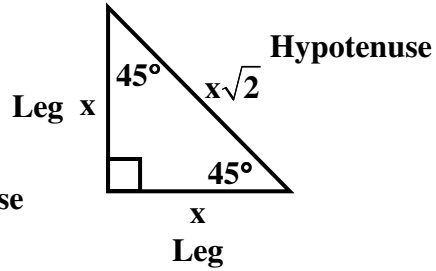**Section 7.3 – Special Right Triangles**

The 45°-45°-90° Triangle

In a 45°-45°-90° triangle, the hypotenuse is $\sqrt{2}$ times as long as each leg.

$$\text{Leg} \cdot \sqrt{2} = \text{Hypotenuse}$$
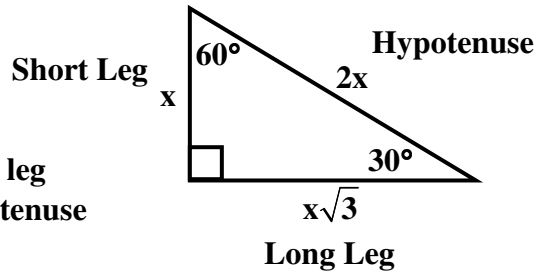
Leg x

45°

45°

x

Leg

Hypotenuse

$x\sqrt{2}$

The 30°-60°-90° Triangle

In a 30°-60°-90° triangle, the hypotenuse is twice as long as the shorter leg, and the longer leg is $\sqrt{3}$ times as long as the shorter leg.

$$\text{Short Leg} \cdot \sqrt{3} = \text{Long leg}$$
$$\text{Short Leg} \cdot 2 = \text{Hypotenuse}$$

Short Leg x

60°

30°

$x\sqrt{3}$

Long Leg

Hypotenuse

2x

Important Note: The short leg is opposite of the 30º angle.
               The long leg is opposite of the 60º angle.

For a 45°-45°-90° triangle, the leg times _____ is equal to the hypotenuse.
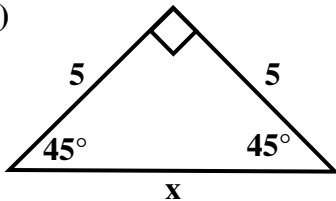
For a 30°-60°-90° triangle, the short leg times _____ is equal to the long leg.

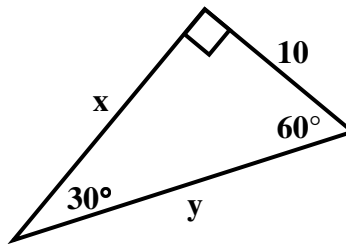For a 30°-60°-90° triangle, the short leg times _____ is equal to the hypotenuse.
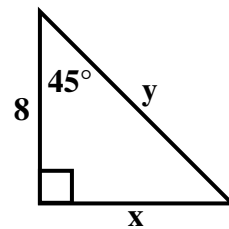
Ex 1:
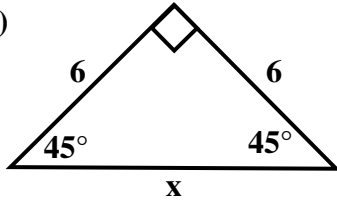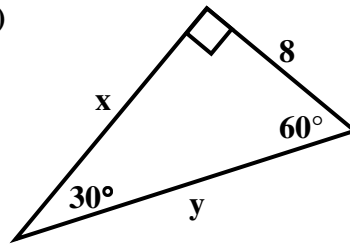Find the value of the variable(s).

a)

5   5

45°   45°

x

b)

10

x

60°

30°   y

c)

45°   y

8

x

STUDENT PRACTICE:

d)

e)

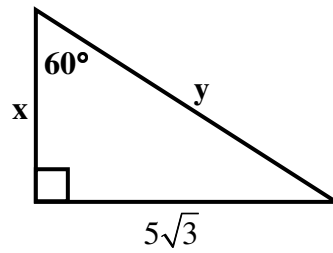

f)
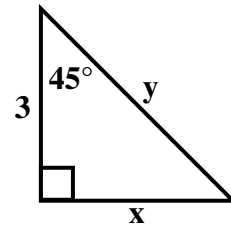
Ex 2:

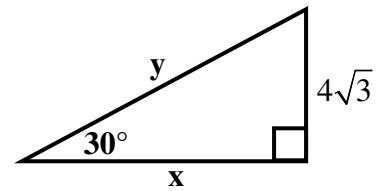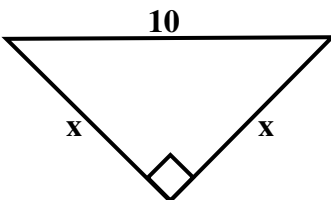Find the value of the variable(s).

a)
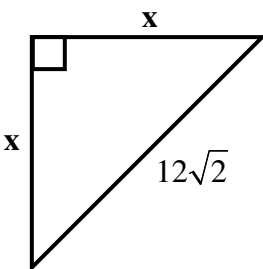
b)

c)

Getting a fraction to NOT have a denominator that is a radical is called

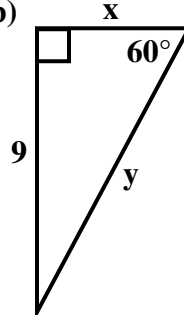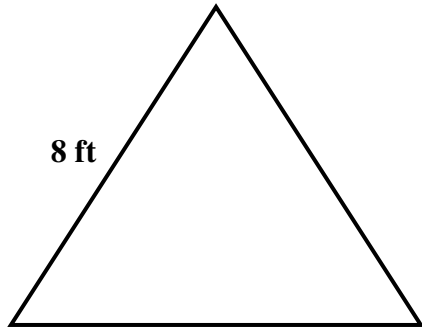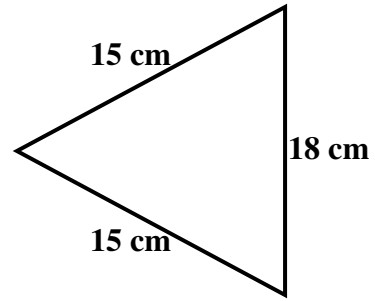_____.

Ex 3:

Find the value of the variable(s).

a)

b)

Ex 4:
a) Find the area of the regular triangle.

8 ft

b) Find the area of the triangle.

15 cm

18 cm

15 cm

c) The altitude (height) of an equilateral triangle is 9 cm. Find the length of a side of the triangle.

Ex 5:
a) The perimeter of a square is 28 inches.
   Find the length of the diagonal.

b) The diagonal of a square is 6 meters.
   Find the area of the square.