

PQRST 08 PUZZLE COMPETITION

PUZZLE 01 (10 points penalty for a wrong answer)

30 points

Equate

Each digit in the equation below represents another digit in a simple logic. Find the original equation which is correct. Different digits represent different digits. Same digits represent same digits.

$$73 \times 83 = 1013$$

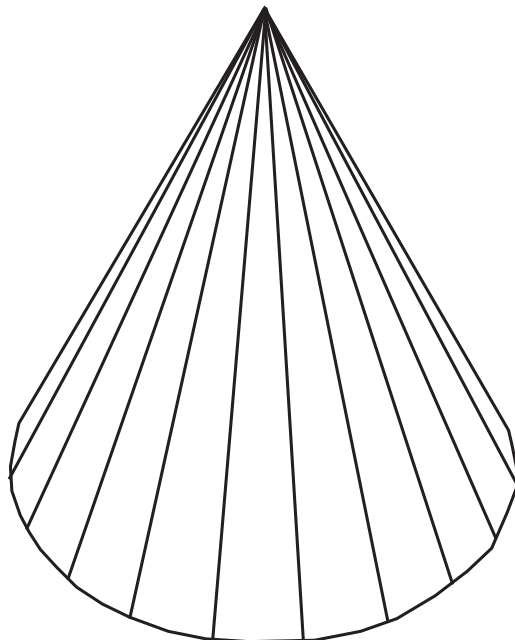
Answer key: Enter the original equation. The answer key will look like: 12x34=5678

PUZZLE 02

50 points

Cone

You've made a 9x9x9 cube gluing 729 small wooden cubes together. You'll carpenter a cone from this big cube. A cone is a pyramid with a circular base. The cone's diameter will be 9 units, and its height will be 9 units. How many small cubes will stay undamaged inside the cone when you are finished?



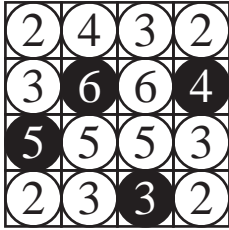
Answer key: Enter the number of undamaged cubes inside the cone.

PUZZLE 03 (10+10 points penalty for wrong answers) 40+65 points

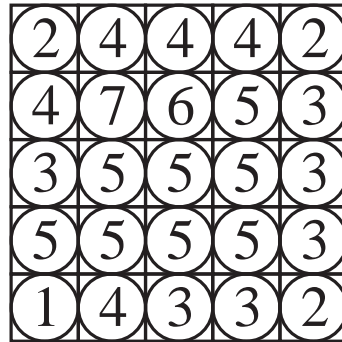
Liar Neighbours

There are cards with numbers on the cells of the grid. Some cards are true, others are false. Each card tells the number of true cards in the neighbouring cells, including diagonals. Identify the false cards.

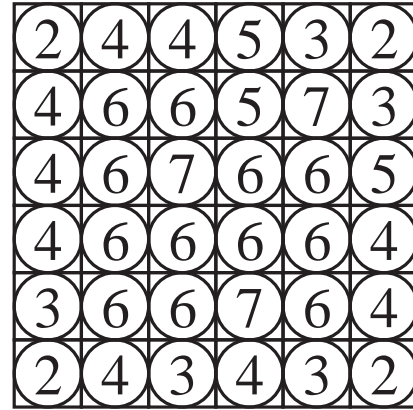
Example:



A) 40 points



B) 65 points



Answer key: For each puzzle, enter the total of the numbers written on the false cards. The answer for the example would be: 18. The answer key will look like: A)20, B)30

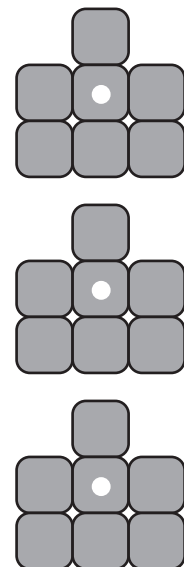
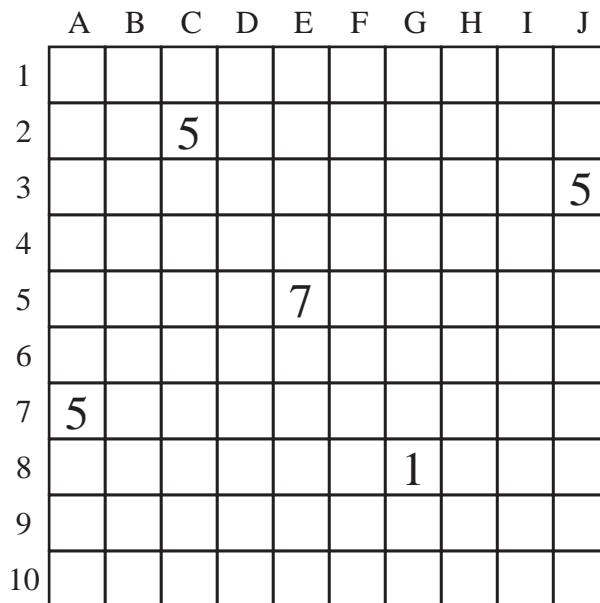
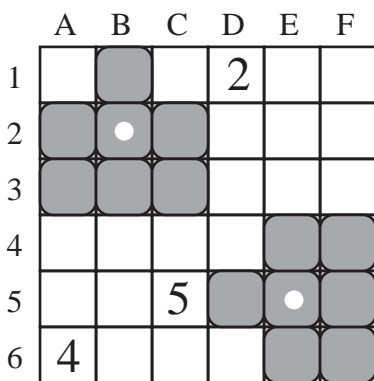
PUZZLE 04

85 points

Tank Search

There are three tanks hiding in the grid. Each tank is made of seven cells and tanks don't touch each other not even diagonally. Numbers tell the total number of tank cells in their row and column. Find the locations of the tanks. Tanks can not cover cells with numbers.

Example with two tanks:



Answer key: Enter the coordinates of the center cells of the tanks. For the example, the answer key would be: B2, E5

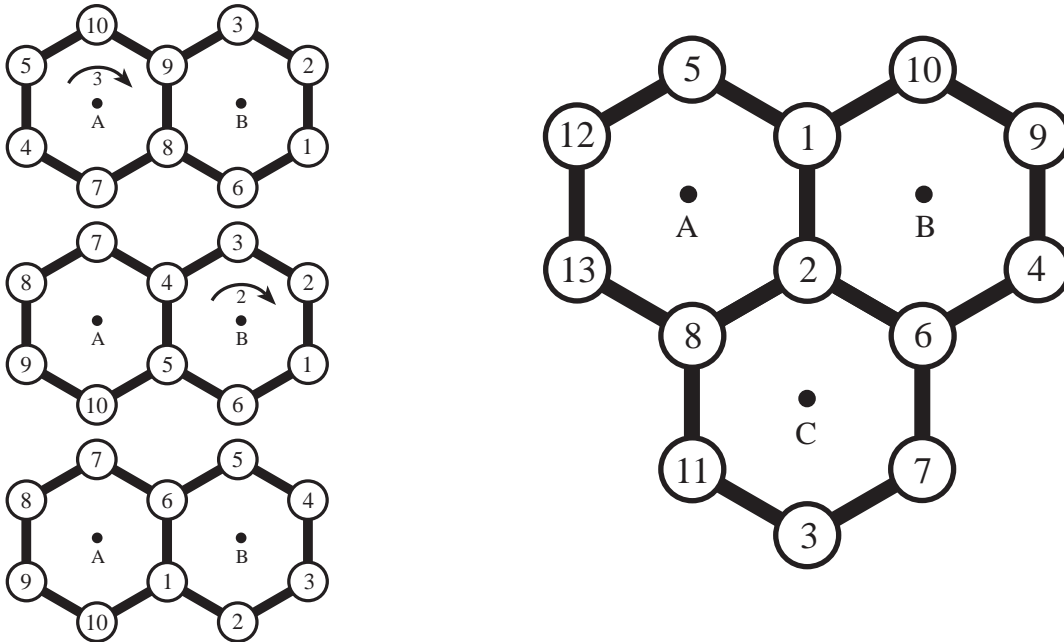
PUZZLE 05 (10 points penalty for each additional turn)

80 points

Clock Wise

There are numbers on three hexagonal devices shown below. You can turn a device with all of the six numbers on it any number of 60 degree units, but only clockwise. Turn the devices so that numbers from 1 to 13 can be visited consecutively traveling the neighbouring circles. Minimize the number of turns. Only the minimum solution will get 80 points.

Example:



Answer key: First enter the number of unit turns in your solution. Then for each move, enter the letter and the number of unit turns. The answer key for the example would be: 5:A3,B2

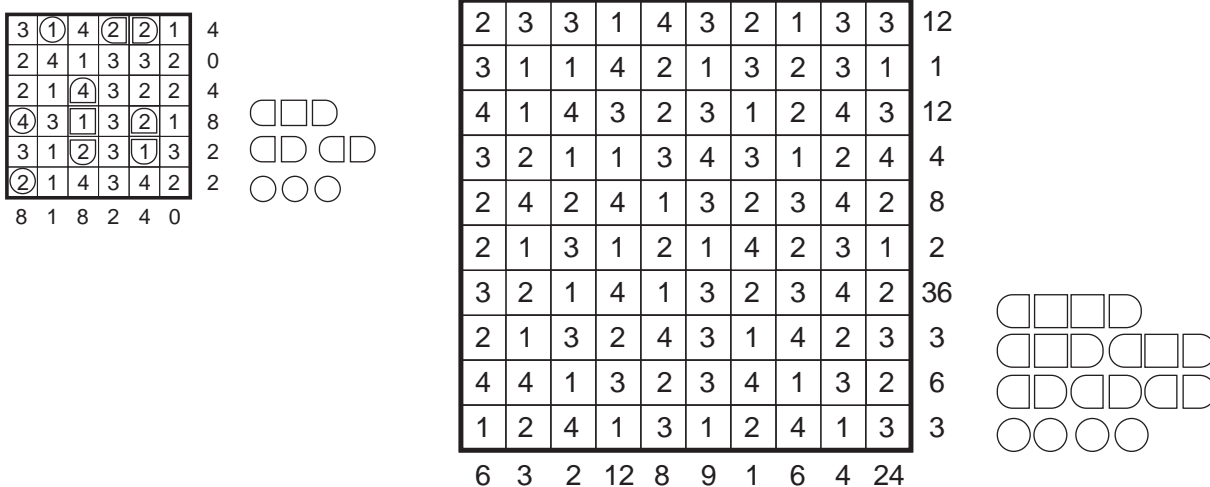
PUZZLE 06 (10 points penalty for a wrong answer)

65 points

Product Battleships

Position the 10-ship fleet horizontally or vertically into the grid. Ships can not touch each other, not even diagonally. Numbers on the sides are the product of the digits on the occupied cells in the respective row or column. If there is only one occupied cell in a row or column, the digit on it is written on the side.

Example:

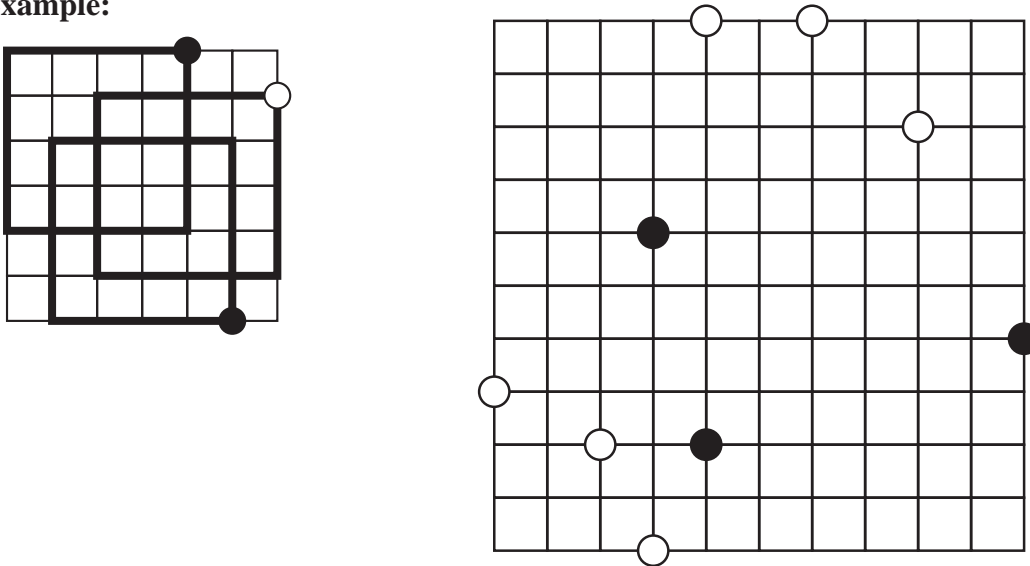


Answer key: Enter the digits written on the four submarines, from lowest to highest. The answer key for the example would be: 1,2,4

Squares

Draw a square along the grid lines from each circle on the grid taking that circle as a corner. White circles are corners of squares with a side length of at least 2. Black circles are corners of squares with a side length of at least 3. Squares may cross each other, but cannot share a corner, side or segment.

Example:

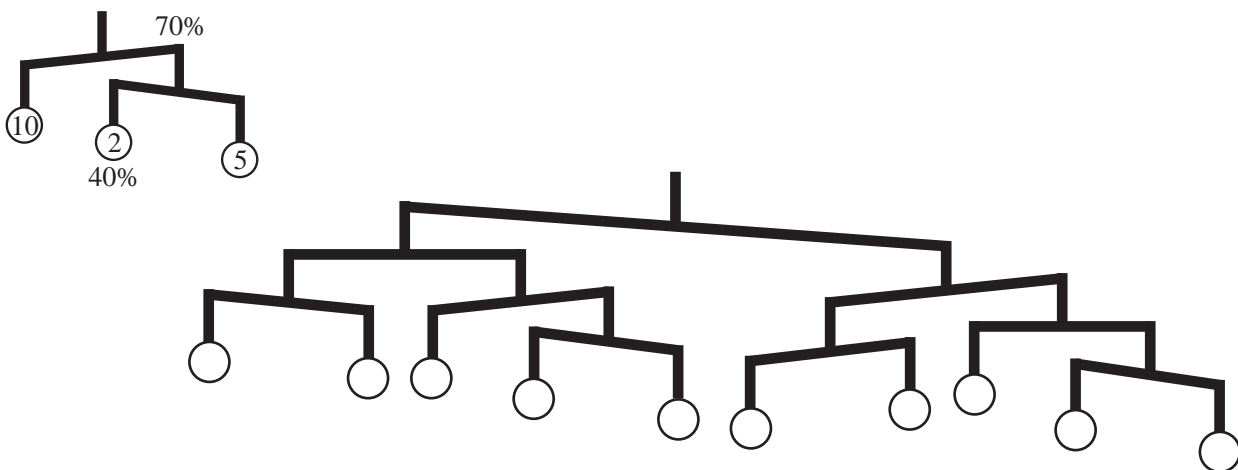


Answer key: Enter the total of the individual areas of all the squares. The answer key for the example would be: 48

Balance Less

Locate ten weights from 1 to 10 into ten baskets of the balance system below. All strings have equal length on both sides. Some of the balances are not at equilibrium. Balances are so close to each other that the lighter side of a balance must at least weight 40% of the heavier side.

A legal example:

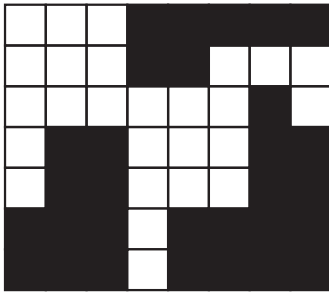


Answer key: Enter the weights on the system from left to right. The answer key for the example would be: 10,2,5

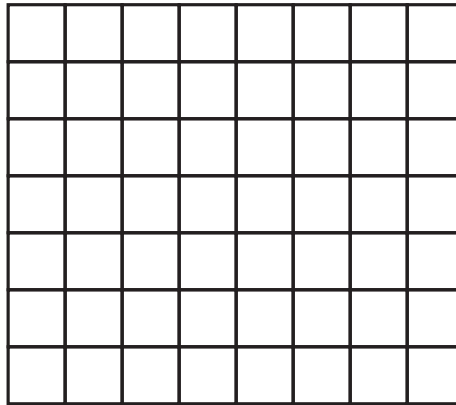
Domino 2004

Form a shape without any holes that can fit into a 7x8 grid. When N is the number of ways to tile this shape with dominoes, make N as close to 2004 as possible. You will get a 2-point penalty for each square in your shape.

Example:



There are 16 ways to tile this shape with dominoes.

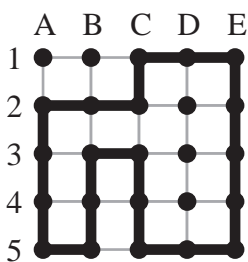


Answer key: Enter N first. Then describe your shape by writing 1 for cells on the shape, and 0 for blank cells on the 7x8 grid. The answer key for the example would be: 16: 11100000,11100111,11111101,10011100,10011100,00010000,00010000

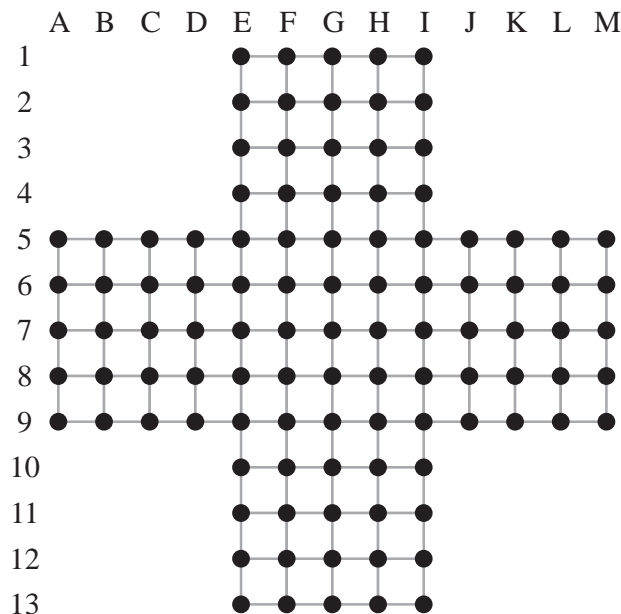
Corner Value

Draw a loop connecting the intersection points of the grid following the grid lines. The loop can not touch or cross itself. For each corner of the loop take the product of the lengths of the two straight lines forming it. Maximize the total of all the products.

Example on a 4x4 grid:



$$1 \times 2 + 2 \times 3 + 3 \times 1 + 1 \times 2 + 2 \times 1 + 1 \times 2 + 2 \times 2 + 2 \times 4 + 4 \times 2 + 2 \times 1 = 39$$



Answer key: Enter your total first. Then, starting with any one of the corners, enter the coordinates of all the corners in the order you connect them. The answer key for the example would be: 39:A2,A5,B5,B3,C3,C5,E5,E1,C1,C2