Name: _____ Date: Dec 11 Hour: 7th

**Unit 4A: Day 8: The Converse of the Pythagorean Theorem**

*Focus Question: If I know the three sides of a triangle, can I decide if it is a right triangle?*

A. Remember the Pythagorean Theorem states **if a triangle is a right triangle then** $a^2+b^2=c^2$.
(Remember that the shortest side is $a$, the medium side is $b$, and the longest side is $c$.)

For each set of numbers below, tell which side would be $a$, which would be $b$, and which would be $c$.

| 3 Side Lengths | a | b | c |
|---|---|---|---|
| 6, 12, 8 | 6 | 8 | 12 |
| 5, 13, 12 | 5 | 12 | 13 |
| 12, 8, 9 | 8 | 9 | 12 |

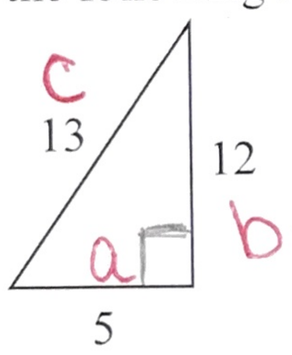
B. Now that you know which side to use for $a$, $b$, and $c$ you can substitute them into (replace) $a^2 + b^2 = c^2$

**If it is true, then the triangle** is **a right triangle.**

**If it is false, then the triangle** is not **a right triangle.**

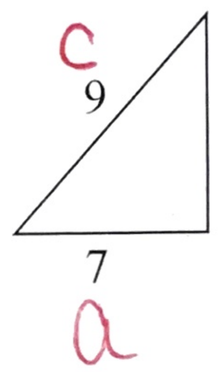
**This is the converse of the Pythagorean Theorem.**

Are the following triangles right triangles?




$5^2+12^2=13^2$
$25+144=169$
$169=169$
True

Yes it is a right $\triangle$.




$7^2+8^2=9^2$
$49+64=81$
$113=81$
False

No it is not a right $\triangle$.

C. Try one yourself.
Is a triangle with side lengths 6, 12, and 10 a right triangle?

a c b

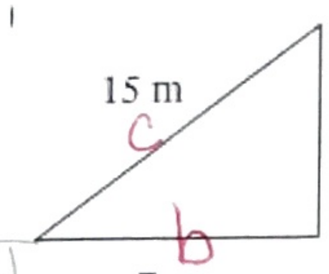
$6^2+10^2=12^2$
$36+100=144$
$136=144$
False

No it is not a right $\triangle$.

D. Practice More:

(1) For each set of side lengths: decide if the sides lengths will make a triangle. $a+b>c$

(2) **If they do**, decide if they make a right triangle. $a^2+b^2=c^2$




① △? No!

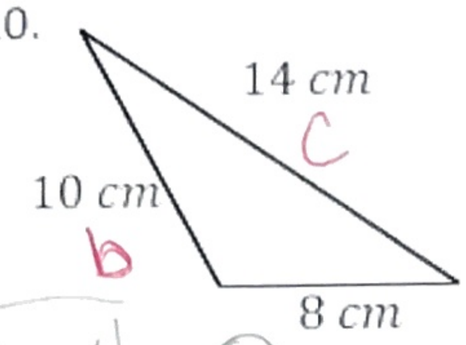
$4+7>15$

$11>15$

False

② X

10.




① △? Yes! → ② a

$8+10>14$

$18>14$

True

Right △? No

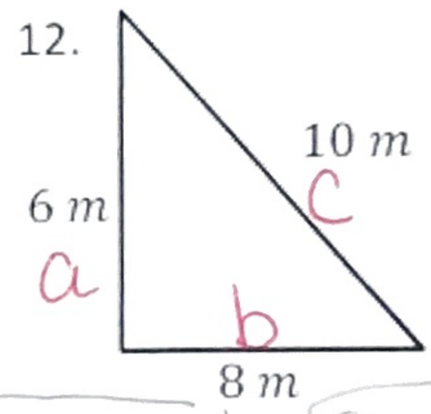
$8^2+10^2=14^2$

$64+100=196$

$164=196$

False

12.




① △? Yes → ② Right △? Yes

$6+8>10$

$14>10$

True

$6^2+8^2=10^2$

$36+64=100$

$100=100$

True

18. $a = 5\ mm$

$b = 12\ mm$

$c = 13\ mm$

| |
|---|
| A = 4 cm |
| B = 6 cm |
| C = 12 cm |

$a=9, b=11, c=14$

John asked his dad to get him boards with the lengths of 5 feet, 7 feet, and 10 feet to make a right triangular ramp to practice skate board tricks. Explain his error(s) in thinking.