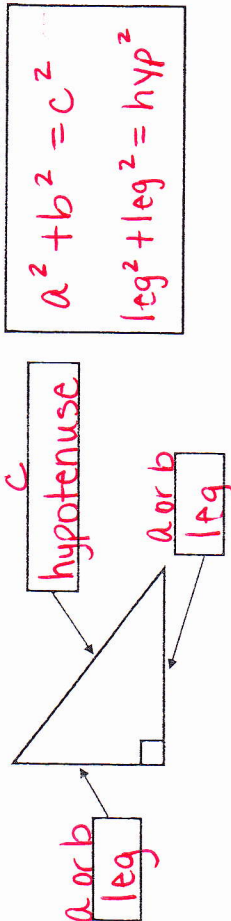


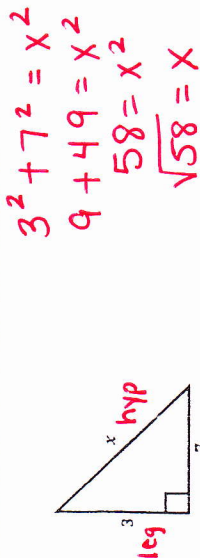
### NOTES 9.1: PYTHAGOREAN THEOREM

When two of three sides of a right triangle are known, the third side can be found using the *Pythagorean Theorem*.

#### PYTHAGOREAN THEOREM

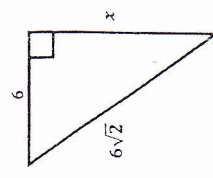


EXAMPLE 1: Find the value of 'x'.

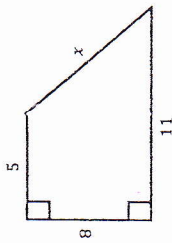


$2 \overline{) 58}$   
 $29$   
 No pairs!

EXAMPLE 2: Find the value of 'x'.



EXAMPLE 3: Find the value of 'x'.



Any group of three positive integers  $a$ ,  $b$ , and  $c$ , such that  $c^2 = a^2 + b^2$  is known as a *Pythagorean Triple*.

EXAMPLE 4: Is 3, 4, 5 a Pythagorean Triple?

Name other Pythagorean Triples:

- a) \_\_\_\_\_ b) \_\_\_\_\_  
 c) \_\_\_\_\_ d) \_\_\_\_\_

Recall that one way to classify triangles is by *angles*. A triangle can be *acute*, *obtuse*, or *right*.

If a triangle can be formed, you can determine the type of triangle formed by comparing the square of the longest side ( $c$ ) to the sum of the squares of the shorter sides ( $a$  &  $b$ ).

A **RIGHT TRIANGLE** can be formed when:  $a^2 + b^2 = c^2$   
 An **ACUTE TRIANGLE** can be formed when:  $a^2 + b^2 > c^2$   
 An **OBTUSE TRIANGLE** can be formed when:  $a^2 + b^2 < c^2$

EXAMPLE 5: Determine if a triangle can be formed, and if so, classify it.

(a) 5, 12, 4

YES or NO

(b) 6, 7, 8

YES or NO

Classify:

Classify:

(c) 1, 3,  $\sqrt{10}$

YES or NO

(d)  $\sqrt{9}$ ,  $\sqrt{16}$ ,  $\sqrt{27}$

YES or NO

Classify:

Classify: