the nmf weekly

Ask your math friend, James

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CIRCLES AS POLYGONS: Solutions

puzzle #1

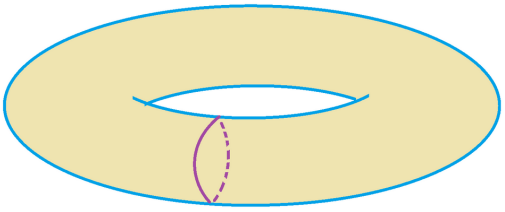
If you draw a circle on a piece of paper, it divides the page into 2 regions: an inside and an outside.

If you draw a circle on the surface of an apple, it also divides the apple surface into 2 regions.

But there is a food item for which a circle drawn on its surface fails to divide its surface into 2 regions. What food item is that?

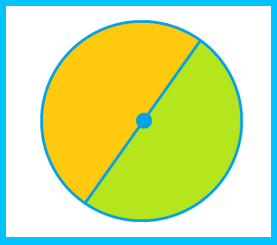
ANSWER TO PUZZLE 1:

One can draw a circle on the surface of a donut or a bagel that keeps the surface connected as just 1 region!



puzzle #2

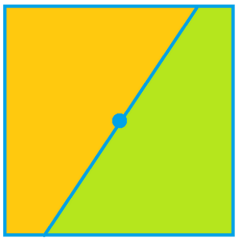
Any line through the center of a circle divides the circle into two regions of equal area.



Is there another shape and a special point within it such that any line drawn through that special point is sure to divide the shape into two regions of equal area?

ANSWER TO PUZZLE 2:

Any line through the center of a square divides the square into two regions of equal area. Can you see why?



Actually, rectangles have this property too, as do all regular polygons. Might there be even more shapes that work?

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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