

Name:

Date:

Period: 2

Special Right Triangles

Lesson Objective IWBAT find side lengths in special right triangles and solve real-life problems involving special right triangles

Think About It... A 45° - 45° - 90° triangle is an *isosceles right triangle* that can be formed by cutting which shape in half, diagonally?

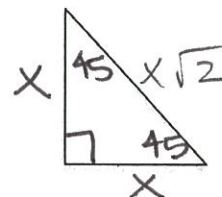
square



45°-45°-90° Triangle Theorem

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

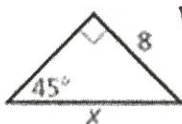
$$\text{hyp} = \text{leg} \sqrt{2}$$



Examples

1. Find the value of x . Write your answer in simplest form.

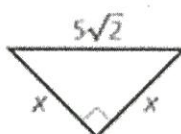
a.



$$\text{hyp} = \text{leg} \sqrt{2}$$

$$x = 8\sqrt{2}$$

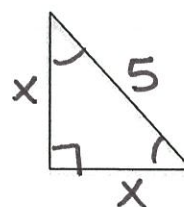
b.



$$\text{hyp} = \text{leg} \sqrt{2}$$

$$\frac{5\sqrt{2}}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$$

$$5 = x$$



$$\text{hyp} = \text{leg} \sqrt{2}$$

$$\frac{5}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$$

$$x = \frac{5}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{5\sqrt{2}}{2}$$

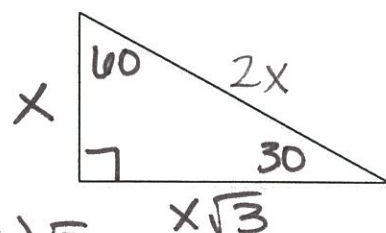
30°-60°-90° Triangle Theorem

In a 30° - 60° - 90° triangle...

1. the hypotenuse is twice as long as the shorter leg
AND
2. the longer leg is $\sqrt{3}$ times as long as the shorter leg

$$\text{hyp} = 2(\text{SL})$$

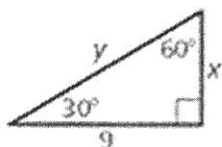
$$\text{LL} = (\text{SL})\sqrt{3}$$



$$\frac{\sqrt{4}}{2} = \frac{5\sqrt{2}}{2}$$

Examples:

2. Find the values of x and y . Write your answer in simplest form.



$$\text{LL} = \text{SL}(\sqrt{3})$$

$$9 = x\sqrt{3}$$

$$\frac{9}{\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{3}$$

$$x = \frac{9\sqrt{3}}{3}$$

$$x = \frac{9\sqrt{3}}{\sqrt{9}}$$

$$x = \frac{9\sqrt{3}}{3}$$

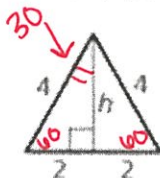
$$x = 3\sqrt{3}$$

$$\text{hyp} = 2(\text{SL})$$

$$y = 2(3\sqrt{3})$$

$$y = 6\sqrt{3}$$

3. What is the altitude of the triangle below?



$$\text{LL} = \text{SL}(\sqrt{3})$$

$$h = 2\sqrt{3}$$