

Synergy Round

Warming Up

Where in the World?

You're standing at a point on earth. After walking a mile north, then a mile west, then a mile south, you're back where you started. Where are you?

[4 points]

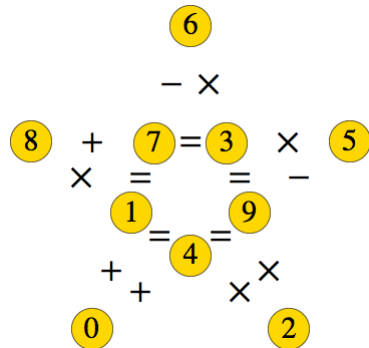
Scrabble With Numbers

Arrange the ten digits 0 to 9 in three arithmetical sums, using three of the four operations of addition, subtraction, multiplication, and division, and using no signs except the ordinary ones implying those operations. For example, $3 + 4 = 7$, $9 - 8 = 1$, and $5 \times 6 = 30$ (please note that this is wrong.)

[6 points]

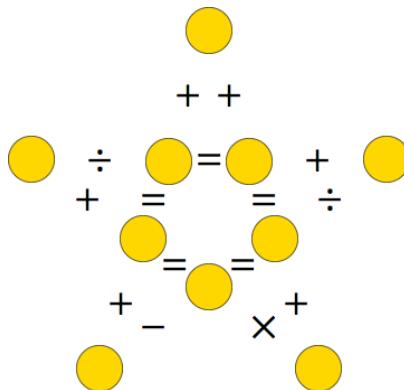
Earning a Gold Star

Insert the digits 0-9 into the circles to make the 5 equations true when read from left to right. Each digit is used exactly once and the solution is unique. The following is an example.



Your task is to complete the star below.

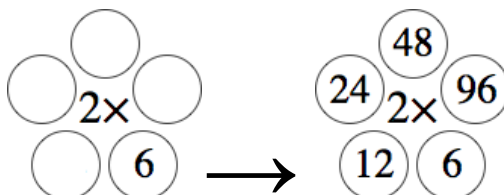
[10 points]



Please Note: Several puzzles copyright of Erich Friedman, 2002.

It's Circular!

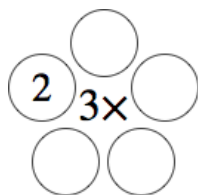
Put positive numbers in each small circle so that moving clockwise each number is either multiplied by the center number, or has one digit removed. Below is a solved example. Each puzzle has a unique solution.



There are three sets below. Each set has an independent solution.

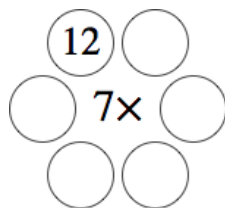
Set 1:

[5 points]



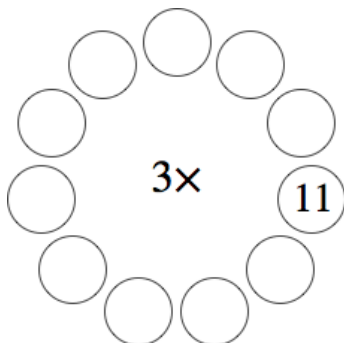
Set 2:

[7 points]



Set 3:

[9 points]



Please Note: Several puzzles copyright of Erich Friedman, 2002.

Divine Squares

Follow the directions below to appease the Roman gods!

Saturn: Fill in the square below with the numbers 1-9 such that each row, column, and diagonal sums to the same number.

[8 points]

Jupiter: Fill in the square below with the numbers 1-16 such that each row, column, and diagonal sums to the same number.

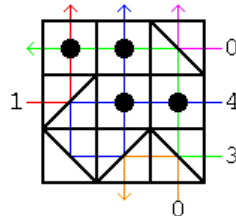
[12 points]

Mars: Fill in the square below with the numbers 1-25 such that each row, column, and diagonal sums to the same number.

[15 points]

Mirror, Mirror in the Maze

Each square in the grids below contains either a person lost in the hall of mirrors, or a diagonal mirror. The numbers at the sides of the square indicate how many people can be seen from that location when looking either horizontally or vertically. Here's an example:

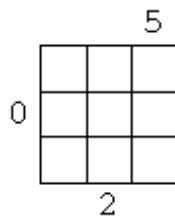


The colored paths are the paths of sight. Notice that a person can be counted twice.

Place a circle or mirror in each box so that makes the puzzle work. Place close attention to which direction the mirror slants! (You do not need to draw the arrows like in the example; they are for your benefit only.)

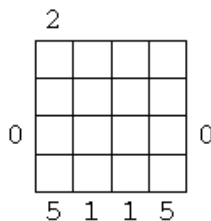
Maze 1:

[9 points]



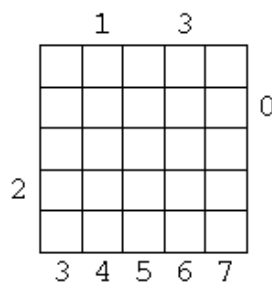
Maze 2:

[13 points]



Maze 3:

[17 points]



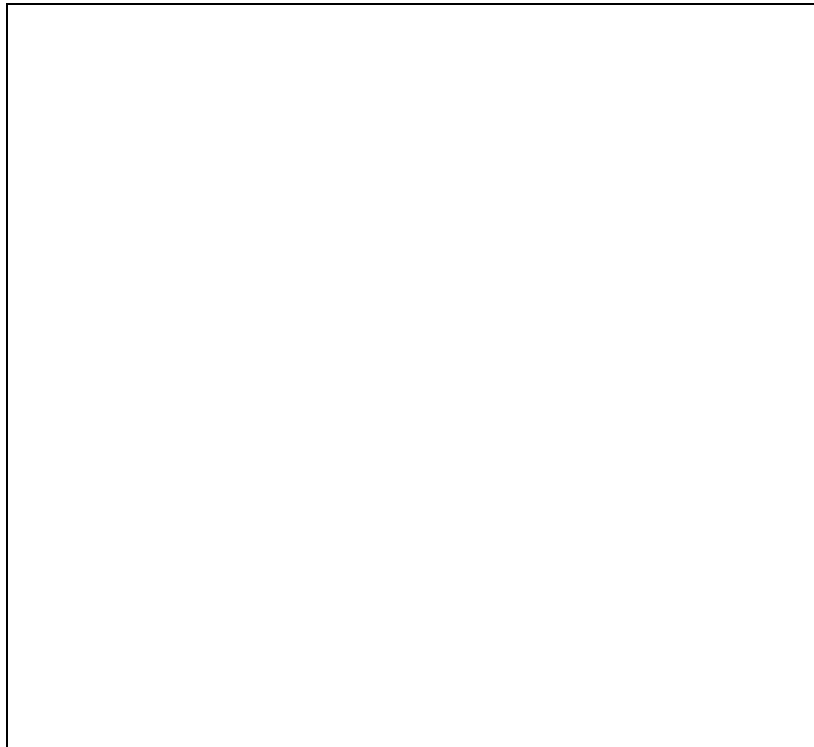
A-cute puzzle

Open the envelope given to you along with the question set. In the envelope you will find 8 triangles of different shapes. Count them and if you have anything more or less than 8 triangles please call the proctor and let them know. Each triangle is assigned a letter, A-E.

The triangles are all acute. Your goal is to join these right angled triangles to construct a square. Once done making the square please draw the order in which you arranged the triangles on the empty square given on the answer sheet. Additionally, put the letter of the piece in your sketch too so that it's easy for us to grade. The drawings needn't be super precise as long as you draw the general shape and number the triangles correctly.

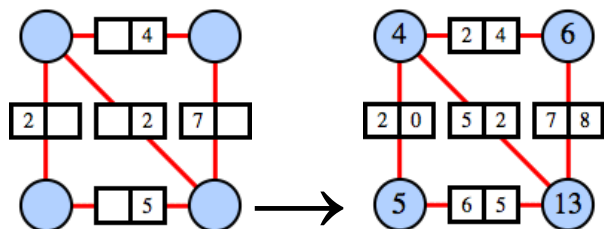
[18 points]

The space below maybe used for scratch work, please your final answer on the space provided on the answer sheet.



Product Paths

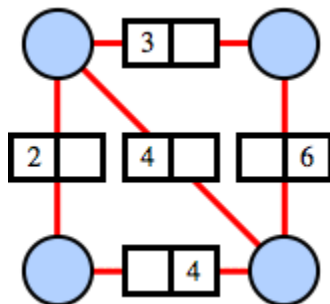
Put a positive integer in each circle and a digit in each empty box. The product of each pair of connected numbers should be the 2-digit number in the boxes. Below is an example.



Fill in each of the two paths below accordingly. Solutions are unique.

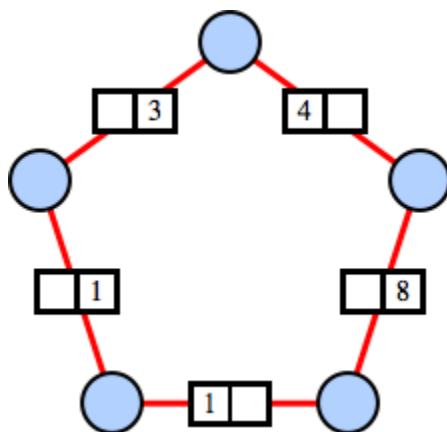
Path 1:

[7 points]



Path 2:

[18 points]



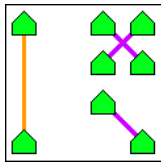
Even More Odd Math

Place a digit in each circle and square so that the multiplication and addition is correct. Each circle should contain an even digit and each square should contain an odd digit. Please note that circles and squares need not contain the same digit.

[9 points]

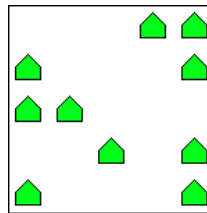
$$\begin{array}{r}
 \textcircled{} \square \\
 \times \textcircled{} \square \\
 \hline
 \square \square \square \\
 + \textcircled{} \textcircled{} \textcircled{} \\
 \hline
 \square \square \square \square
 \end{array}$$

The Shortest Distance Between Two Houses...



Connect pairs of houses with a straight line so that there are only two different distances. An example is to the left.

[10 points]



Making Sense Out of Anagrams

Place a word in each of the blanks so that the sentence makes sense. The words must be anagrams of each other—that is, they must contain the exact same letters in a different order. As a hint, all three words must have six letters.

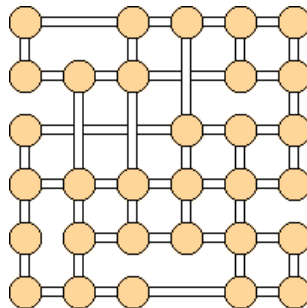
[11 points]

I had to _____ a friend to help me _____ for my lost dog, but she was being too _____ to be found.

Delivery Route

Starting at the red circle, draw a path that reaches every other circle exactly once without using the same path twice.

[12 points]



Synergy - Puzzles to Puzzle You

Answer Key

Warming Up

Where in the World?

[4 points]

South Pole

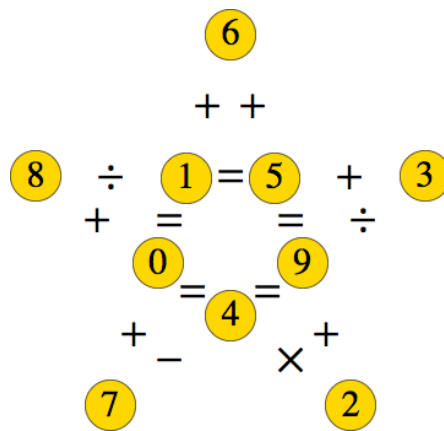
Scrabble With Numbers

[6 points]

$7 + 1 = 8$ $9 - 6 = 3$ $4 \times 5 = 20$

Earning a Gold Star

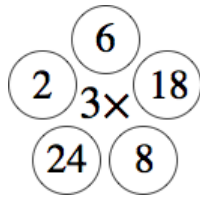
[10 points]



It's Circular!

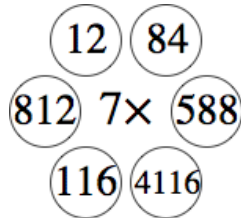
Set 1:

[5 points]



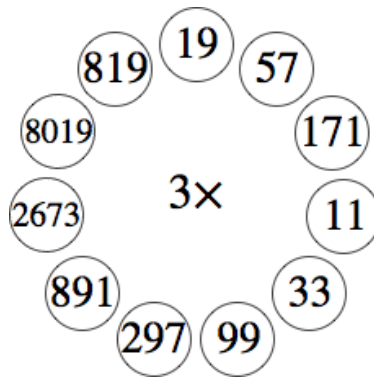
Set 2:

[7 points]



Set 3:

[9 points]



Divine Squares

Saturn:

[8 points]

4	9	2
3	5	7
8	1	6

Jupiter:

[12 points]

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

Mars:

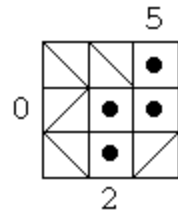
[15 points]

11	24	7	20	3
4	12	25	8	16
17	5	13	21	9
10	18	1	14	22
23	6	19	2	15

Mirror, Mirror in the Maze

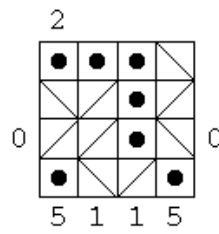
Maze 1:

[9 points]



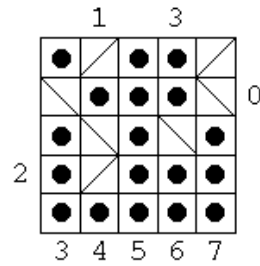
Maze 2:

[13 points]



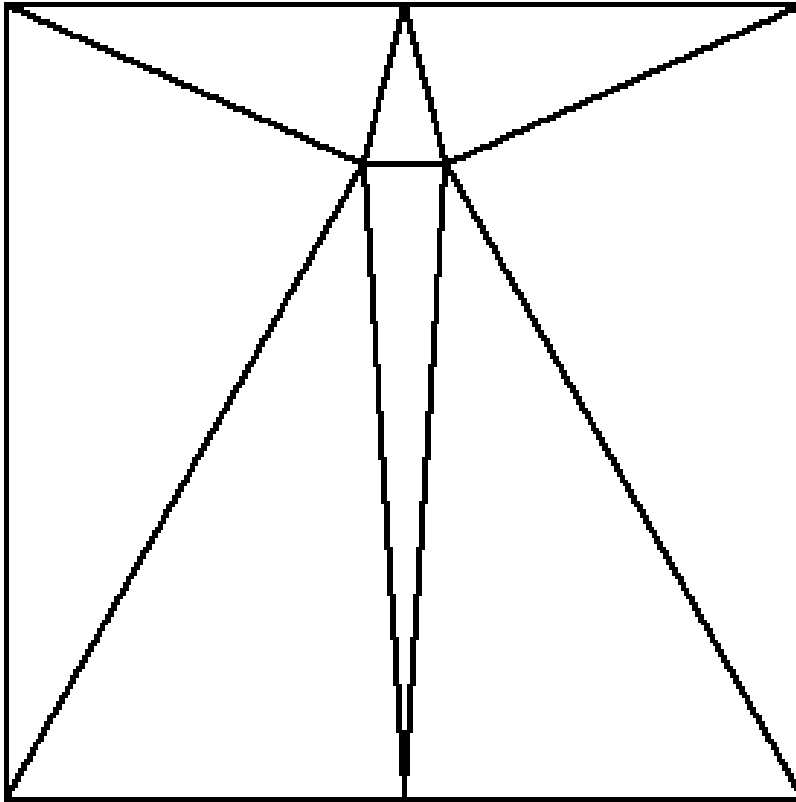
Maze 3:

[17 points]



A-cute Puzzle

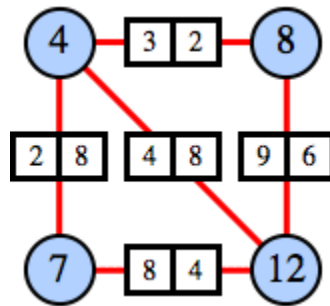
[18 points]



Product Paths

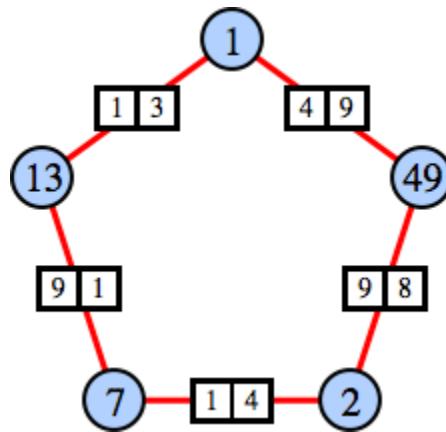
Path 1:

[7 points]



Path 2:

[18 points]



An Assorted Mixture

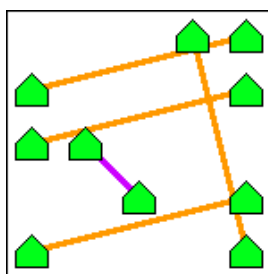
Even More Odd Math

[9 points]

$$\begin{array}{r} 85 \\ \times 87 \\ \hline 595 \\ +680 \\ \hline 7395 \end{array}$$

The Shortest Distance Between Two Houses...

[10 points]



Making Sense Out of Anagrams

[11 points]

I had to ENLIST a friend to help me LISTEN for my lost dog, but she was being too SILENT to be found.

Delivery Route

[12 points]

