

PQRST 14 PUZZLE COMPETITION

PUZZLE 01

45 points

Digit Layers

Three different digit figures have been put on top of each other to form the shape given below. Black areas are two segments overlapping, and grey areas have only one segment. Find the three digits.



Answer key: Enter the three digits in increasing order; in the form of: 0, 1, 2

PUZZLE 02

(10 points penalty for a wrong answer)

40 points

Equation Chain

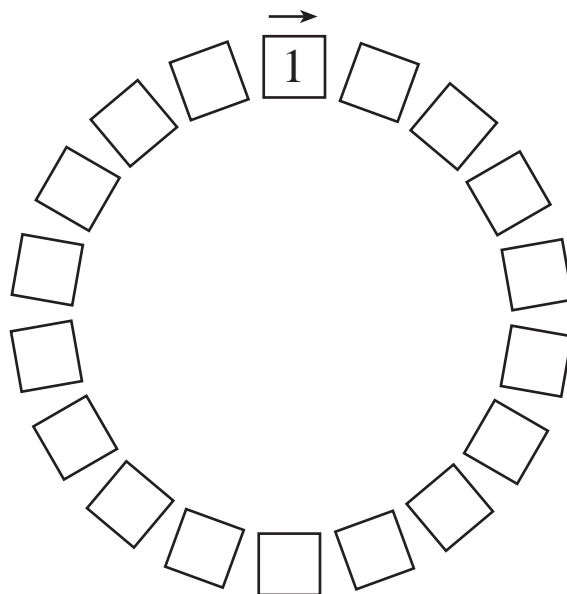
Enter a different digit or an operation into each box on the chain below, keeping the order of digit-operation-digit-... Start with 1, calculate the result of each operation and write the result on the next box, repeating this process until the last operation's result is 1 again. For example, the chain might start as $1(+3)4(/2)2(+5)7...$ Use each digit once, and each operation once.

Digits:

1, 2, 3, 4, 5, 6, 7, 8, 9

Operations:

$\times 2, /5, /2, +5, +4, +3, +1, -7, -3$



Answer key: Enter the nine digits in clockwise order, starting with 1; in the form of: 1,2,3,4,5,6,7,8,9

Magnets

Locate the position and orientation of magnetic and non-magnetic plates in the grid below. Each magnetic plate has two halves with opposite polarity: positive (+) and negative (-). Horizontally or vertically adjacent halves must have opposite polarity. Numbers on the sides tell the numbers of + and - poles in the representing row or column.

Example:

+	-		-	+	2	2
-				-	0	2
+	-		+	-	3	2
	+				1	0
			-	+	1	1
-	+	-	+	-	3	3
2	2	0	2	1	3	+
2	2	1	1	3	1	-

											4	3
											5	6
											4	1
											3	6
											5	4
											5	5
											5	5
											5	6
											3	3
											3	2
											2	3
											3	3
5	4	5	4	2	3	4	3	4	5	4	4	+
5	4	5	3	3	3	3	5	3	4	4	5	-

Answer key: Enter the contents of the NW-SE diagonal of the grid in order, using + or - for the poles and N for non-magnetic plates. For the example, the answer key would be: +NNN++

Multiplication Table

Locate digits from 1 to 7 into each row and each column of the grid once. Numbers on the circles tell the product of the four digits around them.

Example:

1	2	3	4
4	1	2	3
2	3	4	1
3	4	1	2

Example products in circles: 72 (top-right), 24 (middle-left), 8 (bottom-right).

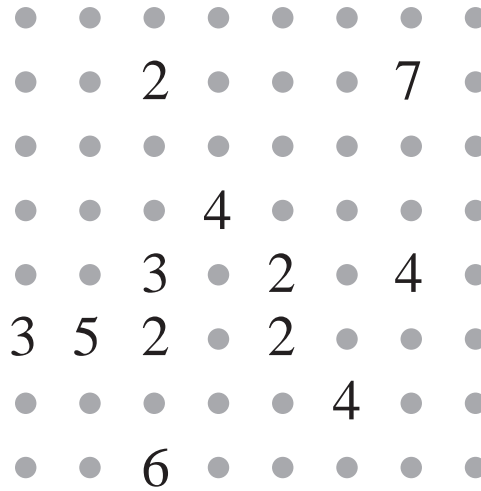
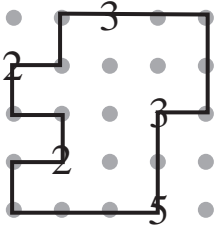
				168		24	
			120				
	192		60		105		
			120				
	36						
		20		84			

Answer key: Enter the contents of the NW-SE diagonal of the grid in order. For the example, the answer key would be: 1142

Loop Segments

Draw one closed loop connecting the dots and numbers horizontally or vertically. The loop cannot touch or cross itself. Visit all numbers on the intersection points. Each number tells the total length of the two loop segments that are connected to it on a straight line.

Example:

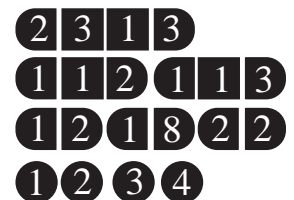
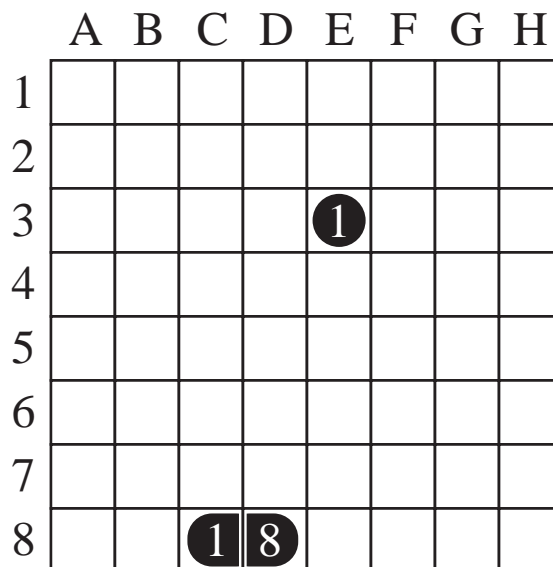
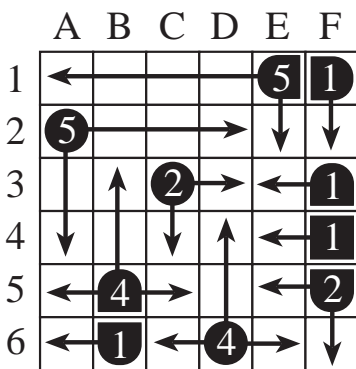


Answer key: For each row of dots, enter the number of dots that are not on the loop. For the example, the answer key would be: 1, 2, 1, 2, 1

Shooting Battleships

Locate the 10-ship fleet into the grid so that ships don't touch each other, not even diagonally. Then, from each ship cell, draw shooting directions horizontally or vertically, totalling all the shooting lengths to the number on the ship cell. Lines must cover all of the remaining area. Two ships are already located.

Example:

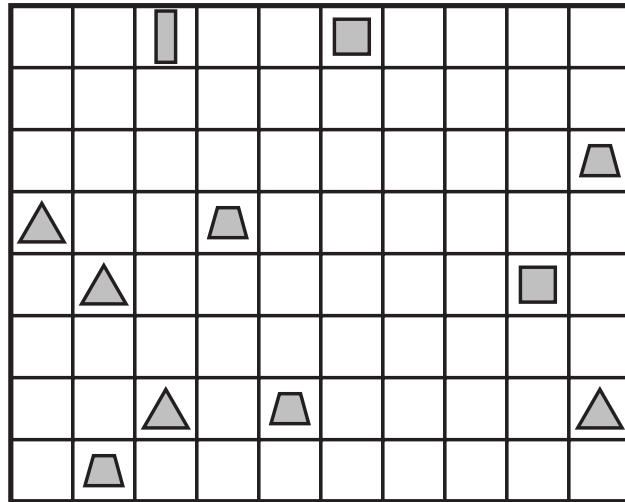
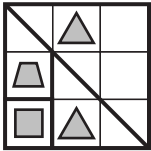


Answer key: Enter the coordinates of the the other three submarines (1-unit ships) in the order of numbers on them (2, 3, then 4). For the example, the answer key for 2, 4, 5 would be: C3, D6, A2

Geometric Shapes

Divide the whole grid into smaller geometric shapes, following the grid lines or the diagonals of the square cells. Each shape must have exactly one symbol inside, which represents it. Rectangle symbol cannot be contained in a square. Trapezoid has two sides parallel, but its other two sides are not parallel.

Example:

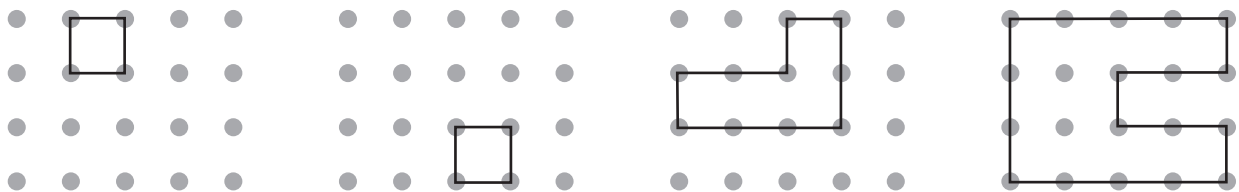


Answer key: Enter the total area of the two squares in square units. For the example, the area of the only square is: 1

How Many Loops

How many different loops can be drawn on a 4x5 array of 20 dots, moving horizontally or vertically? A loop does not touch or cross itself. Some of them are shown.

Examples:

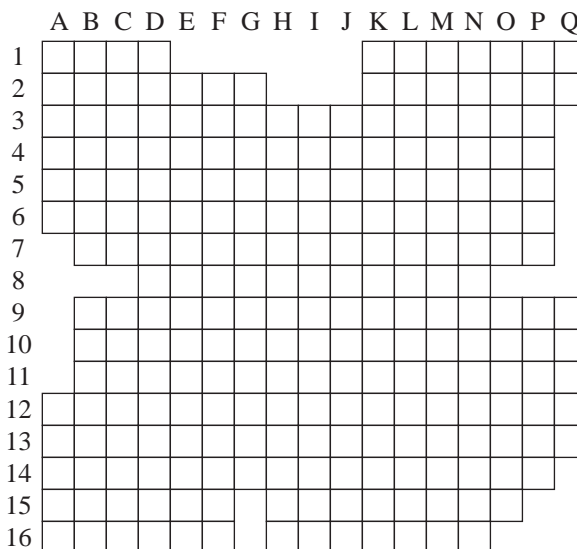
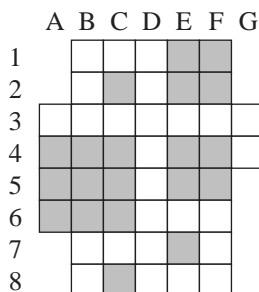


Answer key: Enter the number of loops.

No Touching

Locate some number of squares into the grid, following the grid lines, so that they don't touch each other not even diagonally. And it must be impossible to locate another square into the grid. Minimize the number of squares. Best answer will get 180 points. Other answers will get 40 points penalty for each value over the best answer (No negative points).

Example:

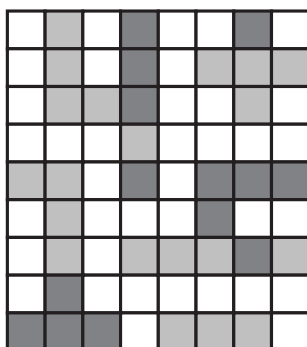


Answer key: Enter the number of squares first. Then for each square, enter the coordinates of the top-left corner and its side length. For the example, the answer key would be: 6: E1-2,C2-1,A4-3,E4-2,E7-1,C8-1

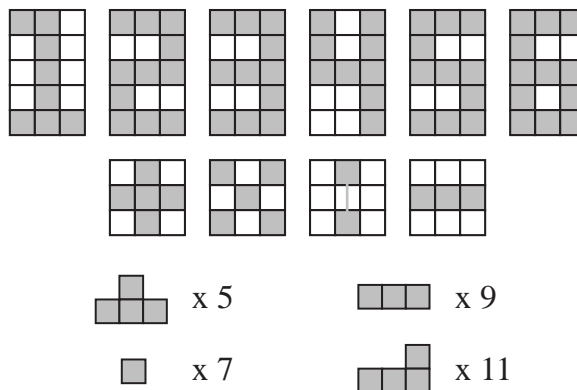
Character Analysis

Locate some copies of four different figures given into a 10x15 grid to make some digits and operation signs. Figure copies are limited, and they can be rotated or reflected, but they cannot overlap each other. You may form any number of digits (1-6) or signs, and they can be rotated but not reflected; also they cannot touch each other side by side. Make a list of the formed characters, and then write two different operations with a whole number result using all of the characters once each, for each of the operations. In one of them, maximize the result; in the other, minimize the result. In the operations there cannot be any multiple-digit numbers. Operations are done from left to right (1-2x4 = -4). Your score is the absolute difference of the two results. Highest answer gets 220 points. Each next answer gets 5 points less, not considering the distance.

Example on an 8x9 grid:



Characters: 1,4,+,
Op. I: 4+4-1=7
Op. II: 1+4-4=1
Score: |7-1|=6



Answer key: Enter your score and the two operations first. Then write the contents of the grid row by row, working downwards. Use B for blank squares. The answer key for the example would be: 6: 4+4-1, 1+4-4: B4B4BB+B, B4B4B+++ , B444BB+B, BBB4BBBB, 11B4B444, B1BBB4BB, B1B44444, B1BBBBBB, 111B---B

Check the errata column on the main page in case of any mistakes or misinformation.
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