the nmf weekly

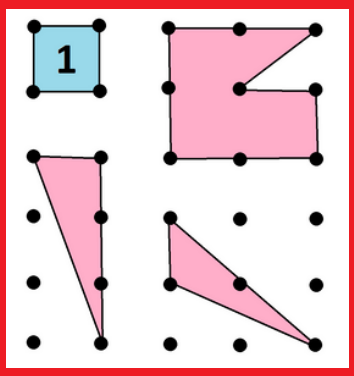
Ask your math friend, James

globalmathproject.org/nmf-weekly • ISSUE 30

More about Pi : Solutions

puzzle #1

If the area of the blue square is 1 square unit, what are the areas of the other three shapes?



ANSWER TO PUZZLE 1:

I see a two-by-two square with a triangular bite taken out of it. Its area is 4 - 1/2 = 3 1/2.

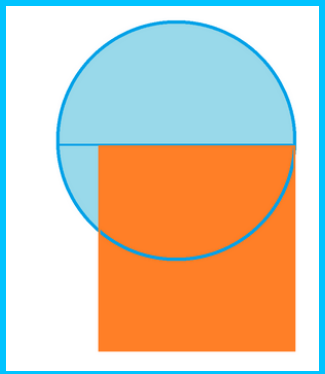
There is also a triangle that is half of a one-by-three rectangle. Its area is 1 1/2.

The remaining triangle sits inside a two-by-two square that is missing a triangle of area 2 and a triangle of area 1. It has area 4 - 2 - 1 = 1.

puzzle #2

The Egyptians from ancient times said that you can approximate the area of a circle by drawing a square along its diameter, but with side only eight-ninths the length of the diameter. Then the area of the square is close to being the area of the circle.

What is a formula for the area of the square the Egyptians describe? What approximate value for pi does their method suggest?



ANSWER TO PUZZLE 2:

The diameter of the circle is 2r.

Eight-ninths of this is (8/9)*2r = (16/9)*r.

The area of the square is (16/9)*r*(16/9)*r, which equals (256/81)*r*r.

This gives the value 256/81 = 3.16049... as an approximation for pi. (This is the value mentioned in the essay.)

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