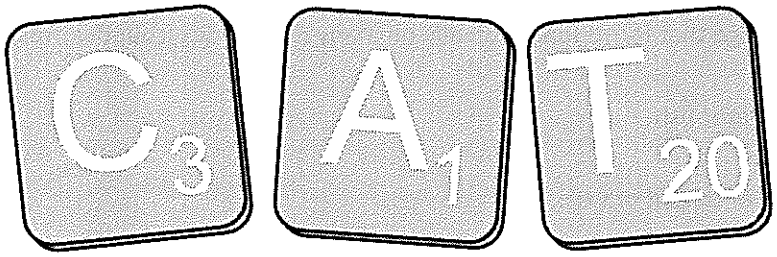
This brainteaser was written by Patrick Vennebush.

Assign each letter a value equal to its position in the alphabet (A = 1, B = 2, C = 3, ...). Then find the product value of a word by multiplying the values together. For example, CAT has a product value of 60, because C = 3, A = 1, T = 20, and $3 \times 1 \times 20 = 60$.



How many other words can you find with a product value of 60?

This brainteaser was written by Derrick Niederman.

It's not too hard to form the number 9 using three 3's and any of the four standard mathematical operations +, −, × and ÷. But can you come up with four different solutions, each of which uses only one of the four operations? (Other standard mathematical symbols can be used as needed.)

$9 = 3 + 3 + 3$

This brainteaser was written by Patrick Vennebush.

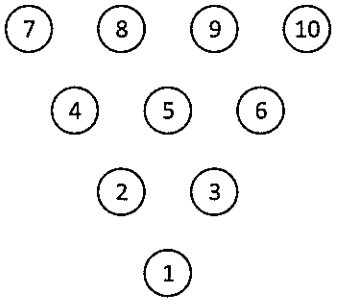
On the chart below, color each square according to the clues below.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

- Two positive odd numbers that have a sum of 40 and the largest possible product.
- The smallest square number that is the sum of two non-zero square numbers.
- The next five numbers in the arithmetic sequence 8, 19, 30, __, __, __, __, __.
- The maximum possible number of givens in a standard 9 × 9 Sudoku grid that does not render a unique solution.
- Two different odd numbers, one of whose digits are the reverse of the other, whose sum is 154.
- The two prime numbers whose product is 4 less than 5^2.
- In a normal distribution, the percent of values within one standard deviation of the mean.
- The 43^{rd} positive even number.
- The first four positive multiples of 4.
- The integer lengths of three sides of a right triangle whose area is 600 square units.
- The value of the sum $2^0 + 2^1 + 2^2 + 2^3$.
- The value of the sum $2^0 + 2^1 + 2^2 + 2^3 + 2^4$.

This brainteaser was written by Derrick Niederman.

Ten is a triangular number, because 10 objects can be neatly arranged in an equilateral triangle.

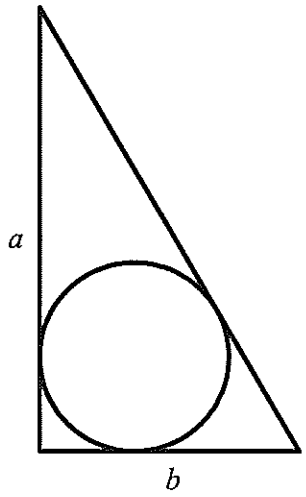


In general, a triangular number is a number that can be represented as a triangle with one object in the first row and each subsequent row contains one more element than the previous row. (From the picture above, you might notice that 1, 3, and 6 are also triangular numbers.)

Order the digits 1 through 9 so that the sum of any two adjacent numbers is a triangular number.

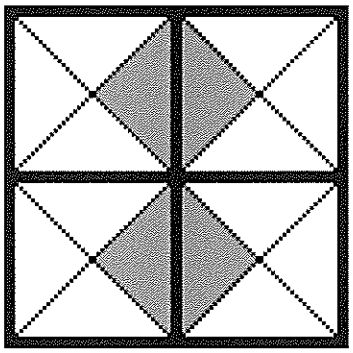
This brainteaser was written by Derrick Niederman.

A circle of radius 1 unit is inscribed inside a right triangle that has height a and base b. If b is an integer, what are the possible values of a?



Puzzle provided by Noetic Learning Math Contest

Jessica has four square tiles. Each of them has an area of 4 square inches. She placed them together and drew a pattern as shown below. What is the area of the shaded part?



This brainteaser was written by Derrick Niederman.

Perform the following steps:

- Pick a positive integer, any positive integer at all.
- Write out the number in English.
- Count the number of letters in that word. The number of letters is now your new number.
- Write out your new number in English, and count the number of letters.
- Repeat until it feels ... um, well ... *repetitive.*

When you can't go any further, what number are you at? And how can you be sure that you will always end at this number, no matter what number you chose at the beginning?

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For one of the two actress names below, it is possible to replace each letter with a unique digit 1–9 to produce a valid addition statement. Can you determine which name works and which one doesn't?

```
  SUSAN
+ SAINT
-------
  JAMES
```

```
  MARY
+ BETH
------
  HURT
```

This brainteaser was written by Derrick Niederman.

There are 4! = 24 ways to rank four objects. However, a friend told me that if ties are allowed, the number increases to 75.

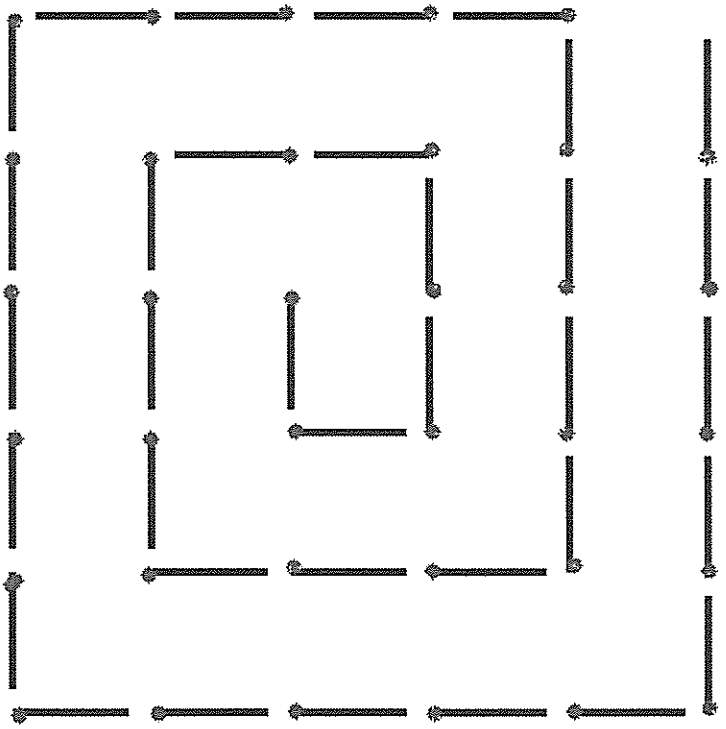
I attempted to list all the possibilities by first listing the 24 orderings of four objects, then using brackets to group ties involving two players, then group ties involving three players, and finally the single case in which all four objects are tied. But something has gone wrong; my list includes just 69 possibilities, not 75.

ABCD	ABDC	ACBD	ACDB	ADBC	ADCB	24
BACD	BADC	BCAD	BCDA	BDAC	BDCA	
CABD	CADB	CBAD	CBDA	CDAB	CDBA	
DABC	DACB	DBAC	DBCA	DCAB	DCBA	
[AB]CD	[AB]DC	[AC]BD	[AC]DB	[AD]BC	[AD]CB	12
[BC]AD	[BC]DA	[BD]AC	[BD]CA	[CD]AB	[CD]BA	
A[BC]D	A[BD]C	A[CD]B	B[AC]D	B[AD]C	B[CD]A	12
C[AB]D	C[AD]B	C[BD]A	D[AB]C	D[AC]B	D[BC]A	
AB[CD]	AC[BD]	AD[BC]	BA[CD]	BC[AD]	BD[AC]	12
CA[BD]	CB[AD]	CD[AB]	DA[BC]	DB[AC]	DC[AB]	
[ABC]D	[ABD]C	[ACD]B	[DAB]C			4
A[BCD]	B[ACD]	C[ABD]	D[ABC]			4
[ABCD]						1
					Total	69

What happened? Did I miss something, or was my friend mistaken?

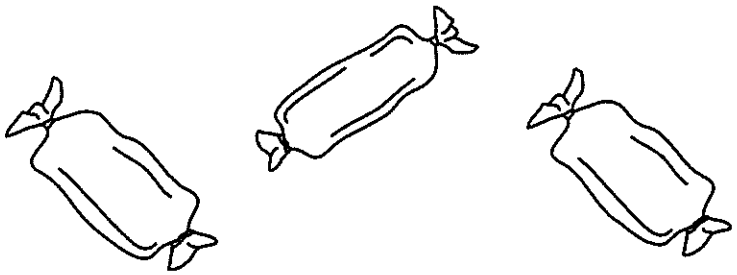
Puzzle provided by Kordemsky: The Moscow Puzzles (Dover)

A figure resembling a spiral is shown with 35 matches. Move 4 matches to form 3 squares.



This brainteaser was supplied by the Mathematical Olympiads for Elementary and Middle Schools (www.moems.org).

A bowl contains 75 candies, identical except for color. Twenty are red, 25 are green, and 30 are brown. Without looking, what is the least number of candies you must pick in order to be absolutely certain that three of them are brown?



Puzzle provided by Kordemsky: The Moscow Puzzles (Dover)

Ask a friend to pick a number from 1 through 1,000. After asking him ten questions that can be answered yes or no, you tell him the number.

What kind of Questions?

Puzzle provided by Kordemsky: The Moscow Puzzles (Dover)

This problem can be found in eighth-century writings.

A man has to take a wolf, a goat, and some cabbage across a river. His rowboat has enough room for the man plus either the wolf or the goat or the cabbage. If he takes the cabbage with him, the wolf will eat the goat. If he takes the wolf, the goat will eat the cabbage. Only when the man is present are the goat and the cabbage safe from their enemies. All the same, the man carries wolf, goat, and cabbage across the river. How?

Puzzle provided by Kordemsky: The Moscow Puzzles (Dover)

Three puzzle competitors are blindfolded. A white piece of paper is glued to each one's forehead and they are told that not all the pieces of paper are black. The blindfolds are removed and the prize goes to the first man to deduce whether the paper on his forehead is white or black.

All three announce white at the same time. Why?

This brainteaser was written by Patrick Vennebush.

There are 29 students in Miss Spelling's class. As a special holiday gift, she bought each of them chocolate letters with which they can spell their names. Unfortunately, some letters cost more than others — for instance, the letter A, which is in high demand, is rather pricey; whereas the letter Q, which almost no one wants, is relatively inexpensive.

The price of the chocolate letters for each student in her class is shown in the table below.

AIDEN – 386	ARI – 209	ARIEL – 376	BLAIRE – 390	CHARLES – 457
CLARE – 334	DEAN – 317	EARL – 307	FRIDA – 273	GABRIEL – 410
IVY – 97	KOLE – 249	LEIA – 317	LEO – 242	MAVIS – 246
NADINE – 453	NED – 236	PAUL – 167	QASIM – 238	RACHEL – 394
RAFI – 231	SAM – 168	TIRA – 299	ULA – 148	VERA – 276
VIJAY – 179	WOLKE – 272	XAVIER – 346	ZERACH – 355	

How much would it cost to buy the letters in **your** name?

This brainteaser was written by Patrick Vennebush.

A magic rectangle is an $m \times n$ array of the positive integers from 1 to $m \times n$ such that the numbers in each row have a constant sum and the numbers in each column have a constant sum (although the row sum need not equal the column sum). Shown below is a 3×5 magic rectangle with the integers 1-15.

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

Two of three arrays below can be filled with the integers 1-24 to form a magic rectangle. Which one can't, and why not?