What's in the shape?

1. Which measurement refers to 10-inch in the below 10-inch circular pizza?
   a or b or c?

   Answer: a (the diameter of the circular pizza)

2. Which measurement refers to 10-inch in the below 10-inch square pizza?

   Answer: Side length of the square pizza

3. Now, let us assume that the thickness of the crust is the same and minimal in both the 10-inch circular and square pizza. Then, which shape gives you more pizza to feed on? How do you know? What measure did you use to compare the pizzas?

   Well, the area of the shape determines the amount of pizza we get to eat.
   So, lets think about the area of both the shapes.

   Area of the circle = $\pi \times (\frac{d}{2})^2$ where d is the diameter of the circular pizza
   Area of the square = d^2 where d is the side length of the square

Image and data credits: Swiggy, Olio, Dominos

As it is always said, the goal is not to find the exact answer but to reason out an estimate.

We know that d^2 is greater than $(\frac{d}{2})^2$

Now, will $(\frac{d}{2})^2$ multiplied by 3.14 be greater than d^2? No; You can try for any set of values and see.

Hence, the square pizza feeds more than a circular pizza.

4. How much larger is one than the other? What is the ratio between the measure of circular pizza to square pizza? (Let us try to find a relation in an algebraic way, rather than finding the exact answer)

   Area of Circular pizza : Area of Square Pizza = $\pi \times (\frac{d}{2})^2$: d^2

   $(\pi \times d^2) / 4 : d^2$

   Which is equal to $\frac{\pi}{4}$: 1

5. Is the ratio same for all scenarios where the diameter of the circular pizza and the side length of the square pizza are equal?

   Yes

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