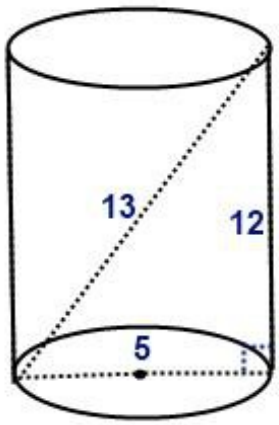
Advanced Geometry questions on the GMAT will involve concepts such as surface area and volume of three-dimensional shapes. Occasionally (just to make things more difficult), the GMAT will require you to visualize a two-dimensional shape inside a three-dimensional shape. To get these questions correct you will need to 1) draw the shape/s cleanly and carefully, and 2) look for ways to transfer information from one shape to another. Let's look at an example!

(1) The height of a certain right circular cylinder is greater than its diameter, and both numbers are positive integers. What is the volume of the cylinder?

1.The radius of the base is 2.5.

2.The longest distance between any two points on the cylinder is 13.

Why is this question hard? Well, for starters they haven't provided the figure! You don't have to have gone to art school to draw it yourself, but make sure you practice a little bit so the figures are relatively neat. Draw them large enough on your scratch pad so you can label the sides clearly.



Looking at Statement (1), this tells us the base is 5, but we still don't know the height. We cannot assume it is 12 because the question doesn't stipulate that the "longest distance between any two points" be an integer as well. For example, the height could be 10. Insufficient.

Moving on to Statement (2), the "longest distance between any two points" will be the hypotenuse of a right triangle formed by the height and the diameter as the "legs." If that hypotenuse is 13 and both the height and diameter are positive integers where h > d, the value of the legs can only be 5 and 12 (the ratio 5:12:13).

To find the volume of a right cylinder we use the formula πr2h. If the diameter is 5, the radius is 2.5. The height is 12. We'll be able to find the volume. The answer is (B). Statement (2) is sufficient by itself.

Make sure to review the common right triangle ratios such as 3:4:5 and 5:12:13, and the Pythagorean Theorem. The GMAT will sometimes hide right triangles (2-D shapes) inside boxes (rectangular prisms) as well. We would not have been able to have done this question if we didn't know the right triangle ratios and the formula for the volume of a right cylinder. But additionally, we had to be able to "visualize" the described figure – turning the given description into a picture. The ability to be flexible, and "see" into the 3-D shapes will be a great tool in your arsenal on Test Day!

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