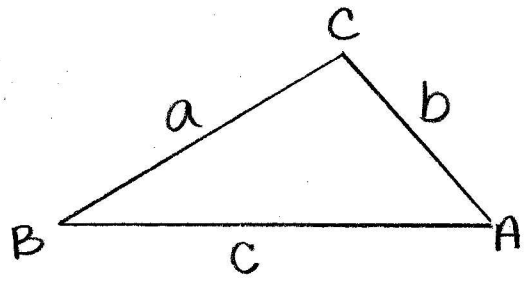
Name: _____ Date: _____ Row: _____ Period: _____

NOTES SECTION 8.3: THE CONVERSE OF THE PYTHAGOREAN THEOREM

THEOREM

If the square of ONE side of a Δ is = to the sum of the squares of the other 2 sides, then the Δ is a Right Δ.

If $a^2+b^2=c^2$ then ΔABC is a Rt. Δ.



PYTHAGOREAN TRIPLES

A Δ with sides of 3, 4 and 5 is a Right Δ. Since $3^2+4^2=5^2$.

Any multiples are also Right Δs. They are called Pythagorean Triples.

3, 4, 5 5, 12, 13 8, 15, 17 7, 24, 25
6, 8, 10 10, 24, 26
9, 12, 15
12, 16, 20
15, 20, 25
⋮

* CAN use these to save work & time! *

EXAMPLE 1

If a triangle is formed with sides having the lengths given, is it a right triangle?

a) 4, 7, 9

$4^2+7^2 \stackrel{?}{=} 9^2$

$65 \neq 81$ NO!

b) 20, 21, 29

$20^2+21^2 \stackrel{?}{=} 29$

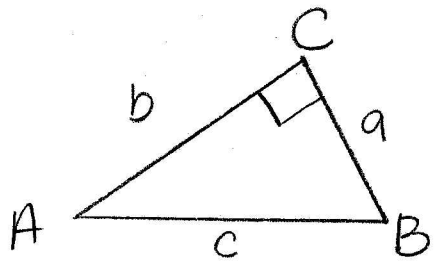
Yes! $841=841$

c) $\sqrt{2}, 2, \sqrt{5}$

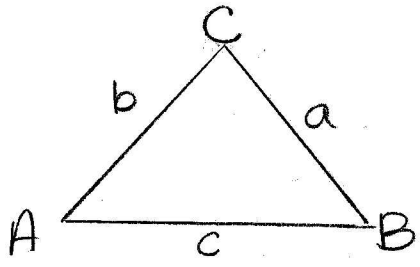
$(\sqrt{2})^2+2^2 \stackrel{?}{=} (\sqrt{5})^2$

$6 \neq 5$ NO!

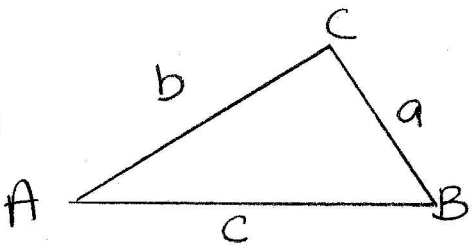
THEOREMS



If $c^2 = a^2 + b^2$ then $\triangle ABC$ is Rt. $\triangle$.



If $c^2 < a^2 + b^2$ then $\triangle ABC$ is acute



If $c^2 > a^2 + b^2$ then $\triangle ABC$ is obtuse.

EXAMPLE 2

If a triangle is formed with the given lengths, is it acute, right, or obtuse?

a) 1, 1, 5

Not a $\triangle$

b) 8, 9, 12

$12^2 \_\_ 8^2 + 9^2$

$144 < 145$ $\therefore$ acute

c) $\sqrt{5}, \sqrt{5}, \sqrt{10}$

$(\sqrt{10})^2 \_\_ (\sqrt{5})^2 + (\sqrt{5})^2$

$10 = 5 + 5$ $\therefore$ Right

d) $5, 5, 5\sqrt{3}$

$(5\sqrt{3})^2 \_\_ 5^2 + 5^2$

$75 > 50$ $\therefore$ obtuse