the nmf weekly

Ask your math friend, James

globalmathproject.org/nmf-weekly • ISSUE 26

Is 1 prime?: SOLUTIONS

puzzle #1

How many different rectangles can one make with 100 dots?

How many different retcangles can one make with 101 dots?

ANSWER TO PUZZLE 1:

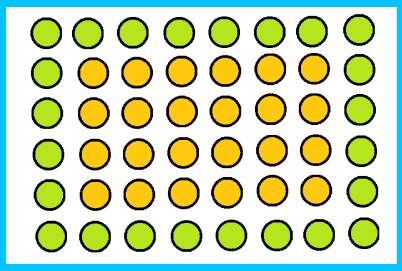
With 100 dots one can make the following rectangles. (Remember from Issue 25 that squares are rectangles too!)

1-by-100 and 100-by-1
2-by-50 and 50-by-2
4-by-25 and 25-by-4
5-by-20 and 20-by-5
10-by-10

The number 101 is prime and you can only make the two obnoxious rectagles 1-by-101 and 101-by-1.

puzzle #2

This picture has 24 yellow dots in a 4-by-6 rectangle surrounded by a single layer of green dots. Count the green dots. There are also 24 of them. WHOA!

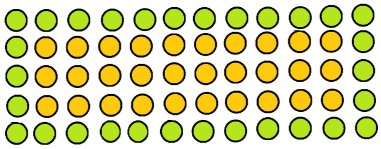


Create another picture like this. Make a rectangle of a different size with yellow dots and a single-layer border of green dots so that the count of green and yellow dots are again the same.

ANSWER TO PUZZLE 2:

Of course, one can always draw a 6-by-4 rectangle of yellow dots to yield the same picture rotated 90 degrees. But that isn't very exciting.

There is another answer that is exciting: a 3-by-10 (or 10-by-3) rectangle of yellow dots works too!



Tough Challenge:
Explain why there are no other solutions!

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.

Learn more at globalmathproject.org/nmf-weekly & nationalmathfestival.org