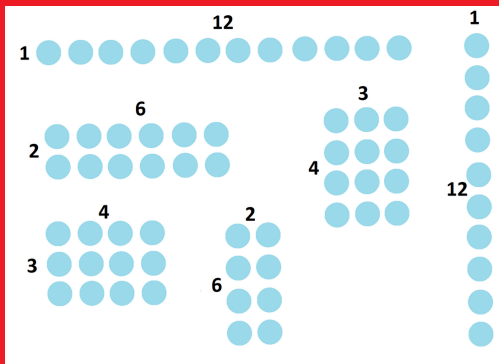


ALIEN MATH: Solutions

Here are the answers to the puzzles.

puzzle #1

One can make six different rectangles with a set of 12 dots.



How different rectangles can you make with 13 dots? With 14 dots? With 15 dots? With 100 dots?

ANSWER TO PUZZLE 1:

13 dots: two rectangles: 1×13 and 13×1 .

14 dots: four rectangles: 1×14 , 2×7 , 7×2 , 14×1

15 dots: four rectangles: 1×15 , 3×5 , 5×3 , 15×1

100 dots: nine rectangles: 1×100 , 2×50 , 4×25 , 5×20 , 10×10 , 20×5 , 25×4 , 50×2 , 100×1 .
(Squares are usually considered rectangles too.)

puzzle #2

In puzzle 1 we see that one can only make four rectangles with 14 dots and with 15 dots. One can also only make four rectangles 10 dots, and with 6 dots.

We're getting a list of the FOUR RECTANGLE NUMBERS: 6, 10, 14, 15, ...

What's the twentieth number in this list?

ANSWER TO PUZZLE 2:

Any count of dots that is the product of two different prime numbers makes exactly four rectangles. (For example: $6 = 2 \times 3$ and $14 = 2 \times 7$ and $15 = 3 \times 5$.)

The first twenty "four-rectangle numbers" are: 6, 10, 14, 15, 21, 22, 26, 33, 34, 35, 38, 39, 46, 51, 55, 57, 58, 62, 65, 69.

About the Author: Dr. James Tanton

The NMF Weekly is written by mathematician Dr. James Tanton as a resource for friends and fans of the 2021 National Math Festival.

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