

# LOGIC MASTERS Deutschland e.V.

MEMBER OF



WORLD PUZZLE FEDERATION

## Instruction booklet for the qualifying test of Logic Masters 2007

*On Saturday, May 19, the official test file will be available for download. Make sure you have read and understood the rules of the contest.*

Welcome to the qualification round for the Logic Masters 2007!

We hope you enjoy the competition, whether you compete seriously or just for fun.

The test will consist of 20 puzzles, some of them extremely difficult. We believe nobody will be able to solve all of them in time. Solve those puzzles you can solve and skip the others; if you have time left, you can always come back to them.

The points for the puzzles have been assigned according to their difficulty. You may use these information to decide, which puzzles to try first. However, keep in mind your estimation of a puzzles difficulty may differ from ours.

We wish you good luck, enjoy the puzzles!

### **Last minute changes:**

If there are any changes or clarifications, they will be announced in our forum at <http://forum.logic-masters.de/viewforum.php?f=7>

### **Remember:**

- Wrong answers will yield a penalty of 5 points. Be careful when entering your answer keys.
- Enter the answer keys you already have, to avoid time trouble at the end of the test. Remember, late answers will yield a penalty of 10 points per minute.
- You are solely responsible for sending your answers in time.
- You must solve the qualification puzzles without outside help. Computer programs, Sudoku solvers or similar are not allowed.

### **Answer key:**

Please try to obey the following guidelines when entering your answer keys:

- If you have to enter several rows, separate them by comma, not by spaces only. In each row, enter your solution from left to right.
- If not specified differently, enter your solution from top to bottom.
- If several letters or digits from one row have to be entered, form a word („ABC“ instead of „A,B,C“).

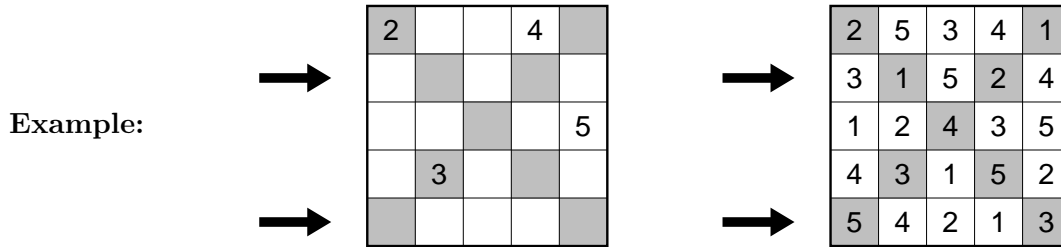
# Instructions

The following instructions come directly from the test file; only the diagrams have been removed. Instead of them, small examples are shown. These examples can not be found in the test file. You should read and understand the instructions and examples before the test.

## 1 Sudoku

10 Punkte

Place digits from 1 to 7 into the grid, so that each digit appears in each row, each column and both marked diagonals exactly once.



**Answer key:** Enter the digits of the third and fifth row.

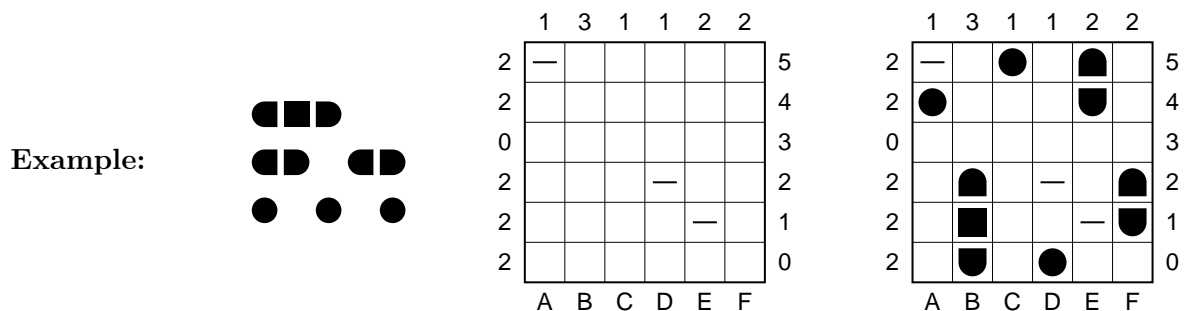
*In the example – with second and fifth row – the answer key would be: 31524, 54213*

## 2 Battleships

10 Punkte

Locate the position of the 10-ship fleet in the grid. The fleet is shown to the left of the grid: one 4-unit battleship, two 3-unit cruisers, three 2-unit destroyers, and four 1-unit submarines. Each segment of a ship occupies a single cell. Ships are oriented either horizontally or vertically, and they do not touch each other, not even diagonally. The numbers on the right and top edges of the grid reveal the total number of ship segments that appear in each respective row or column. The marked cells can not contain a ship segment.

*For solving purposes, ignore the letters below and the numbers right to the grid.*



**Answer key:** The letters below and the numbers right to the grid define a coordinate system. Enter the coordinates of all four 1-unit ships.

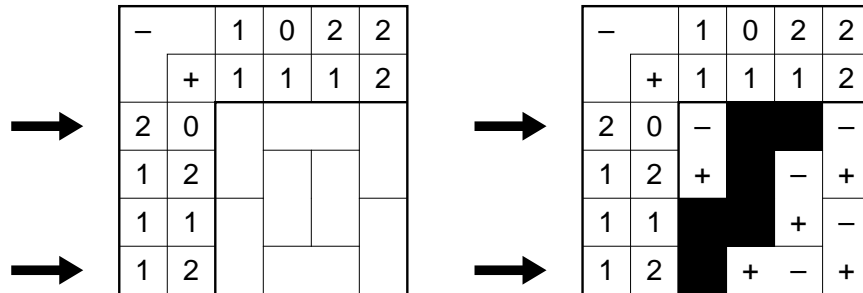
*In the example – with a smaller fleet – the answer key would be: A4,C5,D0*

### 3 Magnets

15 Punkte

The grid is made up of magnetic and non-magnetic plates. Each magnetic plate has two halves: one positive (+) and one negative (-). Halves with the same symbol can not be horizontally or vertically adjacent. The numbers outside the grid indicate how many magnetic halves of each kind can be found in that row or column.

Example:



**Answer key:** Enter the contents of the third and eighth row (use +, - and N for neutral halves).  
*In the example - with first and fourth row - the answer key would be: -NN-, N+-+*

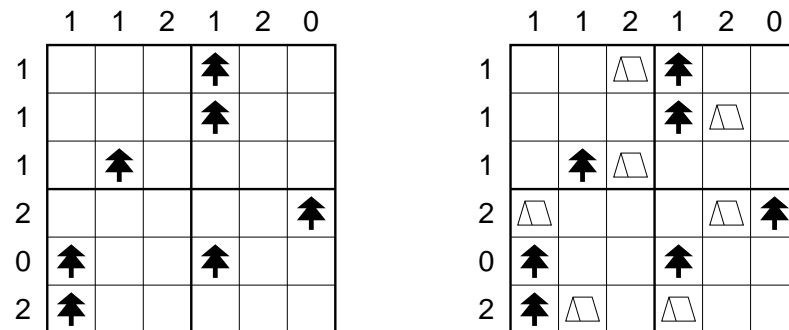
### 4 Tents

15 Punkte

Locate 30 tents in the grid. Each tree is connected to exactly one tent, found in a horizontally or vertically adjacent square. Tents do not touch each other, not even diagonally. The numbers outside the grid indicate the total number of tents in the corresponding row or column.

*For solving purposes, ignore the division into 3x3-squares.*

Example:



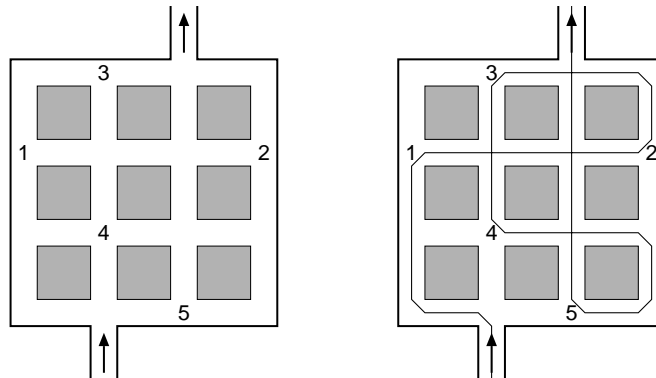
**Answer key:** Enter the number of tents in each 3x3-square.  
*In the example, the answer key would be: 21, 22*

## 5 Number Maze

15 Punkte

Find a way through the maze, passing through the numbers from 1 to 9 in ascending order. The path may not use a line segment more than once. The path may cross itself, but only in two straight lines (horizontally and vertically). The path may not cross itself in a numbered junction.

Example:



**Answer key:** Answer key: For each of the seven (*in the example: four*) horizontal rows, enter how often the path crosses itself in that row.

*In the example, the answer key would be: 1, 2, 1, 0*

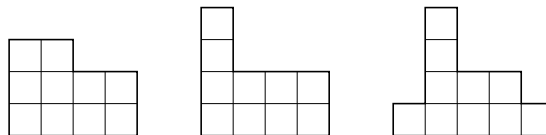
## 6 Triplet

15 Punkte

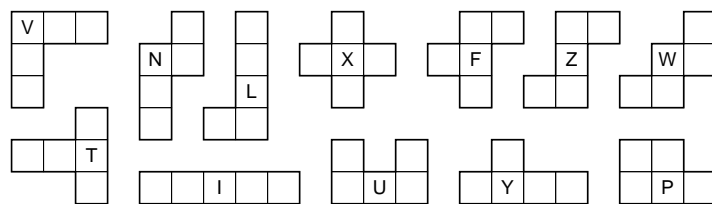
Choose three (*in the example: two*) of the twelve pentominoes, so that each of the three shown figures can be assembled from the chosen pentominoes. In each figure, the three pentominoes must be used exactly once; they may be rotated and/or reflected.

*For solving purposes, ignore the letters inside the pentominoes.*

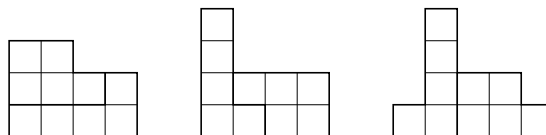
Example:



Die zwölf Pentominos:



Lösung:



**Answer key:** Enter the corresponding letters of the chosen pentominoes.

*In the example – using two instead of three pentominoes – the answer key would be: L, P*

## 7 Dominos

20 Punkte

An 8x7-rectangle has been composed from the shown set of dominoes; the sides of the dominoes have been removed. Restore them, such that each domino is used exactly once.

**Example:**

|   |   |
|---|---|
| 0 | 0 |
| 0 | 1 |
| 0 | 2 |
| 0 | 3 |
| 1 | 1 |

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

|   |   |   |   |   |
|---|---|---|---|---|
| 3 | 2 | 0 | 0 | 0 |
| 1 | 2 | 3 | 2 | 1 |
| 1 | 1 | 2 | 2 | 1 |
| 3 | 0 | 3 | 3 | 0 |

|   |   |   |   |   |
|---|---|---|---|---|
| 3 | 2 | 0 | 0 | 0 |
| 1 | 2 | 3 | 2 | 1 |
| 1 | 1 | 2 | 2 | 1 |
| 3 | 0 | 3 | 3 | 0 |

**Answer key:** Enter all digits in horizontally placed dominoes.  
*In the example, the answer key would be: 2000, 2321, 1122, 3033*

## 8 Hexagonal Path

20 Punkte

Draw a closed loop into the diagram, fulfilling the following conditions:  
 The path connects the centers of adjacent cells; it need not pass through all cells.  
 The must not pass through the same cell more than once. Cells with numbers must not be passed at all.  
 The path must not turn in a 60° angle.  
 Each number indicates how many of the adjacent cells are passed through.

**Example:**

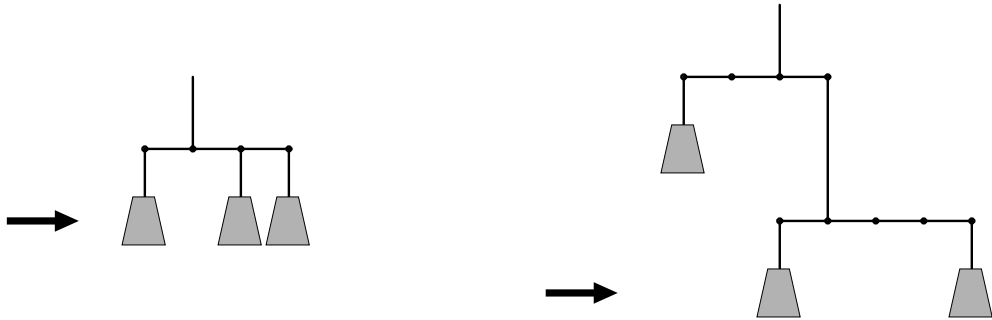
**Answer key:** For each horizontal row, enter the number of empty cells (neither passed through nor containing a number).  
*In the example, the answer key would be: 0, 1, 2, 2, 2*

## 9 Double Balance

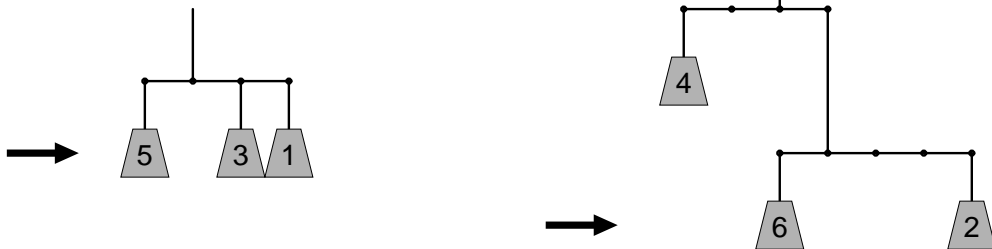
20 Punkte

Assign the values from 1 to 12 to the weights in the diagram so that everything is in perfect balance. Each value must be used exactly once; aside from this, the two systems are completely independent.

Example:



Solution:



**Answer key:** Enter all weights in the two marked rows.

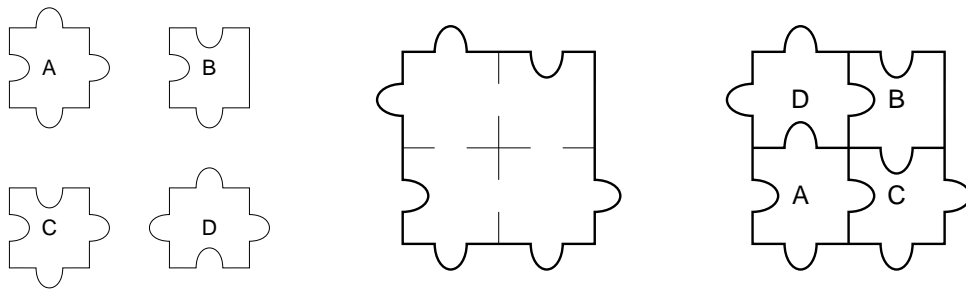
*In the example, the answer key would be: 531, 62*

## 10 Jigsaw Puzzle

20 Punkte

Place the given pieces into the diagram without overlapping. The pieces may not be rotated or reflected.

Example:



**Answer key:** Enter the corresponding letters of all 16 (*in the example: 4*) pieces (top row from left to right, then second row etc).

*In the example, the answer key would be: DB, AC*

# 11 Hexagonal Islands

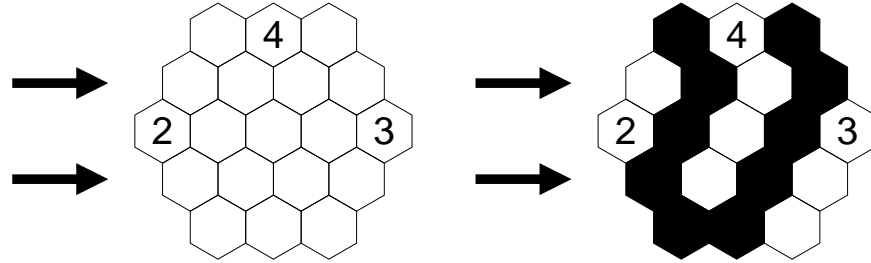
20 Punkte

Place some islands into the grid, fulfilling the following conditions:

Each island must contain exactly one number and consists of so many cells that number indicates.

Each island is completely surrounded by water; the water area is completely connected. However, three pairwise adjacent cells (arranged in a triangle) must not be all water.

Example:



**Answer key:** Enter the contents of the third and sixth row. Use 0 for cells with water and 1 for cells in an island.

*In the example – with second and fourth row – the answer key would be: 1010, 0101*

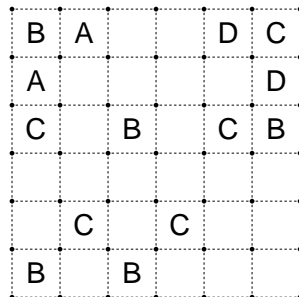
# 12 Cryptic Fences

25 Punkte

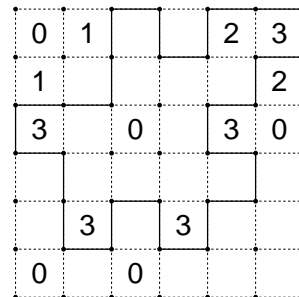
Draw a single continuous loop by connecting neighboring dots along the dotted lines. The numbers indicate how many edges of its square are used for the loop. The loop may not touch or cross itself, and it doesn't need to touch all of the dots.

However, instead of numbers, letters are given. Same letters represent same numbers, different letters represent different numbers. You need to identify the meanings of each letter first.

Example:



A = 1  
B = 0  
C = 3  
D = 2



**Answer key:** Enter the number of squares in each connected area that is outside the loop.

*In the example, the answer key would be: 1, 4, 15*

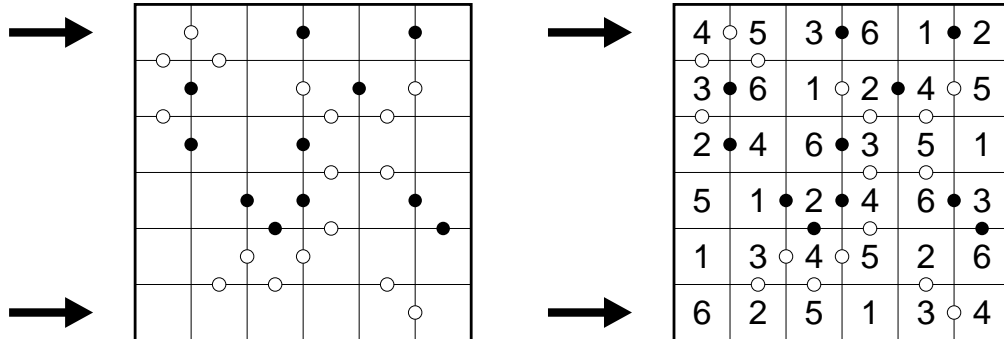
# 13 Kropki

25 Punkte

Place digits from 1 to 9 into the grid, so that each digit appears in each row and each column exactly once.

Two adjacent digits having a white circle between them must have a difference of 1; a black circle means that one digit is exactly half of the other. If there is no circle, then neither property is true.

Example:



**Answer key:** Enter the digits of the first and sixth row.  
*In the example, the answer key would be: 453612, 625134*

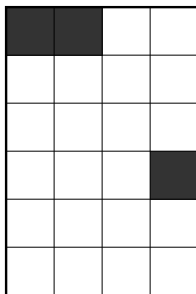
# 14 Jumping Crossword

25 Punkte

Place the listed words into the grid, horizontally from left to right or vertically from top to bottom. Unlike a regular crossword puzzle, some squares may remain empty; before the first letter, between two letters or after the last letter of a word. However, empty squares must not be horizontally or vertically adjacent.

For each word, the length of its area (including all empty squares) is given.  
 Three words remain unused.

Example:



- Words in area of length 2:  
**AR, KA, MA**
- Words in area of length 3:  
**ART, NN, TON**
- Words in area of length 4:  
**MAAT, MIR, OMA, ORT, TOM**
- Words in area of length 5 oder 6:  
**KINO, MOTTO, ROM**



**Answer key:** Enter the unused words.  
*In the example, the answer key would be: AR, NN, MAAT*

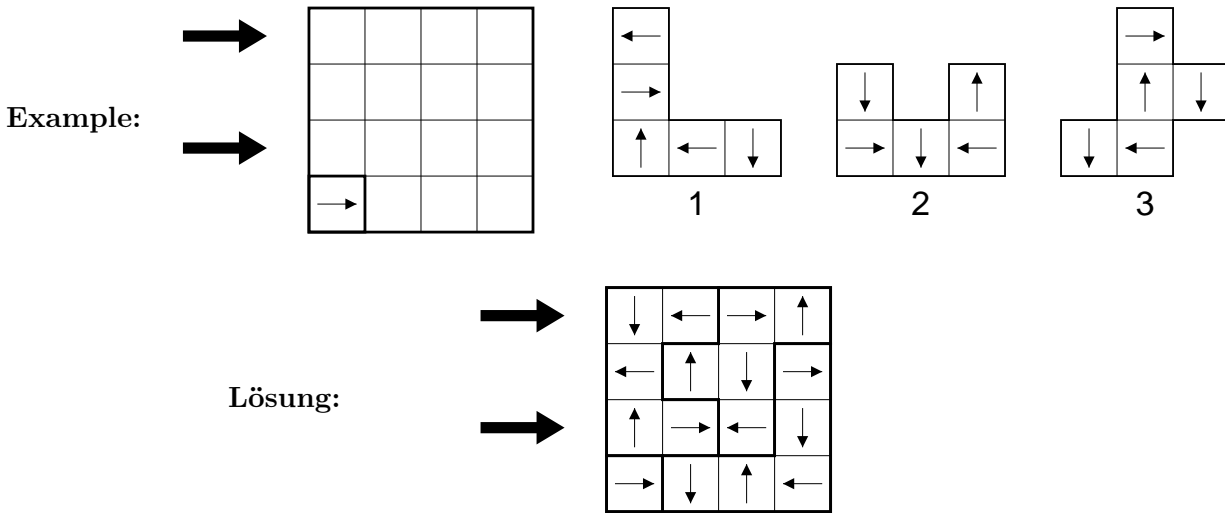


# 15 Magic Arrows

25 Punkte

Place the nine given pentominoes into the diagram without overlapping, so that each symbol appears in each row and column exactly once. They may not be placed on one of the four symbols already given.

Pentominoes may be rotated (not reflected); however, their symbols will be rotated as well.



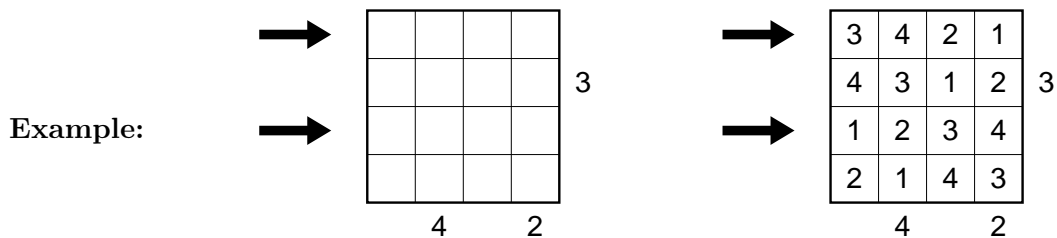
**Answer key:** For each square of the third and sixth row, enter the corresponding number of its pentomino.

*In the example – with first and third row – the answer key would be: 2233, 2231*

# 16 Skyscrapers

30 Punkte

Each row or column contains skyscrapers of different height (from 1 to 7); numbers outside the grid indicate how many skyscrapers are visible from that direction.



**Answer key:** Enter the digits of the third and sixth row.

*In the example – with first and third row – the answer key would be: 3421, 1234*

# 17 Paint-it-black Snakes

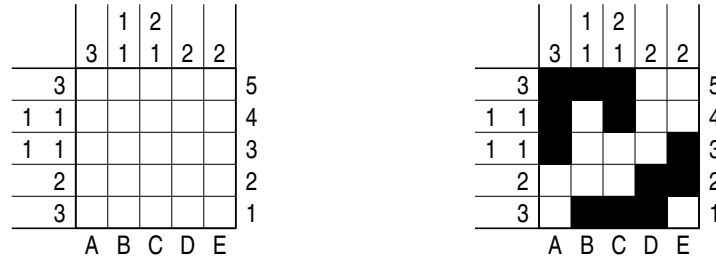
30 Punkte

Six snakes, each consisting of 15 horizontally or vertically connected squares including head and tail (example: two snakes of length 6), are hidden in the grid. The snakes do not touch themselves or others, not even diagonally.

The numbers outside the grid indicate how many groups of black squares there are in the corresponding rows or columns and, respectively, how many consecutive black squares there are in each group.

For solving purposes, ignore the letters below and the numbers right to the grid.

Example:



**Answer key:** The letters below and the numbers right to the grid define a coordinate system. Enter the coordinates of head and tail of each snake.

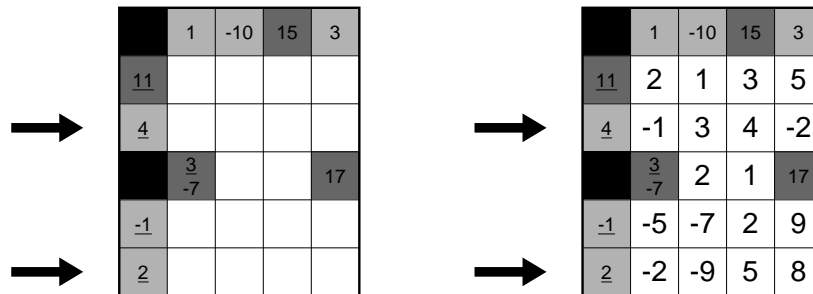
In the example – with two snakes only – the answer key would be: A3, C4, B1, E3

# 18 Plus or Minus Kakuro

30 Punkte

Enter a single signed digit from 1 to 9 (or -1 to -9) into each empty square so that the sum of the numbers in each Across and Down answer equals the value given to the left or above, respectively. No digit (ignoring sign) is repeated within a single answer. If a clue sum is in a dark gray region, then all corresponding digits have the same sign; if the clue sum is in a light gray region, then the corresponding digits have mixed sign.

Example:



**Answer key:** Enter the digits in the first, fourth and ninth row (ignoring sign).

In the example – with second and fifth row – the answer key would be: 1342, 2958

# 19 Word Search

25+10 Punkte

Find the 29 listed words in the grid. Words may read forward, backward, or diagonally (in total, eight possible directions). The central 16 letters in the grid have been removed and are for you to determine.

**Example:**

|   |   |   |   |   |
|---|---|---|---|---|
| N | S | H | H | E |
| E |   |   |   | K |
| R |   |   |   | R |
| D |   |   |   | M |
| K | N | U | K | S |

|       |
|-------|
| AAL   |
| HUND  |
| KATZE |
| MAUS  |
| REH   |
| REN   |
| SKUNK |

|   |   |   |   |   |
|---|---|---|---|---|
| N | S | H | H | E |
| E | E | U | Z | K |
| R | N | T | A | R |
| D | A | A | L | M |
| K | N | U | K | S |

**Answer key:** Enter the 16 (*in the example: 9*) missing letters, starting with the first line of four letters, then the second, third and fourth (25 points) as well as the total number of unused letters (10 points).

*In the example, the answer key would be: EUZ, NTA, AAL, 2*

# 20 Arithmetics

35 Punkte

The numbers from 1 to 17 have been assigned to the letters A, B, C, D, E, H, I, J, K, M, N, O, P, R, S, T and Y. Different letters correspond to different numbers.

For some words, the sum of the corresponding numbers of their letters has been given. If any letter appears more than once in a word, it is counted as often as it appears.

**Example:** (*using letters A, M, O, R, T and numbers from 1 to 5*)

|          |       |
|----------|-------|
| ARA = 11 | A = 3 |
| ORT = 8  | M = 4 |
| ROM = 11 | O = 2 |
| OMA = ?? | R = 5 |
| ARM = ?? | T = 1 |

**Answer key:** Enter the corresponding sums of the two words with a question mark.

*In the example, the answer key would be the corresponding sums of OMA and ARM: 9, 12*