 kg 3) 2 kg 2) 3 kg 1) 4 kg 5) 5 kg

(6,0) Nate has a ruler that is 60 cm long. Unfortunately, some of the markings on the ruler have faded. With just one measurement, Ante can use it to measure lengths of 10 cm, 20 cm, 30 cm, 40 cm, 50 cm, and 60 cm. Which ruler is Ante's?

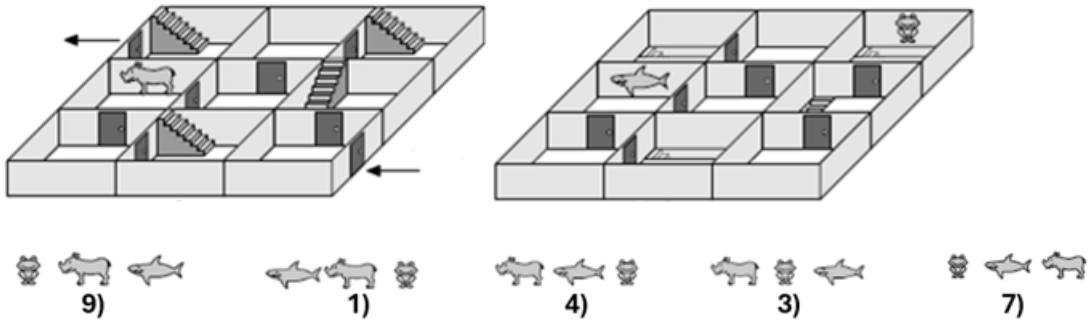


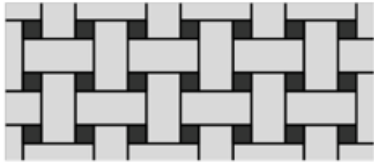
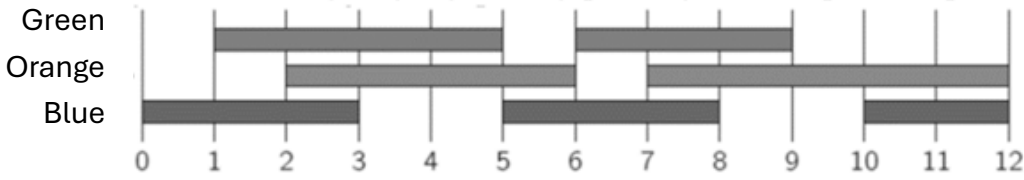
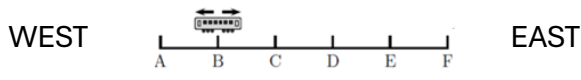


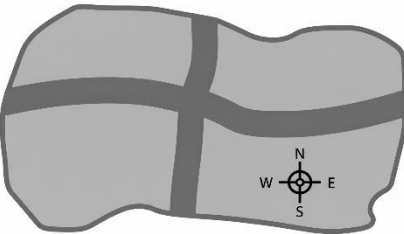
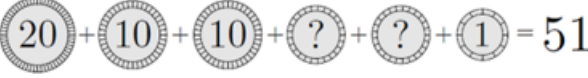
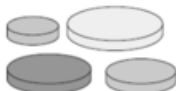
7) 1) 4) 3) 9)

(0,1) Danijel glued two pieces of paper  onto a black circle (pictured right). He could glue either piece over the other without cutting it, so that it partially or completely covered it. What could he not get by gluing?

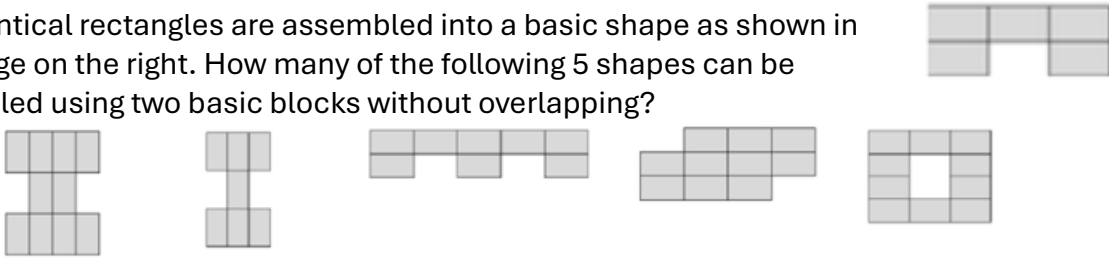



7) 6) 5) 4) 3)

| | |
|--------------|--|
| <p>(1,1)</p> | <p>Borna is going through a labyrinth that has two floors, with the entrance and exit on the first floor. In what order will she encounter the wall stickers?</p>  |
| <p>(2,1)</p> | <p>The floor is paved with two types of tiles:  and . The rectangular tile has dimensions of 23 cm x 11 cm. The picture on the right shows part of the floor. What is the length of the side of the square tile?</p>  <p>3) 3 cm 4) 4 cm 5) 5 cm 6) 6 cm 7) 7 cm</p> |
| <p>(4,1)</p> | <p>The lighting engineer in the theater turned on the colored lights according to the following schedule for a period of 12 minutes:</p>  <p>In the first minute of that period, only the blue light was on. In the last two minutes, the orange and blue lights were on. For how many minutes in total were exactly two lights on at the same time during that period?</p> <p>2) 2 minutes 6) 6 minutes 8) 8 minutes 9) 9 minutes 1) 10 minutes</p> |
| <p>(5,1)</p> | <p>A tram line has 6 stops: A, B, C, D, E and F. A tram stops at each stop. When the tram reaches one of the last stops, A or F, it changes direction. The tram driver started at stop B, so his first stop was stop C. What was the 96th stop he stopped at?</p>  <p>9) A 1) B 4) C 2) D 7) E</p> |


| | |
|-------|---|
| (6,1) | <p>There are 8 cars in the queue to board the ferry. There are two or three people in each car. A total of 19 people are waiting to board the ferry. In how many cars are there exactly two people?</p> |
| (7,1) | <p>Eva and Alan each have 9 marbles. Together they have 8 red and 10 blue marbles. Eva has twice as many blue marbles as red marbles. How many blue marbles does Alan have?</p> <p>9) 3 1) 4 4) 5 2) 6 7) 0</p> |
| (8,1) | <p>There are 7 houses north of road A, 8 houses east of road B, and 5 houses south of road A. How many houses are west of road B?</p> <div style="text-align: center;">  </div> <p>4 5 6 7 8</p> |
| (0,2) | <p>The question marks on the chips hide the same numbers. What are these numbers if the sum of the numbers on all the chips is 51?</p> <div style="text-align: center;">  </div> <p>1) 1 2) 2 5) 5 8) 10 9) 20</p> |
| (1,2) | <p>Amadea has 4 circular tiles of different sizes. She wants to build towers of three tiles so that each top tile is smaller than the tile below it. How many different towers can Amadea build?</p> <div style="text-align: right;">  </div> <p>1 2 4 5 6</p> |

(4,2) Five identical rectangles are assembled into a basic shape as shown in the image on the right. How many of the following 5 shapes can be assembled using two basic blocks without overlapping?



1 2 3 4 5

(5,2) Maya the Bee wants to reach the flower. Which path will lead her there?



6) → ↓ → ↓ ↓ → **1)** ↓ ↓ → ↓ ↓ **3)** → ↓ → ↓ →
2) → → ↓ ↓ ↓ **7)** ↓ → → ↓ ↓ ↓

(6,2) Laser beams are reflected from the mirror as shown in Figure 1. At which point A, B, C, D or E will the laser beam end its path (Figure 2)?

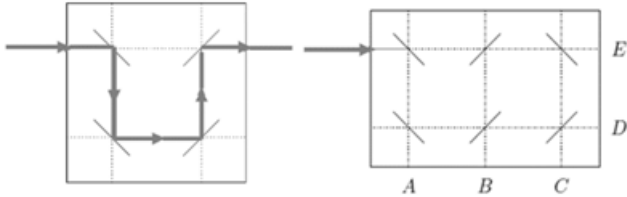



Figure 1 Figure 2

1) A **2) B** **3) C** **4) D** **5) E**

(7,2) The table consists of 28 squares arranged in 4 rows and 7 columns. Ira colored 2 rows and 1 column. How many squares were left uncolored?

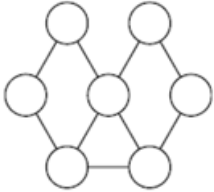
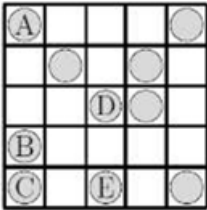

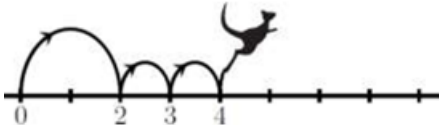
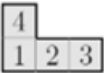
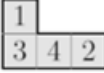
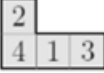
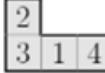
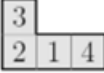
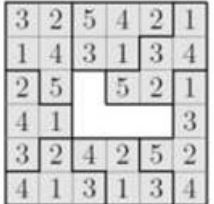


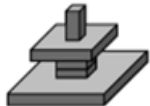




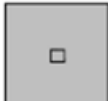


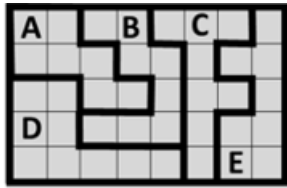
3) 8 **5) 10** **7) 12** **1) 14** **9) 17**

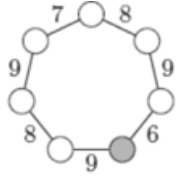
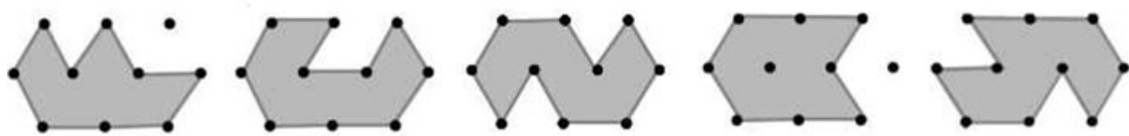
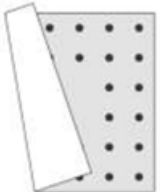
(8,2) In each field of the table is the result of multiplying the numbers on the left and the numbers above the table. What number is hidden under the heart?

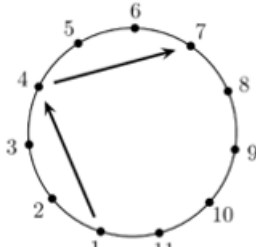

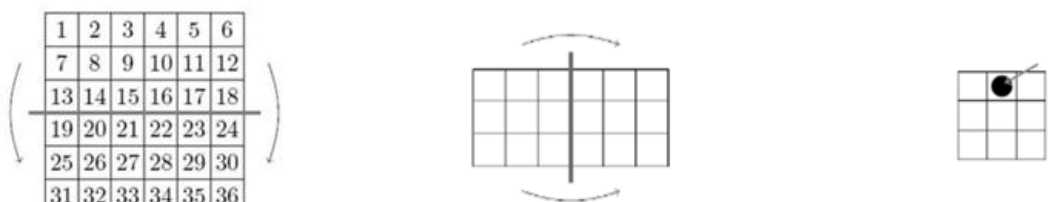

| | | |
|---|----|----|
| | 3 | ? |
| 5 | 15 | 35 |
| 4 | 12 | ♥ |


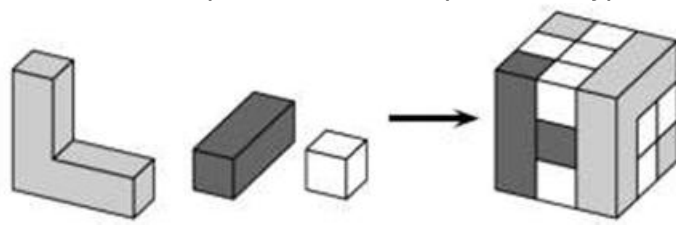
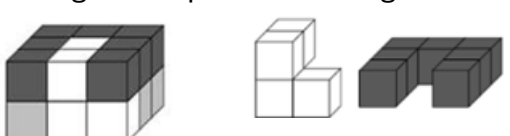
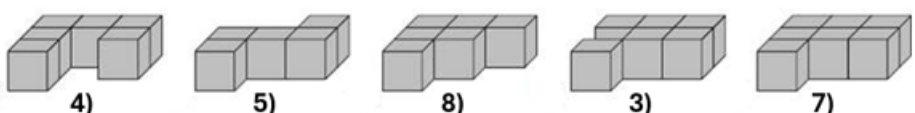
7) 25 **2) 27** **8) 28** **4) 29** **5) 30**





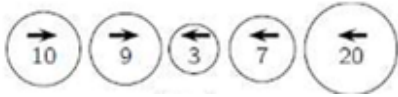
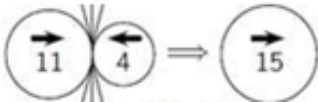
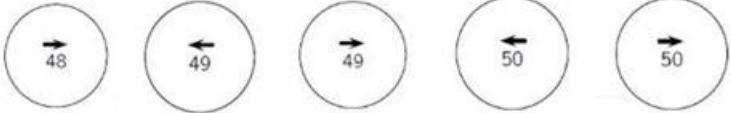
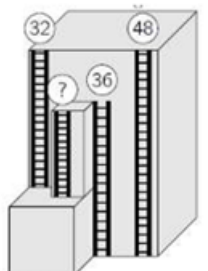
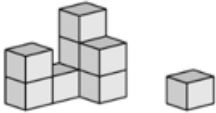
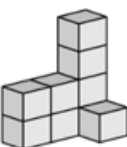
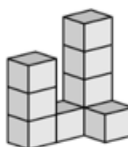
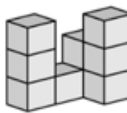
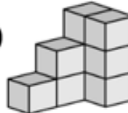
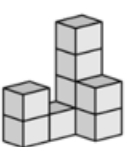
| | | |
|-------|--|---|
| (3,3) | <p>Hana wants to color the circles in the picture. She wants to color any two circles connected by the same line with different colors. What is the least amount of colors she needs?</p> <p>2 3 4 5 6</p> |  |
| (4,3) | <p>Rose needs to arrange the coins in a table so that there are two coins in each row and each column. Which of the coins A, B, C, D or E should be moved to one of the empty spaces to fulfill the required condition?</p> <p>4) A 8) B 2) C 7) D 5) E</p> |  |
| (5,3) | <p>Katja lit 5 identical candles at the same time. The candles stopped burning at different times, so they now look like the picture on the right. Which candle stopped burning first?</p> <p>6) A 3) B 1) C 7) D 9) E</p> |  |
| (6,3) | <p>There are 48 trees in an avenue. Two flower bushes are planted between the first and second trees, one bush between the second and third, two bushes between the third and fourth, one bush between the fourth and fifth, and then two or one flower bush are planted between the trees in a row. How many flower bushes are planted in that avenue?</p> <p>6) 69 2) 70 1) 71 7) 72 9) 73</p> | |
| (7,3) | <p>Kangaroo Kanga always makes one big jump on the number line followed by two small jumps, as shown in the picture. Kanga started at number 0 and ended at number 16. How many jumps did Kanga make on that path?</p> <p>5) 4 4) 7 2) 8 7) 9 8) 12</p> |  |
| (8,3) | <p>Diana has created an incomplete puzzle in which adjacent numbers cannot be the same. Which piece will she use to complete the puzzle?</p> <p>5)  4)  2)  9)  8) </p> |  |













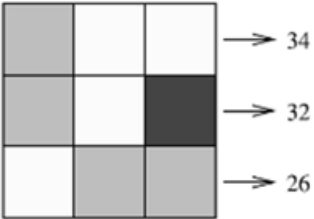
| | |
|--------------|---|
| <p>(0,4)</p> | <p>$2022 + \square = 2020 + \square$</p> <p>What two numbers can we write in the squares so that the equality holds?</p> <p>5) 4 and 1 4) 3 and 4 1) 3 and 5 9) 7 and 2 2) 9 and 8</p> |
| <p>(1,4)</p> | <p>Francis built a tower like the one in the picture on the right. What will Francis see if he looks at the tower from above?</p>  <p>7)  6)  8)  9)  5) </p> |
| <p>(2,4)</p> | <p>Five cars, numbered 1, 2, 3, 4, and 5, are moving in the same direction.</p>  <p>First, the last car overtook the two in front of it. Then, in the new order, the second-to-last car overtook the two in front of it. And finally, in the latest order, the middle car overtook the two in front of it.</p> <p>What order were the cars in after that?</p> <p>7) 1, 2, 3, 5, 4 9) 2, 1, 3, 5, 4 8) 2, 1, 5, 3, 4 5) 3, 1, 4, 2, 5 6) 4, 1, 2, 5, 3</p> |
| <p>(3,4)</p> | <p>The picture on the right shows an apiary with 9 hexagonal cells in which bees store honey. Some of them contain honey. The number on each cell shows how many neighboring cells contain honey. Neighboring cells share a common side. How many cells contain honey?</p> <p>4 5 6 7 8</p>  |
| <p>(4,4)</p> | <p>The garden is divided into five different parts. Which part is the largest?</p> <p>1) A 2) B 3) C 4) D 5) E</p>  |

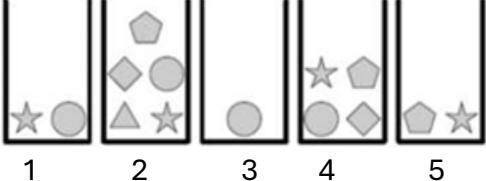

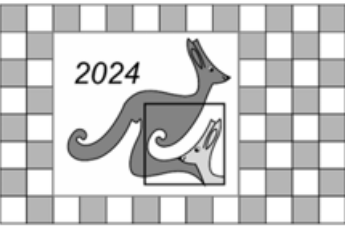







| | | |
|--------------|--|---|
| <p>(5,4)</p> | <p>Mihaela wants to write the numbers 1, 2, 3, 4, 5, 6 and 7 in the circles, one number in each circle, but so that the sum of the numbers in adjacent circles is equal to the number on the line connecting the two circles. What number should be written in the shaded circle?</p> <p style="text-align: center;">1 2 3 4 5</p> |  |
| <p>(7,4)</p> | <p>Six beavers and two kangaroos are standing in a row, marked with numbers. Among any three animals marked with consecutive numbers, exactly one is a kangaroo. Which of the given numbers is the kangaroo marked with?</p> <p style="text-align: center;">① ② ③ ④ ⑤ ⑥ ⑦ ⑧</p> <p style="text-align: center;">1 2 3 4 5</p> | |
| <p>(0,5)</p> | <p>The kangaroos in a family are 2, 4, 5, 6, 8, and 10 years old. The sum of the ages of four of them is 22. What are the ages of the remaining two kangaroos?</p> <p style="text-align: center;">9) 2 and 8 8) 4 and 5 7) 8 and 5 5) 6 and 8 6) 6 and 10</p> | |
| <p>(1,5)</p> | <p>Hermione, Harry, and Ron always enter the common room one at a time. Hermione is never first, Harry is never second, and Ron is never third. In how many different ways can the three of them enter the common room?</p> <p style="text-align: center;">1 2 3 4 6</p> | |
| <p>(3,5)</p> | <p>The pictures show lawns of different shapes. Which one has the smallest area?</p> <p style="text-align: center;">  </p> | |
| <p>(4,5)</p> | <p>Aladdin has a square carpet. Along each side of the carpet there are an equal number of dots arranged in two rows. Someone accidentally folded the carpet. How many dots are there on Aladdin's carpet?</p> <p style="text-align: center;">1) 48 5) 44 6) 40 8) 36 9) 32</p> |  |

| | |
|-------|--|
| (5,5) | <p>In a classroom, students sit in rows. Each row has the same number of students. There are two rows in front of Robert and one row behind him. In the row where Robert sits, there are three students to his left and five to his right. How many students are there in the classroom?</p> <p>4) 10 5) 17 6) 18 7) 27 8) 36</p> |
| (6,5) | <p>The players numbered 1 to 11 stand in a circle. Each player passes the ball to the third player on their left. The pass starts with player number 1 and continues until a player has possession of the ball for the second time. What is the number of the player who passed the ball last?</p> <p>7) 7 8) 8 6) 9 9) 10 1) 11</p>  |
| (7,5) | <p>There are exactly two frogs in each row and each column of the table. The frogs have decided that two of them will jump simultaneously into a free adjacent square (adjacent squares have a common side). After moving the two frogs to adjacent squares, the condition that there are exactly two frogs in each column and each row of the table will still be met. In how many ways can the frogs make this move?</p>  <p>1 2 3 4 5</p> |
| (8,5) | <p>Jasminka folded a square of paper filled with numbers twice; first as shown in Figure 1a, and then a second time as shown in Figure 1b. Finally, she pierced the paper at the place marked with the black circle (Figure 2).</p>  <p>Figure 1a Figure 1b Figure 2</p> <p>What numbers did Jasminka punch?</p> <p>4) 8, 11, 26,29 5) 14, 17, 20, 23 6) 15, 16, 21, 22 7) 14, 16, 21, 23 8) 15, 17, 20, 22</p> |
| (1,6) | <p>Lovro filled the table with numbers with the intention that the sums of the three numbers in all rows and columns would be the same. But he made one mistake? Which number should be corrected?</p>  <p>1) 1 3) 3 4) one of the numbers 4 5) 5 7) one of the numbers 7</p> |

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| <p>(2,6)</p> | <p>Alice has the four pieces shown in the picture. Which two of the four pieces must she put together to make the square shown in the picture?</p>  <p> 2) 1 and 2 3) 1 and 3 4) 1 and 4 5) 2 and 3 6) 2 and 4 </p> |
| <p>(3,6)</p> | <p>The cube in the picture is made up of three types of wooden parts.</p>  <p>How many white wooden pieces were used to assemble the cube?</p> <p> 1) 8 2) 11 3) 13 4) 16 5) 19 </p> |
| <p>(4,6)</p> | <p>Cubes in three colors, white, gray, and black, 18 in total, are arranged as in Figure 1. The white and black cubes are arranged into pieces as in Figure 2.</p>  <p>Figure 1 Figure 2</p> <p>Which of the parts below shows the gray area?</p>  <p> 4) 5) 8) 3) 7) </p> |
| <p>(5,6)</p> | <p>There was some money in the cash register of the ice cream shop. After 6 ice creams were sold, there was €70 in the cash register. At the end of the day, after a total of 16 ice creams were sold, there was €120 in the cash register. How much € was in the cash register before the ice cream was sold?</p> <p> 4) 20 5) 30 1) 40 6) 50 7) 60 </p> |
| <p>(7,6)</p> | <p>Three football teams participate in the tournament. Each team plays one game with the rest. In each game, the winner gets 3 points, and the loser gets 0 points. In case of a tie, both teams get 1 point. What number of points can no team achieve at the end of the tournament?</p> <p> 1 2 4 5 6 </p> |

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| <p>(8,6)</p> | <p>Vlatka marked four cards with the numbers 1, 2, 3 and 4. On the back of each card is a picture of a different fruit. Each fruit represents a number that is written on the other side of the card. Vlatka noticed the following:</p> <div style="text-align: center;">  </div> <p>and</p> <div style="text-align: center;">  </div> <p>What is the sum  +  ?</p> <p style="text-align: center;">3 4 5 6 7</p> |
| <p>(1,7)</p> | <p>Five balls start to move simultaneously in the direction of the arrow shown on them. When two spheres moving in opposite directions collide, the larger sphere swallows the smaller one, maintains its direction, and its value is increased by the value of the smaller sphere. What happens when two balls collide is shown in Figure 2. What is the final result of the series of collisions of the balls shown in Figure 1?</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Figure 1</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Figure 2</p> <div style="text-align: center;">  </div> <p style="text-align: center;">4) 5) 1) 6) 7)</p> |
| <p>(2,7)</p> | <p>Four fire escape ladders are placed on a tall building, as shown in the figure. The heights of the three ladders are indicated at the tops of the ladders in the figure. What is the height of the shortest ladder?</p> <p style="text-align: center;">4) 12 5) 14 6) 16 7) 20 8) 22</p> <div style="text-align: right;">  </div> |
| <p>(3,7)</p> | <p>Lucky's cat knocked one of the cubes off his construction made of identical cubes (see the picture on the right). What might this construction have looked like before the cat knocked the cube over? All structures are viewed from the same, front side.</p> <div style="text-align: right;">  </div> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;"> <p>1)</p>  </div> <div style="text-align: center;"> <p>2)</p>  </div> <div style="text-align: center;"> <p>4)</p>  </div> <div style="text-align: center;"> <p>6)</p>  </div> <div style="text-align: center;"> <p>8)</p>  </div> </div> |

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| <p>(6,7)</p> | <p>Lukas wants to assemble a caterpillar from the parts P, R, S, T and V in the picture. Part P must be in the first place as the head, and part V must be in the last place as the tail of the caterpillar. Between them he can put 1, 2 or 3 parts from the remaining parts. How many different caterpillars can Lukas assemble without turning the parts?</p>  <p style="text-align: center;"> 3 4 5 6 7 </p> |
| <p>(7,7)</p> | <p>Five children ate several plums. Laura ate two more than Sarah. Tara ate three less than Laura. Emma ate one more than Tara and three less than Anna Mari. Which two girls ate the same number of plums?</p> <ol style="list-style-type: none"> 1) Emma and Laura 9) Emma and Sarah 4) Laura and Anna Mari 3) Sarah and Anna Mari 2) Anna Mari and Tara |
| <p>(8,7)</p> | <p>Vinko has 9 bags of potatoes, as shown in the picture. Each bag is labeled with the weight of the potatoes in the bags, expressed in kilograms. Vinko wants to arrange them into three groups of three bags so that each group has the same weight of potatoes. Which of the following bags will be in the same group as the 6 kg bag?</p>  <p style="margin-top: 20px;"> 5)  3)  4)  1)  2)  </p> |
| <p>(0,8)</p> | <p>Marko has three different types of cards: cards with pictures of apples, cherries and grapes. From a set of 5 cards (as in the pictures below), he takes only one pair and swaps the places of these cards. He swaps them so that all cards of the same suit are next to each other. For which set of cards is this not possible ?</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>6)</p> </div> <div style="text-align: center;">  <p>8)</p> </div> <div style="text-align: center;">  <p>9)</p> </div> <div style="text-align: center;">  <p>1)</p> </div> <div style="text-align: center;">  <p>2)</p> </div> </div> |
| <p>(1,8)</p> | <p>In a square grid, the same number is hidden under the same colored squares. To the right of each row is written the sum of the hidden numbers in that row. What number is hidden under the black square?</p>  <p style="text-align: center; margin-top: 20px;"> 6) 6 8) 8 9) 10 1) 12 2) 14 </p> |

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| <p>(2,8)</p> | <p>Sarah wants to choose 5 different shapes from the boxes. She wants to choose only one shape from each box. Which shape should she choose from box number 4?</p>  <p>1 2 3 4 5</p>  |
| <p>(3,8)</p> | <p>Aki has a poster of a kangaroo on her kitchen wall. How many grey tiles are covered by the poster?</p>  <p>1) 15 4) 21 3) 25 5) 30 9) 35</p> |
| <p>(5,8)</p> | <p>At the kitchen table, Masha is playing with three cups. She takes the left cup, turns it over and places it on the right end, as shown in the picture on the right. What position will the cups be in after 10 moves?</p>  <p>4)  9)  6)  8)  7) </p> |
| <p>(6,8)</p> | <p>Vanya chose some of the figures from the picture and announced: "Among the figures I chose, 2 are large, 2 are colored, and 2 are curved in shape."</p>  <p>What is the smallest possible number of characters that Vanja chose that meets all the conditions she outlined?</p> <p>2 3 4 5 6</p> |
| <p>(7,8)</p> | <p>There are fewer than 50 cookies in the box. The cookies can be divided among two, three, or four children so that each child gets the same number of cookies and no cookies are left over. However, they cannot be divided among seven children because then six cookies would be missing. How many cookies are in the box?</p> <p>4) 12 5) 24 6) 30 2) 36 3) 48</p> |

(8,8)

Seven cards are arranged as shown in the picture. Each card has two numbers, one of which is written upside down. Dominik wants to arrange the cards so that the sum of the top numbers is equal to the sum of the bottom numbers. He wants to do this by turning over just one card. Which card does Dominik need to turn over?

| | | | | | | |
|---|---|---|---|---|---|---|
| 7 | 5 | 4 | 2 | 8 | 3 | 2 |
| 4 | 3 | 5 | 5 | 7 | 7 | 4 |
| A | B | C | D | E | F | G |

4) A

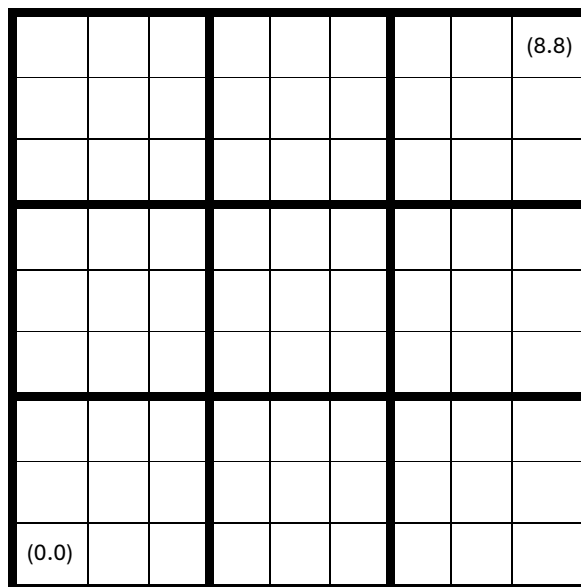
9) C

6) D

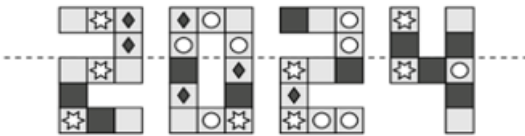











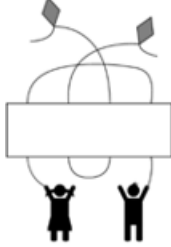
8) F

7) G

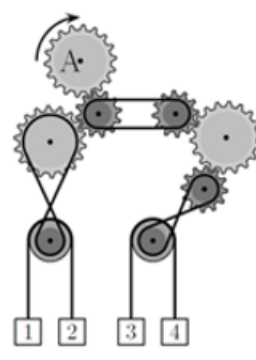
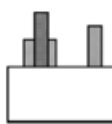
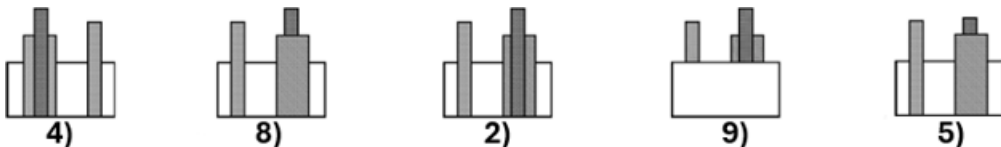
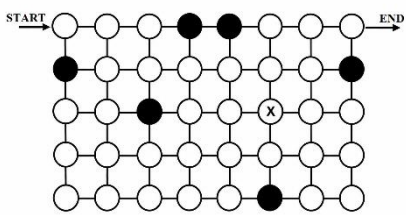
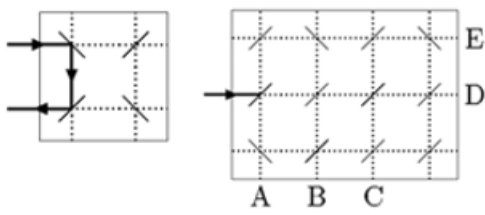
GAME 9_4 (9X9 SUDOKU) – kangaroo 6th and 7th⁷


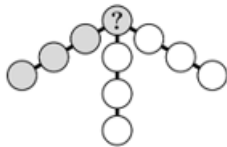
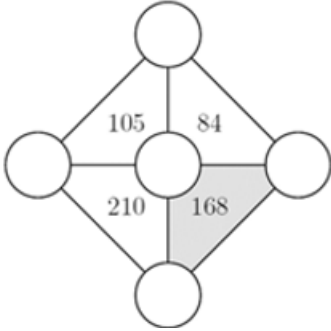
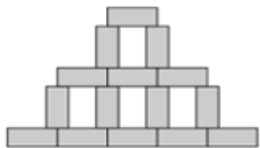



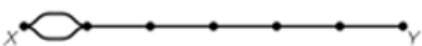


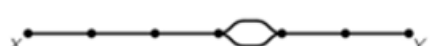

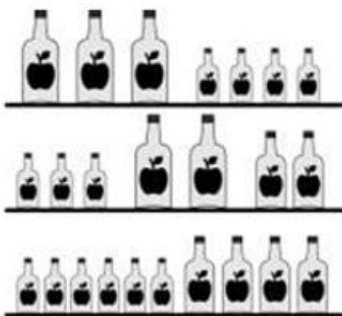

INITIAL CONDITIONS

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| <p>(1,0)</p> | <p>Ana folded the picture shown along the dotted line. Which square will be identical to itself when it is copied?</p>  <p>4)  3)  2)  1)  5) </p> |
| <p>(2,0)</p> | <p>Three identical dice are placed on a table. What is the sum of all the numbers on the sides that touch the table?</p> <p>2) 26 3) 40 4) 43 5) 47 6) 56</p>  |
| <p>(3,1)</p> | <p>Which sticker should be placed in the rectangular space in the picture so that each child is associated with a different dragon?</p> <p>4)  3)  2)  9)  5) </p>  |

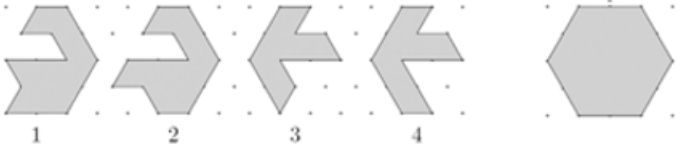
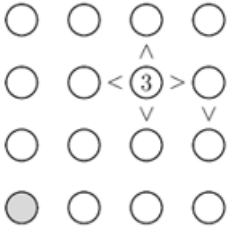

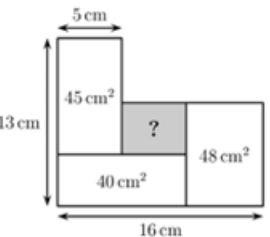

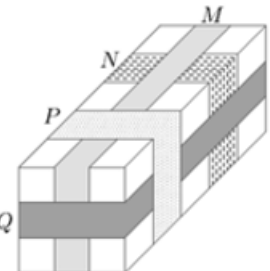
⁷The tasks were taken from the task repository for the Kangaroo Without Borders competition (<https://www.aksf.org/>)

| | | |
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| <p>(4,1)</p> | <p>The gear labeled A rotates clockwise, as shown in the figure. Which two boxes will move up?</p> <p>1) 1 and 4 2) 2 and 3 3) 1 and 3 5) 2 and 4 6) cannot be determined</p> |  |
| <p>(1,2)</p> | <p>Peter placed three blocks against the white wall.</p> <p>Looking from the front, the wall and blocks look like this: . How do they look from the back?</p> |  |
| <p>(0,3)</p> | <p>The researcher wants to go through the maze shown in the picture from the point marked "START" to the point marked "END". He can only move horizontally or vertically and can only pass through the white circles. He must also pass through each of the white circles exactly once. When he passes the circle marked X, what will be his next move?</p> |  |
| <p>(4,3)</p> | <p>The laser beams are reflected from the mirror as shown in the smaller image. In which field will the beam shown in the larger image end up?</p> |  |
| <p>(8,4)</p> | <p>In a <i>second-hand shop</i>, two hats sell for the same price as five skirts, three skirts for the same price as eight T-shirts, and two T-shirts for the same price as three hats. Which of the following collections is the most valuable?</p> <p>3) a hat and five skirts 4) hat, three skirts and a cap 5) eight skirts and six shirts 6) thirty-seven caps 7) three skirts and three hats</p> | |

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| <p>(6,5)</p> | <p>The year 2022 is special because the number 2 appears three times in it. This is the third time in the life of the turtle Eva that exactly three identical numbers appear in a year. How old is Eva in 2022?</p> <p>1) 18 2) 20 3) 32 4) 23 5) 134</p> |
| <p>(8,5)</p> | <p>When identical glasses are stacked vertically, one inside the other, a stack of 8 glasses is 42 cm high, and a stack of two glasses is 18 cm high. How high is a stack of 6 glasses?</p> <p>6) 22 cm 5) 24 cm 4) 28 cm 3) 34 cm 2) 40 cm</p>  |
| <p>(2,6)</p> | <p>Sanja wants to place the numbers 1 to 10, one in each circle shown in the picture. She will place the numbers so that the sum of the numbers in the four circles that are the same length, e.g. in the gray circles, is equal to 23. What number should be written in the circle marked with a question mark?</p> <p>4 5 6 7 8</p>  |
| <p>(5,6)</p> | <p>The numbers 3, 4, 5, 6 and 7 are to be placed in the five circles in the figure so that the number inside each triangle is the product of the numbers inscribed in the circles at the vertices of that triangle. What is the sum of the numbers inscribed in the circles at the vertices of the shaded triangle?</p> <p>7) 12 5) 14 3) 15 4) 17 2) 18</p>  |
| <p>(1,7)</p> | <p>Goran drew several congruent rectangles and got the picture shown. The width of the picture is 45 cm and the height is 30 cm. What is the area of one rectangle?</p> <p>4) 24 cm² 1) 27 cm² 7) 30 cm² 3) 33 cm² 5) 36 cm²</p>  |

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| <p>(7,7)</p> | <p>There is only one railway line between points X and Y. A railway company wants to extend the line with two tracks  so that two trains can run simultaneously, one from point X and one from point Y. The trains run at a constant speed; one takes 180 minutes to get from X to Y, and the other takes 60 minutes to get from Y to X. Where should the two tracks be built so that there is no accident if the trains leave their stations at the same time?</p>  <p>2)  6) </p> <p>3)  9) </p> <p>8) </p> |
| <p>(5,8)</p> | <p>Three pirates were asked how many coins and how many diamonds their friend Graybeard had. Each of the three answered one question truthfully and the other falsely. Their answers were:</p> <p>(1) He has 8 gold coins and 6 diamonds. (2) He has 7 gold coins and 4 diamonds. (3) He has 7 gold coins and 7 diamonds.</p> <p>What is the total number of gold coins and diamonds that Graybeard has?</p> <p>1) 11 8) 12 9) 13 2) 14 5) 15</p> |
| <p>(6,8)</p> | <p>There are 64 deciliters of apple juice on each of the shelves in the picture. The bottles are of different sizes: small, medium, and large. How many deciliters of apple juice are in the medium bottle?</p>  <p>1) 3 8) 6 9) 8 2) 10 5) 14</p> |
| <p>(8,8)</p> | <p>In how many places in the picture are there children holding each other's left hands?</p>  <p>1 2 3 4 5</p> |

THE REST OF THE SUDOKU TABLE

| | | |
|--------------|---|---|
| <p>(0,0)</p> | <p>Ena has the four puzzle pieces shown in the picture. With which pair of puzzle pieces can she assemble the hexagon shown?</p> |  |
| <p>(3,0)</p> | <p>Sonja wants to complete the puzzle shown so that each row and each column contains the numbers 1, 2, 3, and 4, each exactly once. She will arrange the numbers so that the highlighted device symbols < and > give the exact relationship of the values in the circles between which they are placed, for example:</p> $\begin{array}{c} \textcircled{1} < \textcircled{2} \\ \wedge \quad \vee \\ \textcircled{2} > \textcircled{1} \end{array}$ <p>What number will he write in the gray circle?</p> |  |
| <p>(4,0)</p> | <p>A dark circle with three holes is placed over the clock, as shown in the picture. If the gray circle is rotated about its center, what three numbers can be seen in the holes?</p> |  |
| <p>(5,0)</p> | <p>The figure shows four rectangles that touch each other. What is the area of the shaded rectangle?</p> |  |
| <p>(6,0)</p> | <p>Iva is playing with the seven pieces of the puzzle shown. She wants to assemble a caterpillar with one head, one tail, and one, two, or three pieces in between. How many different caterpillars can she assemble? Iva is not allowed to rotate the pieces.</p> |  |
| <p>(7,0)</p> | <p>The package in the picture is wrapped with four decorative ribbons labeled M, N, P, and Q. In what order, from first to last, are the ribbons placed on this package?</p> |  |

- 1) 1 and 2 2) 1 and 3 3) 2 and 3 4) 2 and 4 5) 1 and 4

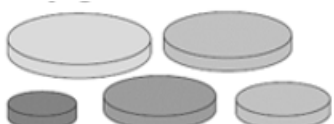





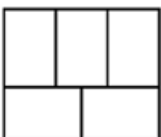
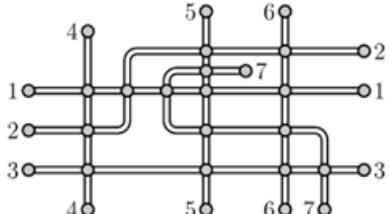







- 1 2 3 4

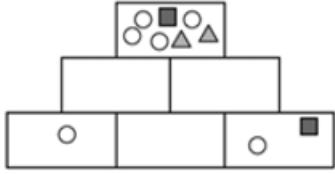


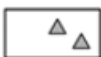









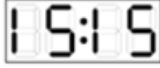


- 1) 2, 4 and 9 4) 1, 5 and 10 7) 4, 6 and 12 8) 3, 6 and 9 2) 5, 7 and 12

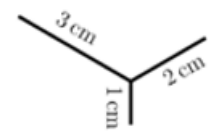
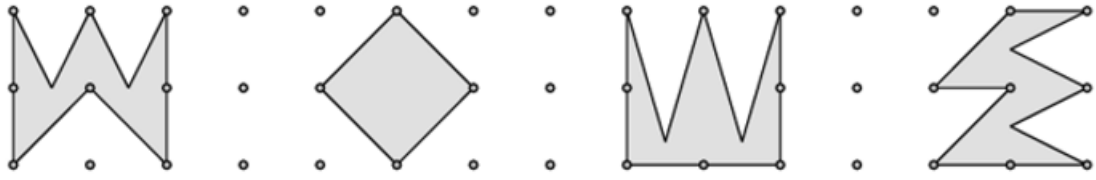
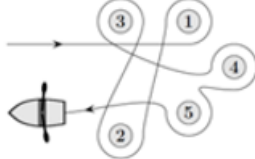
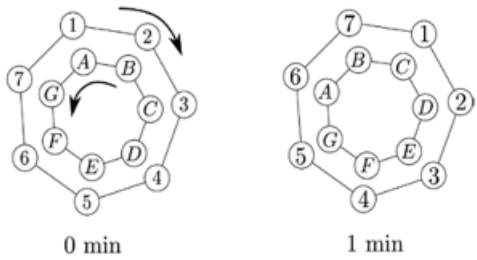
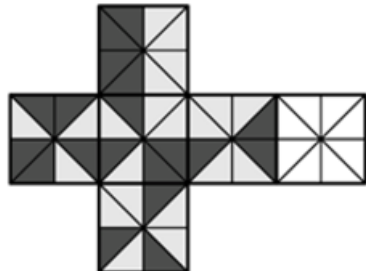
- 2) 12 cm² 3) 14 cm² 4) 16 cm² 5) 18 cm² 6) 20 cm²

- 1) 10 9) 14 3) 16 7) 18 8) 20

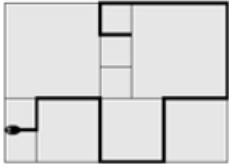
- 1) M, N, Q, P 8) M, N, P, Q 9) N, Q, M, P 2) N, M, Q, P 5) Q, N, M, P

| | | | | | | | | | | | | |
|-------|--|--|---|----|---|---|----|---|---|---|---|----|
| (8,0) | <p>Anna has five circular disks of different sizes. Using the four disks, she wants to build a tower so that each disk in the tower is smaller than the disk immediately below it. How many different towers can she build?</p> <p>1) 4 9) 5 3) 9 5) 12 6) 20</p> |  | | | | | | | | | | |
| (0,1) | <p>Which of the following shapes cannot be divided into two triangles by a single straight line?</p> <p>1)  9)  3)  5)  6) </p> | | | | | | | | | | | |
| (1,1) | <p>The picture shows 5 rectangles. Lukas wants to color them red, blue, and yellow so that every two adjacent rectangles are colored differently. In how many different ways can he do this?</p> <p>3 4 5 6 7</p> |  | | | | | | | | | | |
| (2,1) | <p>Which two numbers should Lara replace if she wants the sum of the numbers in the white cells to equal the sum of the numbers in the gray cells?</p> <p>1) 1 and 11 4) 2 and 8 8) 3 and 7 5) 4 and 13 6) 7 and 13</p> | <table border="1" data-bbox="1204 1008 1460 1108"> <tbody> <tr> <td>1</td> <td>3</td> <td>5</td> <td>2</td> <td>13</td> </tr> <tr> <td>7</td> <td>4</td> <td>6</td> <td>8</td> <td>11</td> </tr> </tbody> </table> | 1 | 3 | 5 | 2 | 13 | 7 | 4 | 6 | 8 | 11 |
| 1 | 3 | 5 | 2 | 13 | | | | | | | | |
| 7 | 4 | 6 | 8 | 11 | | | | | | | | |
| (5,1) | <p>Dora wrote a three-digit number on the board. Then Drago added a fourth digit to the right of the number and said to Dora: "Look, the number has increased by 2024." What digit did Drago add?</p> <p>2 3 4 8 9</p> | | | | | | | | | | | |
| (6,1) | <p>The picture shows a plan of seven railway lines in a small town. The stations are marked with circles. Mea wants to color the lines so that those that have a common station are colored in different colors. With what minimum number of different colors can she do this?</p> <p>3 4 5 6 7</p> |  | | | | | | | | | | |
| (7,1) | <p>Marina, Petar, Roko and Tina were playing football in the classroom and one of them broke the window. When the principal asked who did it, she got the following answers. Marina: <i>It was Petar.</i> Petar: <i>It was Roko.</i> Roko: <i>It wasn't me.</i> Tina: <i>It wasn't me either.</i> Only one child told the truth. Who broke the window?</p> <p>1) Marina 4) Tina 8) Peter 5) Rocco 6) cannot be determined</p> | | | | | | | | | | | |
| (8,1) | <p>Mia glued three pieces of paper of the shape shown  on a black circle. Which of the following patterns could she not get?</p> <p>1)  4)  7)  8)  2)  </p> | | | | | | | | | | | |


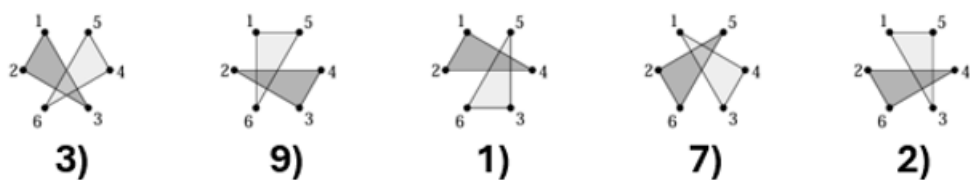
| | |
|-------|---|
| (0,2) | <p>Franka is writing down consecutive whole numbers. She wrote down three numbers, but instead of digits she used symbols, so she wrote down $\square\diamond, \heartsuit\triangle, \heartsuit\square$. What number will she write down next?</p> <p>1) $\square\heartsuit$ 4) $\square\square$ 7) $\heartsuit\heartsuit$ 8) $\diamond\square$ 2) $\heartsuit\diamond$</p> |
| (2,2) | <p>Domagoj draws shapes in rectangles arranged in a pyramid, as in the picture. Each rectangle contains all the shapes in the rectangles directly below it, and only those shapes. In some rectangles, he has already drawn all the shapes they contain. Which shapes will he draw in the middle rectangle of the bottom row?</p>  <p>1)  2)  7)  9)  4) </p> |
| (3,2) | <p>Goran has four blocks arranged in this way: . In one move, Goran can take some or all of the blocks from the top of the pile and place them upside down in the manner shown in the figure: . Goran wants to arrange the blocks in this order: . What is the smallest number of moves needed to reach the desired order?</p> <p style="text-align: center;">2 3 4 5 6</p> |
| (4,2) | <p>Four stakes are placed along a 120 m long track, as shown in the figure. What is the smallest number of stakes that must be added to divide the track into sections of equal length?</p>  <p>1) 12 2) 15 4) 17 9) 20 7) 37</p> |
| (5,2) | <p>When I look in the mirror, I see an image of my digital clock standing in the doorway behind me, as shown in the picture. What image will I see in the mirror 30 minutes later? </p> <p>1)  4)  8)  5)  6) </p> |
| (6,2) | <p>Nevio plans to cut the rope into 12 equal parts and marks the places where the rope should be cut. Ilko plans to cut the same rope into 16 equal parts and also marks the places where he should do this. Then Ljiljana cuts the rope at the marked places. How many parts of the rope did Ljiljana get?</p> <p>1) 24 9) 25 3) 27 7) 28 8) 29</p> |

| | | |
|--------------|---|---|
| <p>(7,2)</p> | <p>Maja wants to draw the picture shown without lifting her pencil from the paper. What is the shortest distance she has to travel with her pencil to do this? The lengths of the lines are given in the picture. She can start her drawing wherever she wants.</p> |  |
| <p>(8,2)</p> | <p>Which of the following figures has the largest surface area?</p>  <p>3) first (left) 4) other 6) third 7) fourth (right) 8) all have the same surface area</p> | |
| <p>(1,3)</p> | <p>Corina rowed around five buoys, as shown in the picture. Which buoys did she row around in a counterclockwise direction?</p> |  |
| <p>(2,3)</p> | <p>Two wheels are connected and each is marked with seven positions. The wheels turn in opposite directions and each takes 7 minutes to make a full turn. At the end of each minute, each letter is exactly in front of a number. The pictures show the first two positions of the wheel, where we see that at the beginning the letter A is next to the number 1, the letter B is in front of the number 2, and so on. The wheels turn until the letter C is in front of the number 2. Which number is the letter F in front of?</p> |  |
| <p>(3,3)</p> | <p>A grandmother bought candy for her grandchildren. She divided it up so that each grandchild got a bag with the same number of candies. She put as many candies as possible in the bags. When she was done, she saw that there were 20 candies in each bag, and that she had 12 candies left. What was the smallest possible number of candies that the grandmother had?</p> | |
| <p>(5,3)</p> | <p>Given a given grid, Matt wants to assemble a cube so that the triangles touching the common edge of each of the two sides of the cube are equally shaded. Which of the squares can be the unshaded part of the grid to assemble such a cube?</p> |  |
| <p>(6,3)</p> | <p>The rooms in the hotel are numbered in ascending order, starting with 1. No number is left out. Counting the digits on all the room numbers, Kanga counted the digit 2 14 times and the digit 5 3 times. What is the largest room number in that hotel?</p> | |

(7,3) A snake crawled onto a terrace paved with square tiles of three different sizes and settled down as shown in the picture. How long is the snake if the perimeter of the smallest square is 80 cm?
1) 380 cm 4) 400 cm 8) 420 cm 5) 440 cm 6) 1680 cm

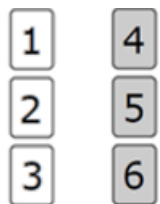


(8,3) Six points are numbered as in the picture. Jan drew two triangles; one connecting the even-numbered points and the other connecting the odd-numbered points. He then shaded these triangles; one dark gray and the other light gray. Which of the five possibilities represents Jan's picture?

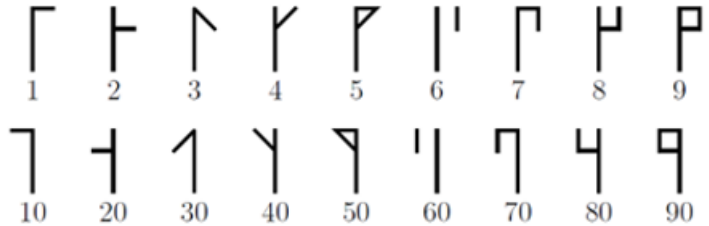
3) 9) 1) 7) 2)




(0,4) Fran has three cards with numbers written on both sides. Card number one has the number 1 on the front and the number 4 on the back. Card number two has the number 2 on the front and the number 5 on the back. Card number three has the number 3 on the front and the number 6 on the back. Fran randomly places three cards on the table and adds up the numbers she sees. How many different amounts can she get?








3) 3 4) 4 5) 5 6) 6 7) 10

(1,4) *Cistercian numerals* were used in the early 13th century. Every integer from 1 to 99 can be represented by a single symbol formed by the two basic symbols shown.

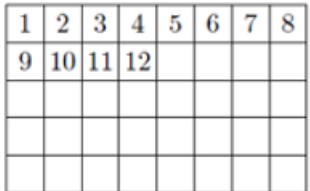


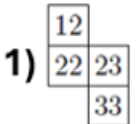
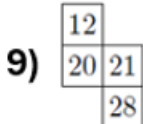
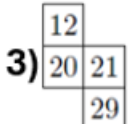
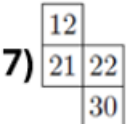
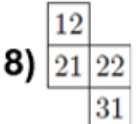
The symbol for 24 looks like this: , for the number 81 like this: , and for the number 93 like this: .

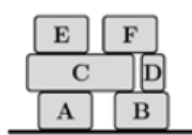
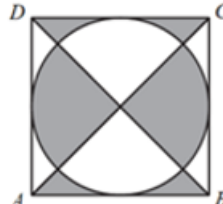
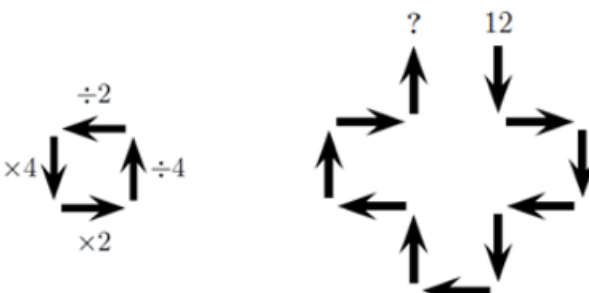
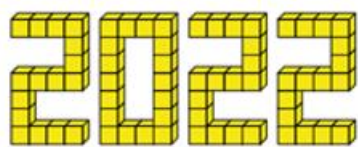
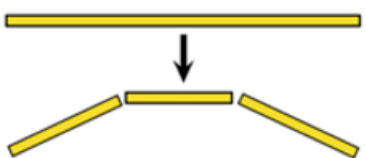
What does the symbol for the number 45 look like?

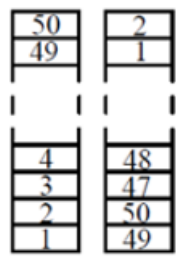
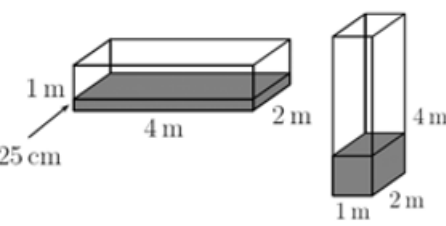
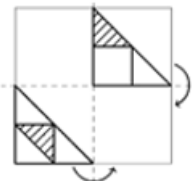
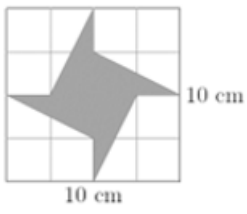

3)  6)  4)  2)  1) 

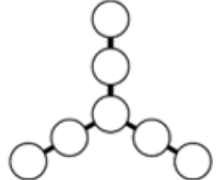
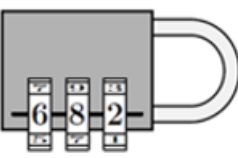
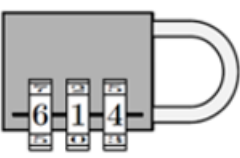
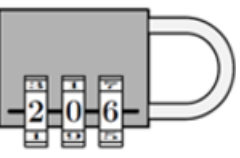
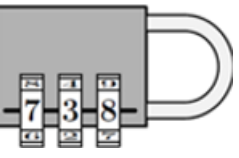
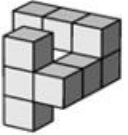
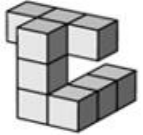
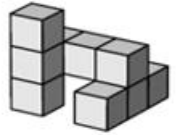
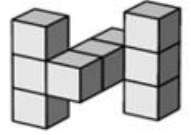
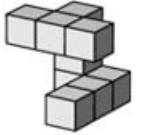
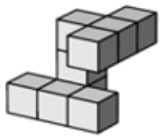



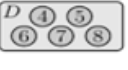

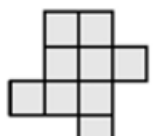
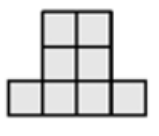

(2,4) Continuing the presented system of filling in the table, Hrvoje fills in the empty cells with numbers up to 40. Which of the offered parts can he cut out from the completed table?

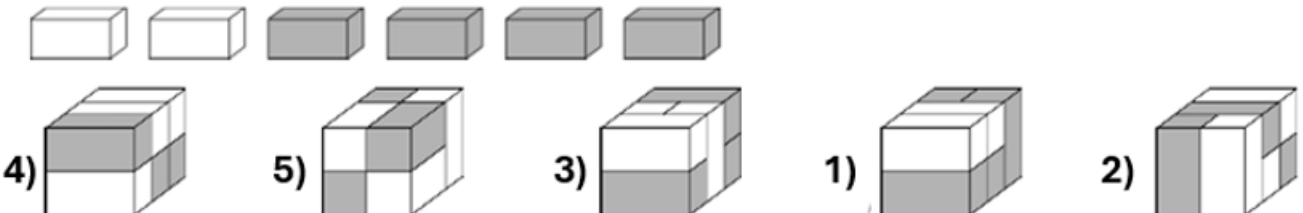
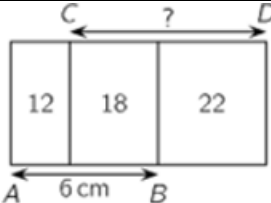

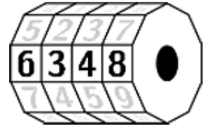



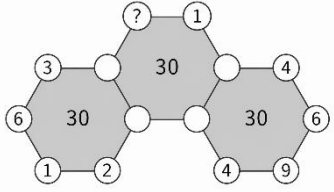

1)  9)  3)  7)  8) 

| | | |
|--------------|--|---|
| <p>(3,4)</p> | <p>Six boxes are stacked on a truck as shown in the picture. The worker moved them to the floor. He took them one box at a time, making sure that the box he took did not have another box on top. He stacked the boxes either on the floor or on top of another box. Which of the following stacks could he not stack?</p> |  |
| <p>(4,4)</p> | <p>In the picture, there is a square with sides 10 cm long. What is the area of the shaded part?</p> <p>4) 40 cm² 5) 45 cm² 8) 50 cm² 7) 55 cm² 3) 60 cm²</p> |  |
| <p>(5,4)</p> | <p>Fran rearranged the seven pieces shown in the picture to make the smallest possible twelve-digit number. What are the last three digits of that number?</p> <p>4) 69 113 9 51 5 67</p> <p>1) 669 4) 113 8) 551 7) 967 3) 459</p> | |
| <p>(6,4)</p> | <p>Jan started with the number 12 and followed the arrows, following the rule shown in the left picture. What number did he end the calculation with, as shown by the arrows in the right picture?</p>  <p>3) 3 6) 6 1) 12 5) 24 4) 48</p> | |
| <p>(7,4)</p> | <p>Kristijan and his friends made the number 2022 using 66 cubes, as shown in the picture. They then painted the resulting object yellow. How many cubes are there in this object that have exactly four yellow sides?</p> <p>3) 16 6) 30 1) 46 5) 54 9) 60</p> |  |
| <p>(0,5)</p> | <p>Mia wants to shorten a long piece of string by breaking it. She makes three pieces from each piece she breaks, as shown in the picture. What number cannot be the total number of pieces she gets this way?</p> <p>4) 13 5) 17 8) 20 7) 23 3) 25</p> |  |

| | | |
|-------|--|---|
| (1,5) | <p>A tower of blocks numbered 1 to 50 is stacked on a table. Corina builds a new tower as follows: she takes two blocks from the top of the tower and places them on the table, then takes two more blocks from the top of the remaining tower and places them on top of the new tower, as shown in the picture. Which of the following pairs of numbers are on adjacent blocks in the new tower?</p> <p>1) 29 and 28 2) 34 and 35 4) 29 and 26 9) 31 and 33 7) 27 and 30</p> |  |
| (2,5) | <p>A water tank with a rectangular base has dimensions 4m x 2m x 1m. A quantity of water is poured into the tank to a height of 25 cm. The tank is then turned so that its rectangular base has dimensions 1m x 2m, as shown in the figure. To what height does the water reach in the tank thus positioned?</p> <p>3) 25 cm 9) 50cm 1) 75 cm 6) 1 meter 4) 1.25 m</p> |  |
| (3,5) | <p>Piculet are sold in packages of 5, 10 or 25 pieces. Hrvoje bought exactly 95 piculet. What is the minimum package he had to buy?</p> <p>4) 4 5) 5 7) 7 8) 8 1) 10</p> | |
| (4,5) | <p>A pattern is drawn on a piece of transparent paper as shown in the picture. The paper is then folded twice. What does the folded paper look like?</p> <p>9) 3) 1) 6) 4)</p> |  |
| (5,5) | <p>The area of a square is 100 cm^2. What is the area of the shaded part highlighted in that square?</p> <p>1) 20 cm^2 2) 25 cm^2 3) 30 cm^2 4) 35 cm^2 5) 40 cm^2</p> |  |
| (7,5) | <p>Two congruent rectangles, each of area 18, are placed partially on top of each other to form a new rectangle, as shown in the figure. The new rectangle can be divided into three congruent squares. What is the area of the new rectangle?</p> <p>4) 24 1) 27 7) 30 3) 32 5) 36</p> |  |

| | | |
|-------|---|---|
| (0,6) | <p>Domagoj writes seven numbers 3, 4, 5, 6, 7, 8 and 9 in the circles in the picture so that the sum of the numbers written in each of the three circles connected by length is the same. What is the largest possible sum of numbers on one length that can be obtained in the described way?</p> <p style="text-align: center;">2) 28 3) 18 4) 22 5) 16 6) 20</p> |  |
| (1,6) | <p>For each of the padlocks, a statement is given that helps to reveal the code.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>One of the digits is correct and is in the right place.</p> </div> <div style="text-align: center;">  <p>One of the digits is correct, but it is in the wrong place.</p> </div> <div style="text-align: center;">  <p>Two digits are correct, but they are in the wrong place.</p> </div> <div style="text-align: center;">  <p>Not a single digit is correct.</p> </div> </div> <p>What is the code to unlock the padlock?</p> <p style="text-align: center;">1) 604 5) 082 4) 640 9) 042 2) 064</p> | |
| (3,6) | <p>Zita has four dogs. The mass of each dog is a natural number expressed in kilograms. No two dogs have the same mass, and their total mass is 60 kg. The second-heaviest dog, counting from the heaviest dog, has a mass of 28 kg. What is the mass of the third-heaviest dog, counting from the heaviest dog?</p> <p style="text-align: center;">2) 2 kg 3) 3 kg 4) 4 kg 5) 5kg 6) 6 kg</p> | |
| (4,6) | <p>Matthias has the figure shown in the picture on the right. Which of the following figures is equal to Matthias's?</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;"> 4)</div> <div style="text-align: center;"> 5)</div> <div style="text-align: center;"> 1)</div> <div style="text-align: center;"> 9)</div> <div style="text-align: center;"> 2)</div> </div> |  |
| (6,6) | <p>Zoran has five boxes of chocolates marked A, B, C, D, E. The chocolates in the box are numbered, depending on the flavor, as shown. He ate all but one of the chocolates from each box, and the picture below shows what was left. What is the label of the box marked X?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <div style="display: flex; justify-content: center; margin-top: 10px;"> <div style="text-align: center; border: 1px solid gray; padding: 2px 5px; margin: 0 5px;">X</div> <div style="text-align: center; border: 1px solid gray; padding: 2px 5px; margin: 0 5px;">5</div> <div style="text-align: center; border: 1px solid gray; padding: 2px 5px; margin: 0 5px;">4</div> <div style="text-align: center; border: 1px solid gray; padding: 2px 5px; margin: 0 5px;">3</div> <div style="text-align: center; border: 1px solid gray; padding: 2px 5px; margin: 0 5px;">2</div> <div style="text-align: center; border: 1px solid gray; padding: 2px 5px; margin: 0 5px;">1</div> </div> <p style="text-align: center;">4) A 1) B 7) C 3) D 5) E</p> | |
| (7,6) | <p>The three images show views from above, front, and right of an object made of cubes.</p> <div style="display: flex; justify-content: space-around; align-items: center; text-align: center;"> <div style="margin: 10px;">  From above </div> <div style="margin: 10px;">  Front </div> <div style="margin: 10px;">  Right </div> </div> <p>What is the largest number of cubes used to build this object?</p> <p style="text-align: center;">2) 18 3) 19 4) 20 5) 21 6) 22</p> | |

| | |
|-------|--|
| (8,6) | <p>There are 30 people sitting around a round table. Some of them are wearing hats. Those who are wearing hats always tell the truth, while those who are not wearing hats sometimes lie and sometimes tell the truth. Each person says, "At least one of the people next to me is not wearing a hat." What is the largest possible number of people at the table who are wearing hats?</p> <p>2) 5 3) 10 4) 15 8) 20 9) 25</p> |
| (0,7) | <p>Which of the following shapes can be assembled using the given 6 cubes?</p>  |
| (2,7) | <p>Rectangles of equal height are arranged as shown in the figure. The numbers inside the rectangles indicate their area in square centimeters. If the length of side AB is 6 cm, what is the length of side CD?</p> <p>4) 7 cm 5) 7.5 cm 2) 8 cm 1) 8.2 cm 3) 8.5 cm</p>  |
| (3,7) | <p>Sanja had 4 white chips and Maja had 4 gray chips. They played a game in which they took turns placing their chips on top of each other to make two piles. Sanja played first. Which of the following pairs of piles could they not make?</p>  |
| (4,7) | <p>My younger brother has a four-digit combination on his bicycle lock. Each wheel contains the numbers 0 to 9. He started turning the wheels from the correct combination so that each wheel turned the same number of times in the same direction. The lock now shows the combination 6348. Which of the following combinations CANNOT be the combination for his brother's lock?</p> <p>4) 8560 5) 3015 3) 4906 1) 1893 6) 0782</p>  |
| (5,7) | <p>The picture shows a honeycomb with 16 cells. Some of them contain honey. The number in each cell shows how many of its neighboring cells contain honey. Cells are adjacent if they have a common edge. How many cells in that honeycomb does honey contain?</p> <p>4) 7 1) 8 7) 9 3) 10 5) 11</p>  |
| (6,7) | <p>There were 20 apples and 20 pears in a box of fruit. Karlo randomly took 20 pieces of fruit from the box, and Luka took the rest. Which of the following statements is always true?</p> <p>2) Karlo took at least one pear. 8) Karlo has the same number of pears as apples. 3) Karlo took the same number of apples as Luka. 9) Karlo took the same number of pears as Luka took apples. 6) Karlo took the same number of pears as Luka.</p> |

| (8,7) | <p>The diagram shows three hexagons with numbers highlighted in their vertices, some of which are invisible. The sum of the six numbers around each hexagon is 30. Which number is at the top marked with a question mark?</p> <p>3 4 5 6 7</p> |  | | | | | | |
|-------------------------------------|--|---|-------------------------------------|--|---------|------------------|---------------|----------------|
| (0,8) | <p>Ana, Branko, Cvijeta, Damir and Emil are sitting at a round table. Ana is not next to Branko, Damir is next to Emil and Branko is not next to Damir. Which two people are sitting next to Cvijeta?</p> <p>3) Ana and Branko. 4) Branko and Damir. 5) Damir and Emil. 6) Emil and Ana. 7) It cannot be determined exactly.</p> | | | | | | | |
| (1,8) | <p>Each of the 16 circles shown contains one number. The numbers in adjacent circles differ by 1. One of the circles contains the number 5, and one contains the number 13. How many different numbers are written in these 16 circles?</p> <p>4) 9 1) 10 7) 13 3) 14 5) 16</p> |  | | | | | | |
| (2,8) | <p>Marin asked the cook in the cafeteria for a pancake recipe. He received a recipe for 100 pancakes.</p> <table border="1" data-bbox="518 1153 1157 1299"> <thead> <tr> <th colspan="2"><i>Ingredients for 100 pancakes</i></th> </tr> </thead> <tbody> <tr> <td>25 eggs</td> <td>4 liters of milk</td> </tr> <tr> <td>5 kg of flour</td> <td>1 kg of butter</td> </tr> </tbody> </table> <p>Marin has 6 eggs, 400 g of flour, 0.5 liters of milk and 200 g of butter. How many pancakes can he make using this recipe?</p> <p>6) 6 8) 8 1) 10 2) 12 5) 15</p> | | <i>Ingredients for 100 pancakes</i> | | 25 eggs | 4 liters of milk | 5 kg of flour | 1 kg of butter |
| <i>Ingredients for 100 pancakes</i> | | | | | | | | |
| 25 eggs | 4 liters of milk | | | | | | | |
| 5 kg of flour | 1 kg of butter | | | | | | | |
| (3,8) | <p>An apple and an orange have the same mass as a pear and a peach. An apple and a pear have less mass than an orange and a peach, and a pear and an orange have less mass than an apple and a peach. Which of the following fruits has the greatest mass?</p> <p>1) Apple 8) Orange 6) Peach 2) Pear 5) Cannot be determined</p> | | | | | | | |
| (4.8) | <p>Peter chose four out of five numbers 2, 3, 4, 5 and 6 and wrote one number in each <i>box</i> so that he got the correct answer. How many numbers, out of the five offered, could he write in the shaded box?</p> <p style="text-align: center;"> + - = </p> <p style="text-align: center;">1 2 3 4 5</p> | | | | | | | |

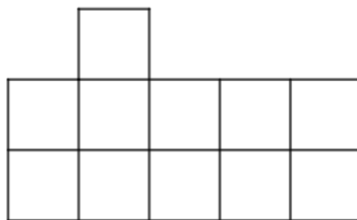
(7,8) An equilateral triangle is tiled with four congruent triangles, two congruent trapezoids, and three congruent rhombuses. Which statement is true?

- 4) The light gray area is the largest.
- 1) The dark gray area is the largest.
- 7) Light gray and dark gray surfaces are the same.
- 3) The white surface is half dark gray.
- 5) The white surface is half light gray.



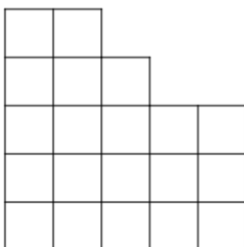
TASKS

1. The figure shows a figure with an area of 11 unit squares, which corresponds to an area of 46.75 cm^2 . Determine the area of the unit square.



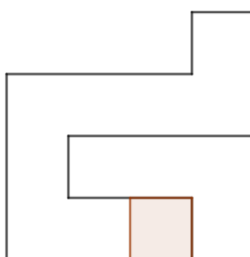
- 9) 4.25 cm^2 8) 2.06 cm^2 7) 11 cm^2

2. The figure shows a figure with drawn unit squares, with an area of 180 dm^2 . What is the length of the side of the unit square?



- 8) 4 dm 9) 9 cm 4) 3 dm

3. The figure shows a figure with a highlighted unit square of perimeter 18 cm. Determine the area of the drawn figure, expressed in dm^2 .



- 7) 182.25 dm^2 4) $18,225 \text{ dm}^2$ 2) 1.8225 dm^2

7. The figure shows a figure with an area of 72 dm^2 , with a highlighted square with an area of 450 cm^2 . Determine the area of the shown figure, expressed in unit squares.

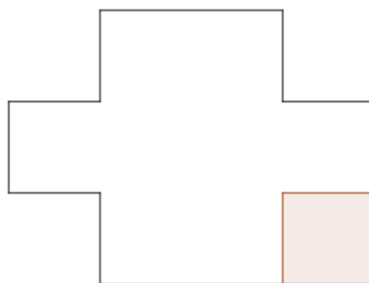


2) 16

3) 20

4) 72

8. . The figure shows a figure with a perimeter of 42 cm, with a highlighted unit square. What is the area of the figure shown?

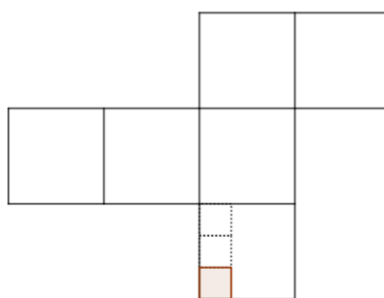


7) 0.81 m^2

5) 81 cm^2

6) 11 unit squares

9. The figure shows the grid of a cube with a volume of 27 m^3 . The unit square is highlighted on the grid. Determine its area.

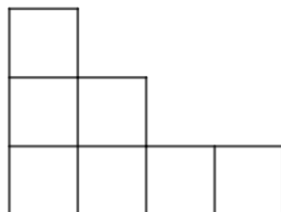


3) 27 cm^2

2) 100 cm^2

1) 10000 cm^2

10. The figure shows a figure with an area of 7 unit squares, which corresponds to an area of 24.5 cm^2 . Determine the area of the unit square.

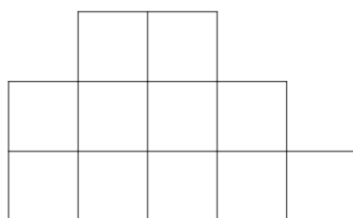


8) 1.5 cm^2

7) 4 cm^2

6) 3.5 cm^2

11. The figure shows a figure with drawn unit squares, with an area of 704 cm^2 . What is the length of the side of the unit square?

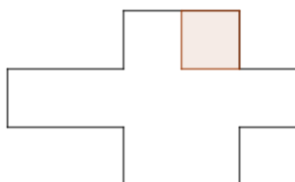


1) 4 cm

5) 8 cm

3) 64 cm

12. The figure shows a figure with a highlighted unit square whose perimeter is 32 cm. Determine the area of the drawn figure, expressed in dm^2 .

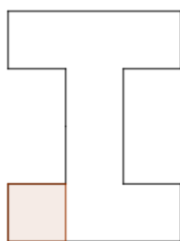


1) 5.76 dm^2

2) 576 dm^2

3) 0.576 dm^2

13. The figure shows a figure with a highlighted unit square whose area is 16 cm^2 . Determine the perimeter of the drawn figure, expressed in meters.

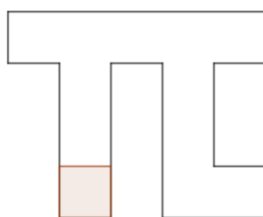


3) 0.72 cm

5) 72 cm

7) 720 cm

14. The figure shows a figure with a highlighted unit square whose side length is 7 m. What is the area of the figure shown, expressed in unit squares?

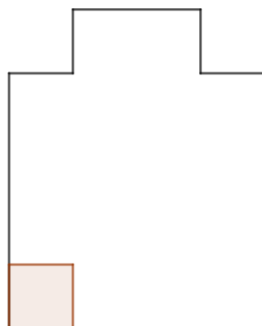


7) 84

3) 12

6) 588

15. The picture shows a figure with a perimeter of 18 and the unit square is highlighted. Determine the area of the unit square, expressed in cm^2 .



9) 1

8) 100

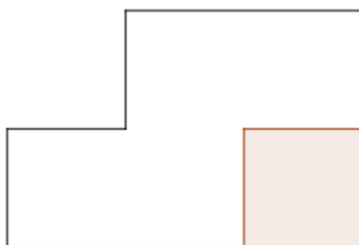
7) 10000

16. The figure shows a figure with an area of 90 dm^2 , with a highlighted square with an area of 900 cm^2 . Determine the area of the shown figure, expressed in unit squares.



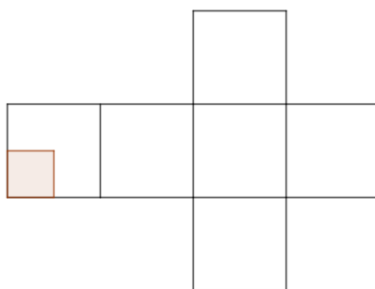
- 2) 1 9) 10 6) 90

17. The figure shows a figure with a perimeter of 24 cm, with a highlighted unit square. What is the surface area of the depicted figure?



- 8) 0.000576 m^2 6) 10 unit squares 8) 57.6 cm^2

18. The figure shows the grid of a cube with a volume of 8 m^3 . The unit square is highlighted on the grid. Determine its area.



- 3) 100 cm^2 5) 1000 cm^2 8) 10000 cm^2

GAME 9_6: VECTOR WALK ON A SUDOKU BOARD

Instructions: the field in row A and column 5 will be marked with A_5 .

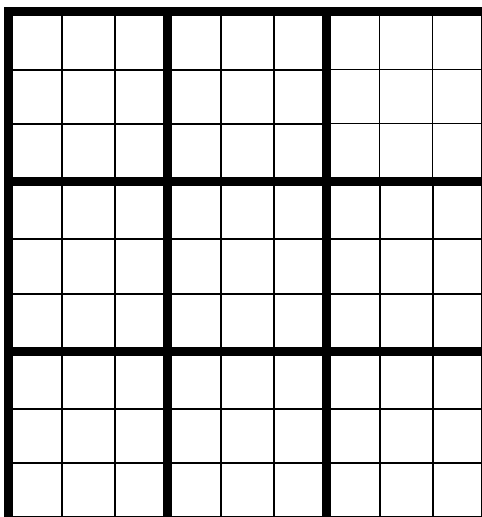
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | | | | | | | | | |
| C | | | | | | | | | |
| D | | | | | | | | | |
| E | | | | | | | | | |
| F | | | | | | | | | |
| G | | | | | | | | | |
| H | | | | | | | | | |
| I | | | | | | | | | |

The initial set of the Sudoku game is given below with tasks in two colors: blue and green.

| BLUE |
|---|
| 1. Position yourself in the field E_2 and move by vector $\overrightarrow{E_2A_1}$. Enter 1 in the field you arrived at. |
| 2. Move the vector $\overrightarrow{D_4H_6}$ and enter 2 in the field you came to. |
| 3. Move the vector $\overrightarrow{E_6B_4}$ and enter 2 in the field you came to. |
| 4. Move the vector opposite the vector $\overrightarrow{C_6B_2}$ and enter 9 in the field you arrived at. |
| 5. Move the vector opposite the vector $\overrightarrow{H_3F_2}$ and enter 1 in the field you arrived at. |
| 6. Position yourself in the field I_9 and move by vector $\overrightarrow{I_9C_8}$. Enter 1 in the field you arrived at. |
| 7. Move the vector $\overrightarrow{E_1G_2}$ and enter 9 in the field you came to. |
| 8. Move the vector $\overrightarrow{C_9G_3}$ and enter 6 in the field you came to. |
| 9. Move the vector opposite the vector $\overrightarrow{F_7H_1}$ and enter 7 in the field you arrived at. |
| 10. Move the vector opposite the vector $\overrightarrow{B_3B_5}$ and enter 4 in the field you arrived at. |
| 11. Position yourself in the field D_7 and move by vector $\overrightarrow{D_7I_2}$. In the field you have reached, enter 2. |
| 12. Move the vector $\overrightarrow{H_3E_8}$ and enter 2 in the field you came to. |
| 13. Move the vector $\overrightarrow{H_6F_1}$ and enter 7 in the field you came to. |
| 14. Move the vector opposite the vector $\overrightarrow{D_6E_2}$ and enter 4 in the field you arrived at. |
| 15. Move the vector opposite the vector $\overrightarrow{E_5E_9}$ and enter 5 in the field you arrived at. |

| GREEN |
|---|
| 1. Position yourself in the field D_5 and move by vector $\overrightarrow{D_5A_6}$. In the field you have reached, enter 8. |
| 2. Move the vector $\overrightarrow{B_6F_2}$ and enter 8 in the field you came to. |
| 3. Move the vector $\overrightarrow{F_5G_8}$ and enter 6 in the field you came to. |
| 4. Move the vector opposite the vector $\overrightarrow{A_2A_1}$ and enter 7 in the field you arrived at. |
| 5. Move the vector opposite the vector $\overrightarrow{E_8B_5}$ and enter 5 in the field you arrived at. |
| 6. Position yourself in the field A_9 and move by vector $\overrightarrow{A_9E_8}$. In the field you have reached, enter 7. |
| 7. Move the vector $\overrightarrow{A_8E_6}$ and enter 9 in the field you came to. |
| 8. Move the vector $\overrightarrow{H_6C_1}$ and enter 5 in the field you came to. |
| 9. Move the vector opposite the vector $\overrightarrow{A_3A_1}$ and enter 9 in the field you arrived at. |
| 10. Move the vector opposite the vector $\overrightarrow{G_8I_9}$ and enter 9 in the field you arrived at. |
| 11. Position yourself in the field C_7 and move by vector $\overrightarrow{C_7G_3}$. In the field you have reached, enter 5. |
| 12. Move the vector $\overrightarrow{H_3I_8}$ and enter 6 in the field you came to. |
| 13. Move the vector $\overrightarrow{F_3B_2}$ and enter 6 in the field you came to. |
| 14. Move the vector opposite the vector $\overrightarrow{D_6F_8}$ and enter 3 in the field you arrived at. |
| 15. Move the vector opposite to the vector $\overrightarrow{E_5A_8}$ and enter 1 in the field you arrived at. |

GAME 9_7: SPACE SUDOKU



| LINE | COLUMN | TASK | |
|------|--------|---|--|
| 8 | 1 | The Earth takes 365 days to go around the Sun. Jupiter needs 11 times longer. How many Jupiter years does it take for Earth to make 11 full orbits? | |
| 7 | 8 | How many astronauts out of the three who participated in the Apollo 11 mission landed on the Moon? | |
| 1 | 1 | If there are 6 astronauts in a space team and each astronaut can carry 5 kilograms of equipment, and each kilogram of equipment uses 1 liter of oxygen in 1 hour, how many liters of oxygen do they use in total in 10 hours? The highest digit of the resulting number is the solution. | |
| 3 | 3 | If a rocket consumes 3 tons of fuel per minute, how many minutes can it fly with 27 tons of fuel? | |
| 1 | 9 | An astronaut uses about 2 liters of oxygen per hour. How many astronauts would use a total of 36 liters of oxygen over 3 hours? | |
| 1 | 4 | One day on Venus lasts 243 Earth days. How many Venusian days are equal to 1215 Earth days? | |
| 4 | 3 | The International Astronomical Union officially recognizes 288 planetary moons orbiting the eight planets of the Solar System. If Jupiter has 79 natural satellites, what is the percentage of Jupiter's satellites in the total number of satellites in the Solar System? Divide the answer by 10, add 1, and round up to the next higher integer. | |

| | | | |
|---|---|---|--|
| 6 | 8 | Which of the following planets is closest to the Sun? 9) Saturn 2) Earth 5) Mercury 8) Uranus | |
| 7 | 4 | So far, only 12 people have walked on the Moon. If each mission included 3 astronauts, and only 2 astronauts from each mission walked on the Moon, how many such missions have there been in total? | |
| 3 | 1 | A geostationary satellite orbits the Earth and makes a full circle in 24 hours. If the satellite orbits the Earth once a day, how many times will it orbit the Earth in a week? | |
| 3 | 2 | Astronauts on the International Space Station "wake up" every 90 minutes, as a "new dawn" occurs as they orbit the Earth. How many times during a 12-hour orbit do astronauts see the sunrise? | |
| 3 | 5 | The International Space Station (ISS) orbits the Earth in approximately 90 minutes. How many times does it orbit the Earth in 3 hours? | |
| 9 | 6 | How many minutes does it take light to travel from the Sun to the Earth? | |
| 4 | 6 | What are the two most common colors that appear in the aurora borealis? 5) pink and purple 2) green and red 8) blue and white 9) brown and black | |
| 2 | 6 | The universe is about 13.8 billion years old, and the Earth is about 4.5 billion years old. What is the nearest whole number that shows how many billions of years younger the Earth is than the universe? | |
| 6 | 3 | Let's imagine a spacecraft traveling toward Mars at a speed of 75 million kilometers per year. The average distance from Earth to Mars is 225 million kilometers. How many years will it take the spacecraft to reach Mars? | |

| | | | |
|---|---|--|--|
| 4 | 9 | <p>How many planets does the Solar System have (not counting dwarf planets)?</p> <p>4) 6</p> <p>6) 7</p> <p>9) 8</p> <p>3) 9</p> | |
| 2 | 7 | <p>Which planet is called the "red planet" because of the color of its surface?</p> <p>1) Mars</p> <p>3) Jupiter</p> <p>7) Uranus</p> <p>9) Saturn</p> | |
| 4 | 7 | <p>A spaceship travels 240,000 kilometers to the Moon at a speed of 30,000 km per hour. How many hours does it take to arrive?</p> | |
| 4 | 8 | <p>Seasons occur because of:</p> <p>1) greater or lesser distance of the Earth from the Sun (during its movement around the Sun)</p> <p>8) Moon phases</p> <p>3) due to the rotation of the Earth around its own axis</p> <p>6) the tilt of the Earth's axis relative to the plane in which the Earth moves around the Sun</p> | |
| 7 | 2 | <p>If Jupiter has 79 natural satellites and Saturn has 83, how many do they have together? What is the sum of the digits of that number?</p> | |
| 6 | 6 | <p>If a galaxy contains 100 billion stars, and you have only seen 0.001% of those stars, how many stars have you seen? The answer is the sum of the digits of the resulting number.</p> | |
| 9 | 5 | <p>The first crew to reach the surface of the Moon in July 1969 consisted of Neil Armstrong, Buzz Aldrin, and Michael Collins. This landing was carried out as part of which mission:</p> <p>1) Apollo 11</p> <p>5) Apollo 12</p> <p>8) Apollo 13</p> <p>4) Apollo 14</p> | |

| | | | |
|---|---|---|--|
| 8 | 3 | <p>What is the correct order of the Moon's phases?</p> <p>5) New Moon, First Quarter, Full Moon, Last Quarter</p> <p>2) First quarter, New Moon, Full Moon, Last quarter</p> <p>1) Full Moon, Last quarter, First quarter, New Moon</p> <p>7) Last quarter, New Moon, First quarter, Full Moon</p> | |
| 5 | 7 | <p>Which of the following planets has the largest diameter?</p> <p>3) Earth</p> <p>2) Jupiter</p> <p>5) Mars</p> <p>4) Saturn</p> | |
| 1 | 5 | <p>The Sun goes through several phases during its life, as listed below. During which phase the Sun is expected to "swallow" Mercury, Venus, and Earth, due to its increase in diameter:</p> <p>3) First phase: Protosun</p> <p>2) Second phase: Main sequence</p> <p>1) Fifth stage: White dwarf</p> <p>9) Fourth stage: Planetary nebula</p> <p>7) Third phase: Red giant</p> | |

SOLUTIONS

GAME 4_1

| | | | |
|---|---|--|---|
| P | | | C |
| | | | |
| C | Ž | | P |
| | | | |

| | | | |
|---|---|---|---|
| P | Z | Ž | C |
| Ž | C | P | Z |
| C | Ž | Z | P |
| Z | P | C | Ž |

GAME 4_2

| | | | |
|---|---|---|---|
| C | | | |
| | | Ž | |
| | Z | | |
| | | | P |

| | | | |
|---|---|---|---|
| C | | | |
| | | Ž | |
| | Z | | |
| | | | P |

GAME 4_3

| | | | |
|---|---|---|---|
| Z | C | | |
| | | | |
| | | | |
| | | Ž | C |

| | | | |
|---|---|---|---|
| Z | C | | |
| | | | |
| | | | |
| | | Ž | C |

GAME 4_4

| | | | |
|---|---|---|---|
| 4 | 1 | 2 | 3 |
| 3 | 2 | 1 | 4 |
| 2 | 3 | 4 | 1 |
| 1 | 4 | 3 | 2 |

GAME 4_5

| | | | |
|---|---|---|---|
| 3 | 1 | 4 | 2 |
| 4 | 2 | 1 | 3 |
| 1 | 3 | 2 | 4 |
| 2 | 4 | 3 | 1 |

GAME 4_6

| | | | |
|---|---|---|---|
| 3 | 4 | 1 | 2 |
| 1 | 2 | 3 | 4 |
| 4 | 1 | 2 | 3 |
| 2 | 3 | 4 | 1 |

GAME 4_7

| | | | |
|----------|---|---|----------|
| 3 | 2 | 4 | 1 |
| 1 | 4 | 3 | 2 |
| 2 | 3 | 1 | 4 |
| 4 | 1 | 2 | 3 |

GAME 4_8

| | | | |
|----------|----------|----------|----------|
| 3 | 2 | 1 | 4 |
| 4 | 1 | 2 | 3 |
| 2 | 3 | 4 | 1 |
| 1 | 4 | 3 | 2 |

GAME 4_9

| | | | |
|---|----------|----------|----------|
| 1 | 2 | 4 | 3 |
| 3 | 4 | 2 | 1 |
| 4 | 1 | 3 | 2 |
| 2 | 3 | 1 | 4 |

GAME 4_10

| | | | |
|---|---|---|---|
| 3 | 4 | 1 | 2 |
| 2 | 1 | 4 | 3 |
| 4 | 3 | 2 | 1 |
| 1 | 2 | 3 | 4 |

GAME 4_11

| | | | |
|---|---|---|---|
| 3 | 4 | 2 | 1 |
| 1 | 2 | 3 | 4 |
| 4 | 3 | 1 | 2 |
| 2 | 1 | 4 | 3 |

GAME 4_12

| | | | |
|--|---|---|---|
| | | | Ž |
| | C | | |
| | | Ž | P |
| | | | |

| | | | |
|--|---|---|---|
| | | | Ž |
| | C | | |
| | | Ž | P |
| | | | |

GAME 4_13

| | | | |
|---|---|---|---|
| 4 | 1 | 3 | 2 |
| 3 | 2 | 4 | 1 |
| 2 | 4 | 1 | 3 |
| 1 | 3 | 2 | 4 |

GAME 4_14

| | | | |
|----|----|----|----|
| 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 |

GAME 6_1

| A | B |
|--------------|--------------|
| 1. (3,1) → 6 | 1. (1,0) → 2 |
| 2. (4,3) → 4 | 2. (3,4) → 1 |
| 3. (3,0) → 4 | 3. (5,1) → 5 |
| 4. (0,3) → 1 | 4. (0,5) → 5 |
| 5. (2,2) → 2 | 5. (1,1) → 1 |
| 6. (1,4) → 4 | 6. (5,4) → 3 |
| 7. (4,5) → 6 | 7. (2,3) → 3 |
| 8. (4,2) → 1 | 8. (2,1) → 4 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | 3 | 1 | 2 | 6 | 4 |
| 2 | 4 | 6 | 1 | 5 | 3 |
| 1 | 6 | 3 | 5 | 4 | 2 |
| 4 | 5 | 2 | 3 | 1 | 6 |
| 3 | 1 | 4 | 6 | 2 | 5 |
| 6 | 2 | 5 | 4 | 3 | 1 |

GAME 6_2

| A | B |
|--------------|--------------|
| 1. (2,1) → 1 | 1. (0,0) → 4 |
| 2. (5,4) → 4 | 2. (1,2) → 1 |
| 3. (3,5) → 5 | 3. (4,3) → 3 |
| 4. (1,0) → 5 | 4. (0,2) → 5 |
| 5. (2,5) → 6 | 5. (5,5) → 3 |
| 6. (4,2) → 4 | 6. (0,4) → 1 |

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 2 | 4 | 6 | 5 | 1 | 3 |
| 1 | 3 | 5 | 6 | 2 | 4 |
| 6 | 2 | 4 | 1 | 3 | 5 |
| 5 | 1 | 3 | 2 | 4 | 6 |
| 3 | 6 | 1 | 4 | 5 | 2 |
| 4 | 5 | 2 | 3 | 6 | 1 |

(5,5) ←
 (0,1) →
 (0,0) ↖
 (1,0) ↑

GAME 6_3

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 6 | 1 | 2 | 4 | 5 | 3 |
| 5 | 3 | 4 | 2 | 6 | 1 |
| 3 | 2 | 6 | 5 | 1 | 4 |
| 1 | 4 | 5 | 3 | 2 | 6 |
| 4 | 5 | 1 | 6 | 3 | 2 |
| 2 | 6 | 3 | 1 | 4 | 5 |

GAME 6_4 – NUMERICAL MATHEMATICS

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 4 | 3 | 6 | 2 | 1 | 5 |
| 2 | 5 | 1 | 3 | 4 | 6 |
| 5 | 4 | 2 | 1 | 6 | 3 |
| 6 | 1 | 3 | 5 | 2 | 4 |
| 3 | 2 | 4 | 6 | 5 | 1 |
| 1 | 6 | 5 | 4 | 3 | 2 |

GAME 6_5 – COORDINATE SYSTEM

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 6 | 4 | 1 | 5 | 3 | 2 |
| 2 | 3 | 5 | 1 | 6 | 4 |
| 3 | 5 | 2 | 6 | 4 | 1 |
| 1 | 6 | 4 | 2 | 5 | 3 |
| 5 | 1 | 3 | 4 | 2 | 6 |
| 4 | 2 | 6 | 3 | 1 | 5 |

GAME 6_6 – DIRECTED LENGTHS AND VECTORS

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 2 | 1 | 4 | 3 | 5 | 6 |
| 6 | 5 | 3 | 4 | 2 | 1 |
| 5 | 3 | 6 | 2 | 1 | 4 |
| 4 | 2 | 1 | 6 | 3 | 5 |
| 3 | 4 | 5 | 1 | 6 | 2 |
| 1 | 6 | 2 | 5 | 4 | 3 |

GAME 6_7 – EQUAL AND OPPOSITE VECTORS

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 3 | 4 | 2 | 1 | 6 | 5 |
| 6 | 5 | 1 | 2 | 3 | 4 |
| 2 | 3 | 5 | 4 | 1 | 6 |
| 1 | 6 | 4 | 5 | 2 | 3 |
| 5 | 2 | 3 | 6 | 4 | 1 |
| 4 | 1 | 6 | 3 | 5 | 2 |

GAME 6_8 - ADDITION AND SUBTRACTION OF VECTORS

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 2 | 4 | 6 | 5 | 1 | 3 |
| 1 | 3 | 5 | 6 | 2 | 4 |
| 6 | 2 | 4 | 1 | 3 | 5 |
| 5 | 1 | 3 | 2 | 4 | 6 |
| 3 | 6 | 1 | 4 | 5 | 2 |
| 4 | 5 | 2 | 3 | 6 | 1 |

GAME 6_9 - TRANSLATION

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 3 | 4 | 2 | 1 | 6 | 5 |
| 6 | 5 | 1 | 2 | 3 | 4 |
| 2 | 3 | 5 | 4 | 1 | 6 |
| 1 | 6 | 4 | 5 | 2 | 3 |
| 5 | 2 | 3 | 6 | 4 | 1 |
| 4 | 1 | 6 | 3 | 5 | 2 |

GAME 6_10

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 5 | 2 | 4 | 6 | 1 | 3 |
| 1 | 3 | 6 | 4 | 5 | 2 |
| 2 | 6 | 1 | 5 | 3 | 4 |
| 3 | 4 | 5 | 2 | 6 | 1 |
| 6 | 1 | 2 | 3 | 4 | 5 |
| 4 | 5 | 3 | 1 | 2 | 6 |

GAME 6_11

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 3 | 4 | 1 | 5 | 6 | 2 |
| 5 | 2 | 6 | 4 | 3 | 1 |
| 2 | 3 | 5 | 6 | 1 | 4 |
| 1 | 6 | 4 | 2 | 5 | 3 |
| 4 | 5 | 3 | 1 | 2 | 6 |
| 6 | 1 | 2 | 3 | 4 | 5 |

GAME 6_12

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 6 | 3 | 1 | 4 | 2 | 5 |
| 2 | 5 | 4 | 3 | 6 | 1 |
| 5 | 6 | 2 | 1 | 4 | 3 |
| 4 | 1 | 3 | 2 | 5 | 6 |
| 3 | 2 | 6 | 5 | 1 | 4 |
| 1 | 4 | 5 | 6 | 3 | 2 |

GAME 6_13

| | | | | | |
|---|---|---|---|---|---|
| 5 | 2 | 4 | 6 | 3 | 1 |
| 3 | 1 | 6 | 4 | 2 | 5 |
| 6 | 3 | 1 | 2 | 5 | 4 |
| 2 | 4 | 5 | 3 | 1 | 6 |
| 4 | 5 | 3 | 1 | 6 | 2 |
| 1 | 6 | 2 | 5 | 4 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | | | 6 | | |
| | 1 | 6 | | 2 | 5 |
| | | 1 | 2 | | 4 |
| 2 | 4 | | | 1 | |
| | 5 | 3 | | 6 | |
| 1 | | | 5 | | 3 |

GAME 6_14

| | | | | | |
|---|---|---|---|---|---|
| 5 | 1 | 4 | 2 | 6 | 3 |
| 6 | 3 | 2 | 1 | 5 | 4 |
| 3 | 6 | 1 | 5 | 4 | 2 |
| 2 | 4 | 5 | 3 | 1 | 6 |
| 1 | 2 | 6 | 4 | 3 | 5 |
| 4 | 5 | 3 | 6 | 2 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | 1 | 4 | 2 | | |
| | | | | | |
| 3 | | | | 4 | |
| | | 5 | | | 6 |
| | 2 | | 4 | | |
| 4 | | | | | 1 |

GAME 6_15

| | | | | | |
|---|---|---|---|---|---|
| 2 | 1 | 4 | 3 | 5 | 6 |
| 6 | 5 | 3 | 4 | 2 | 1 |
| 5 | 3 | 6 | 2 | 1 | 4 |
| 4 | 2 | 1 | 6 | 3 | 5 |
| 3 | 4 | 5 | 1 | 6 | 2 |
| 1 | 6 | 2 | 5 | 4 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| | | 4 | 3 | | 6 |
| | 5 | | | | 1 |
| 5 | | | | | 4 |
| | | 1 | 6 | | |
| | | 5 | | | |
| | 6 | | | 4 | |

GAME 6_16

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 3 | 6 | 4 | 2 | 1 | 5 |
| 5 | 2 | 1 | 4 | 3 | 6 |
| 2 | 1 | 3 | 5 | 6 | 4 |
| 4 | 5 | 6 | 3 | 2 | 1 |
| 1 | 4 | 2 | 6 | 5 | 3 |
| 6 | 3 | 5 | 1 | 4 | 2 |

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| | 6 | | | 1 | |
| 5 | | | | | 6 |
| | | 3 | 5 | | |
| | 5 | | | | 1 |
| | | 2 | | | |
| 6 | | 5 | | 4 | |

GAME 6_17

| | | | | | |
|---|---|---|---|---|---|
| 1 | 3 | 6 | 4 | 5 | 2 |
| 2 | 4 | 5 | 6 | 1 | 3 |
| 6 | 5 | 3 | 1 | 2 | 4 |
| 4 | 1 | 2 | 3 | 6 | 5 |
| 5 | 6 | 4 | 2 | 3 | 1 |
| 3 | 2 | 1 | 5 | 4 | 6 |

| | | | | | |
|--|---|---|---|---|---|
| | 3 | | 4 | | |
| | | 5 | 6 | | 3 |
| | | | 1 | | |
| | 1 | | 3 | | 5 |
| | 6 | 4 | | 3 | 1 |
| | | 1 | | 4 | 6 |

GAME 9_1 - SUDOKU IN A COORDINATE SYSTEM

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1 | 3 | 2 | 5 | 8 | 4 | 6 | 7 | 9 |
| 7 | 9 | 5 | 4 | 3 | 7 | 6 | 2 | 8 | 1 |
| 6 | 7 | 6 | 8 | 9 | 1 | 2 | 3 | 5 | 4 |
| 5 | 6 | 1 | 9 | 8 | 3 | 5 | 4 | 2 | 7 |
| 4 | 5 | 8 | 3 | 2 | 4 | 7 | 9 | 1 | 6 |
| 3 | 2 | 4 | 7 | 1 | 6 | 9 | 8 | 3 | 5 |
| 2 | 8 | 9 | 1 | 4 | 5 | 3 | 7 | 6 | 2 |
| 1 | 4 | 7 | 5 | 6 | 2 | 8 | 1 | 9 | 3 |
| 0 | 3 | 2 | 6 | 7 | 9 | 1 | 5 | 4 | 8 |
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

GAME 9_2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| 8 | 6 | 5 | 4 | 3 | 7 | 2 | 9 | 1 | 8 | 8 |
| 7 | 2 | 7 | 8 | 1 | 5 | 9 | 6 | 4 | 3 | 7 |
| 6 | 3 | 9 | 1 | 8 | 6 | 4 | 2 | 5 | 7 | 6 |
| 5 | 5 | 3 | 9 | 2 | 8 | 7 | 4 | 6 | 1 | 5 |
| 4 | 7 | 8 | 6 | 9 | 4 | 1 | 5 | 3 | 2 | 4 |
| 3 | 1 | 4 | 2 | 6 | 3 | 5 | 7 | 8 | 9 | 3 |
| 2 | 8 | 2 | 5 | 4 | 9 | 3 | 1 | 7 | 6 | 2 |
| 1 | 4 | 1 | 3 | 7 | 2 | 6 | 8 | 9 | 5 | 1 |
| 0 | 9 | 6 | 7 | 5 | 1 | 8 | 3 | 2 | 4 | 0 |
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |

GAME 9_3

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6 | 1 | 8 | 4 | 5 | 9 | 3 | 2 | 7 |
| 2 | 5 | 7 | 8 | 6 | 3 | 4 | 9 | 1 |
| 9 | 3 | 4 | 2 | 7 | 1 | 8 | 5 | 6 |
| 7 | 2 | 3 | 1 | 9 | 8 | 6 | 4 | 5 |
| 1 | 8 | 9 | 6 | 4 | 5 | 7 | 3 | 2 |
| 4 | 6 | 5 | 3 | 2 | 7 | 1 | 8 | 9 |
| 5 | 4 | 1 | 9 | 3 | 6 | 2 | 7 | 8 |
| 3 | 9 | 6 | 7 | 8 | 2 | 5 | 1 | 4 |
| 8 | 7 | 2 | 5 | 1 | 4 | 9 | 6 | 3 |

GAME 9 4

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 3 | 4 | 8 | 6 | 5 | 9 | 2 | 7 | 1 |
| 1 | 5 | 2 | 8 | 3 | 7 | 9 | 6 | 4 |
| 6 | 9 | 7 | 2 | 1 | 4 | 5 | 3 | 8 |
| 8 | 7 | 6 | 5 | 9 | 2 | 4 | 1 | 3 |
| 4 | 2 | 3 | 7 | 8 | 1 | 6 | 9 | 5 |
| 9 | 1 | 5 | 4 | 6 | 3 | 7 | 8 | 2 |
| 7 | 8 | 9 | 3 | 4 | 5 | 1 | 2 | 6 |
| 5 | 6 | 1 | 9 | 2 | 8 | 3 | 4 | 7 |
| 2 | 3 | 4 | 1 | 7 | 6 | 8 | 5 | 9 |

GAME 9 5 and GAME 9 6

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| A | 1 | 6 | 4 | 7 | 5 | 8 | 9 | 2 | 3 |
| B | 2 | 9 | 7 | 1 | 3 | 6 | 5 | 8 | 4 |
| C | 3 | 5 | 8 | 2 | 9 | 4 | 7 | 1 | 6 |
| D | 5 | 7 | 9 | 8 | 2 | 3 | 6 | 4 | 1 |
| E | 6 | 8 | 2 | 5 | 4 | 1 | 3 | 7 | 9 |
| F | 4 | 1 | 3 | 9 | 6 | 7 | 2 | 5 | 8 |
| G | 8 | 3 | 5 | 6 | 1 | 2 | 4 | 9 | 7 |
| H | 9 | 4 | 1 | 3 | 7 | 5 | 8 | 6 | 2 |
| I | 7 | 2 | 6 | 4 | 8 | 9 | 1 | 3 | 5 |

GAME 9_7

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 3 | 2 | 1 | 5 | 7 | 4 | 9 | 8 | 6 |
| 4 | 5 | 6 | 3 | 8 | 9 | 1 | 7 | 2 |
| 7 | 8 | 9 | 1 | 2 | 6 | 3 | 4 | 5 |
| 5 | 1 | 4 | 7 | 3 | 2 | 8 | 6 | 9 |
| 9 | 7 | 8 | 4 | 6 | 5 | 2 | 1 | 3 |
| 2 | 6 | 3 | 8 | 9 | 1 | 7 | 5 | 4 |
| 8 | 9 | 7 | 6 | 5 | 3 | 4 | 2 | 1 |
| 1 | 3 | 5 | 2 | 4 | 7 | 6 | 9 | 8 |
| 6 | 4 | 2 | 9 | 1 | 8 | 5 | 3 | 7 |