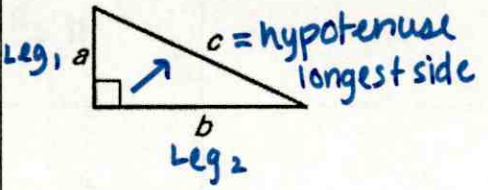
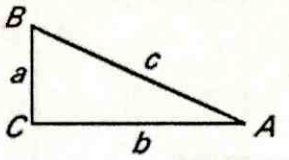
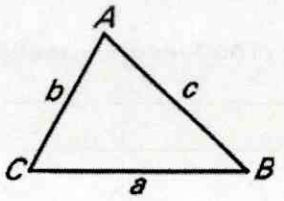
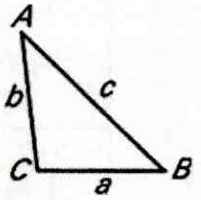
Section 7.1 - 7.2 Date _____

Apply Pythagorean Theorem and Use the Converse

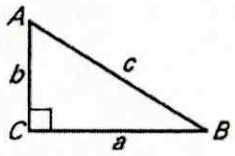
7.1

Vocabulary	Definition	Example
THEOREM 7.1 PYTHAGOREAN THEOREM	In a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the legs.	$c^2 = a^2 + b^2$ · $c = \sqrt{a^2 + b^2}$  $a^2 = c^2 - b^2$ $b^2 = c^2 - a^2$
PYTHAGOREAN TRIPLE 7.2	A Pythagorean triple is a set of three positive integers a, b, and c that satisfy the equation $c^2 = a^2 + b^2$.	**3, 4, 5** · **5, 12, 13** · **8, 15, 17** · **7, 24, 25** x 2 · 6, 8, 10 · 10, 24, 26 · 16, 30, 34 · 14, 48, 50 x 3 · 9, 12, 15 · 15, 36, 39 · 24, 45, 51 · 21, 72, 75 x 10 · 30, 40, 50 · 50, 120, 130 · 80, 150, 170 · 70, 240, 250 3x, 4x, 5x · 5x, 12x, 13x · 8x, 15x, 17x · 7x, 24x, 25x
THEOREM 7.2 CONVERSE of PYTHAGOREAN THEOREM	If the square of the length of the longest side of a triangle is equal to the sum of the squares of the other two sides, then the triangle is a right triangle.	 $c^2 = a^2 + b^2$ ↓ longest side If $c^2 = a^2 + b^2$, then $\triangle ABC$ is a right triangle.

THEOREM 7.3	If the square of the length of the longest side of a triangle is less than the sum of the squares of the other two sides, then the triangle is an acute triangle.	 $c^2 \boxed{<} a^2 + b^2$ If $c^2 < a^2 + b^2$, then the triangle ABC is acute.
THEOREM 7.4	If the square of the length of the longest side of a triangle is greater than the sum of the squares of the other two sides, then the triangle is an obtuse triangle.	 $c^2 \boxed{>} a^2 + b^2$ If $c^2 > a^2 + b^2$, then the triangle ABC is obtuse.

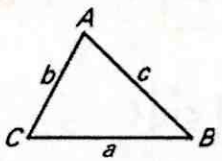
METHODS FOR CLASSIFYING A TRIANGLE BY ANGLES USING ITS SIDE LENGTHS

Theorem 7.2



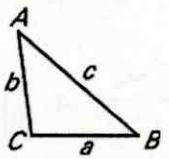
If $c^2 = a^2 + b^2$, then $m\angle C = 90°$ and $\triangle ABC$ is a right triangle.

Theorem 7.3



If $c^2 < a^2 + b^2$, then $m\angle C < 90°$ and $\triangle ABC$ is an acute triangle.

Theorem 7.4



If $c^2 > a^2 + b^2$, then $m\angle C > 90°$ and $\triangle ABC$ is an obtuse triangle.

6, 7, 9 (c)

$9^2 \boxed{<} 6^2 + 7^2$

$81 \quad 36 + 49$

85

Acute

10, 4, 8 (c)

$10^2 \boxed{>} 4^2 + 8^2$

$100 \quad 16 + 64$

80

obtuse

$3, 5, \sqrt{34}$ (c)

$(\sqrt{34})^2 \boxed{=} 3^2 + 5^2$

$34 \quad 9 + 25$

34

Right