

## Formulas HW 5: Pythagorean Theorem

As we learned, the Pythagorean Theorem says that if you have a triangle with one right (90 degree) angle, then adding up the squares of the two sides forming the right angle will give you the square of the other side. So, “If it’s a right triangle, **then** the sum of the squares of the two shorter sides equals the square of the longer side.”

Builders will very often use the converse of the Pythagorean theorem, which says this: “In a triangle, if the sum of the squares of the two shorter sides equals the square of the longer side, then the triangle is a right triangle.” It’s a subtle difference, but an important one: builders usually want to make sure that rooms are rectangular (called “square” in their lingo – it refers to the right angles).

Let’s have you check one of the corners in your house or apartment! [This video will show you how!](#)

1. **(3 points)** Take a picture of your square checking! Make sure I can see the three “rulers” you used. 😊
2. **(3 points) (w)** What’s so special about the 3 inches, 4 inches, and 5 inches? How are they related (using Pythagoras)? Show me the math! And include the units that you get!
3. **(2 points)** Suppose I was checking the square of a room in, say, England. They don’t measure with inches over there; they use the Metric system<sup>1</sup>. So, let’s say they measure their strips in **centimeters**. But, 3 centimeters is **really** small, so they decided to make that smallest length **9** centimeters, instead. What would the other two ruler lengths have to be, in order to work? Make sure they’re in *centimeters*!
4. **(2 points)** Now, suppose your smallest ruler is still 9, but find two other lengths of the **larger** rulers, different from those you used in #3, that would **also** work to check the square. **Hint:** you might want to Google “Pythagorean triples!”

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<sup>1</sup> Interesting note: inches are part of what are called “Imperial” units, which originated (surprise!) in Britain. Nowadays, the entire world (except for three countries) primarily uses the **Metric** system (England among them). We’re one of those three – for an extra credit point, find the other two!