

Geometry is essential to GMAT Quantitative success, and knowing the special right triangles are a fundamental “you-will-definitely-see-it” type of concept. The **special right triangles** are so called because their side-ratio never changes. If we know the value of one side, we can find the values of all the other sides. The first is a **30-60-90 triangle**. Its sides will always be in a ratio of $x: x\sqrt{3} : 2x$. The other special triangle is the **45-45-90 triangle**. Its sides will always be in a ratio of $x: x: x\sqrt{2}$.

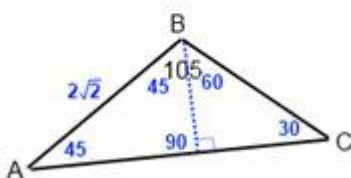
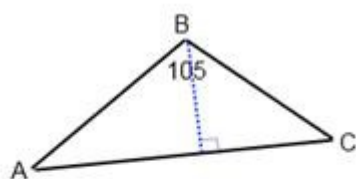
Remember that for the 30-60-90 triangle, the hypotenuse (longest side) is the side that has the ratio of $2x$. Don’t confuse it with the 45-45-90 ratio, and think that the $x\sqrt{3}$ should be on the hypotenuse! Let’s check out a sample Veritas Prep question:

In triangle ABC, angle ABC is 105 degrees. Is the area of triangle ABC less than 5?

(1) Segment AB = $2\sqrt{2}$

(2) Angle BCA is 30 degrees.

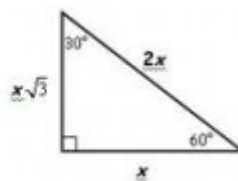
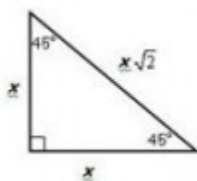
It’s important to always draw figures that are described but not provided:



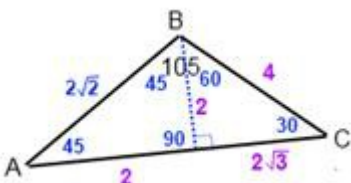
We know the formula for the area of a triangle is $(1/2)(B)(H)$. If we choose AC as our base, we’ll need to draw an altitude to create a height.

At a minimum, we’ll probably need to use BOTH pieces of information given in the statements to try and find both the length of our height AND our base, so let’s fill that information in:

Since we’re dealing with special right triangles, we already know we will be able to move information from one part of the triangle to the other and eventually find the area. If this was a “value” question, we’d be done and not have to actually solve. But since it’s a “yes or no” question, we’ll want to solve for the area to see whether it is less than 5.



Remember the special right triangles ratios!



Now we can see the height is 2, and the base is $2+2\sqrt{3}$.

$$\text{Area} = (1/2)(2)(2+2\sqrt{3})$$

$$\text{Area} = 2 + 2\sqrt{3}$$

Since $\sqrt{3}$ is more than 1, we know the total area will be more than 5. The answer is definitively “no”. **The correct response is (C).**

If you chose (A), this gives us a value for one side, but we still can’t

determine whether the area is greater than 5 for the entire figure without more information. Remember, we can’t estimate, or “eyeball” the figure. If you chose (B), this tells us we’re dealing with special right triangles, but without a value for at least one side, we can’t tell if the area will be less than 5 because we can’t find the area.

Remember your special right triangle ratios. We’ll see them in both Problem Solving and Data Sufficiency. They are worth practicing, especially because triangles are the GMAT’s favorite plane geometry shape!