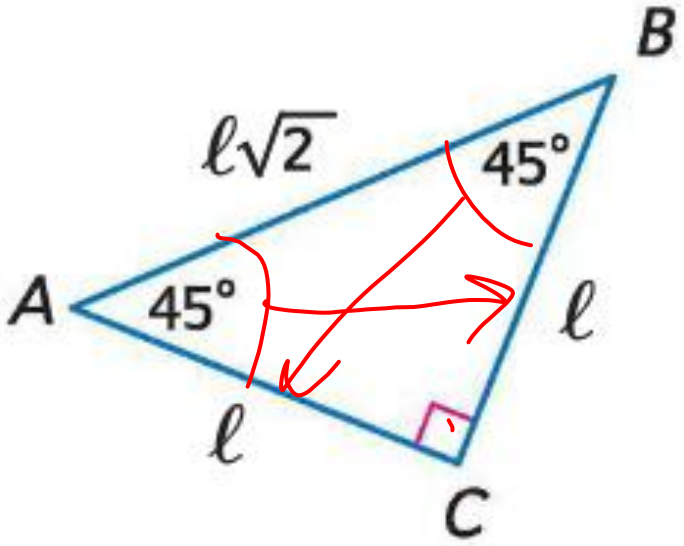
Special Right Triangles

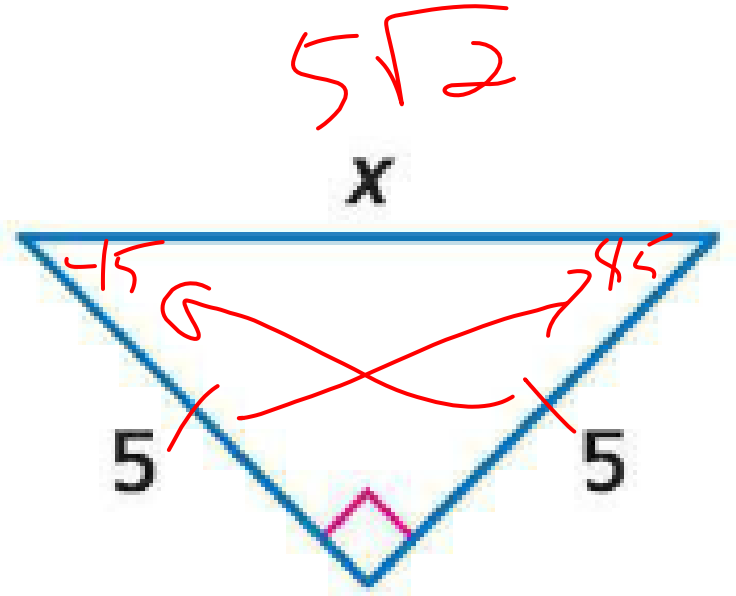
45-45-90 Triangle Theorem

- In a 45-45-90 triangle, the legs ℓ are congruent and the length of the hypotenuse h is $\sqrt{2}$ times the length of a leg.



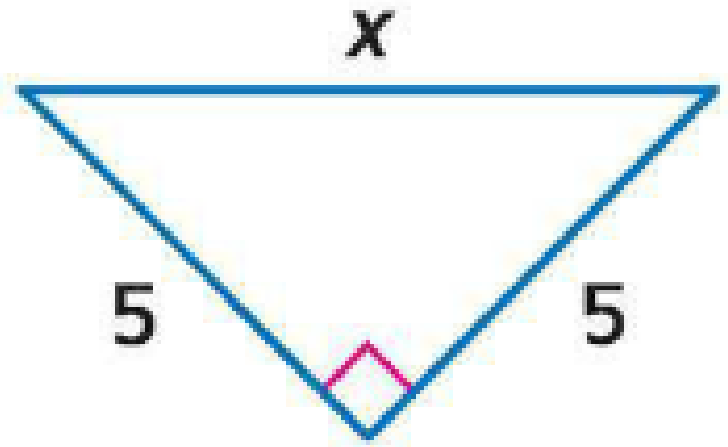
Examples

- Find x.



Examples

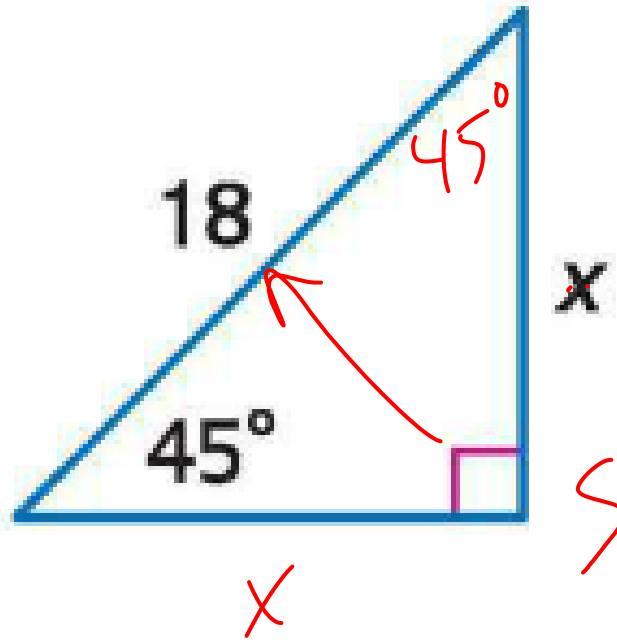
- Find x.



- $x = 5\sqrt{2}$

Examples

- Find x.



$x^2 + x^2 = 18^2$

$\frac{2x^2}{2} = \frac{324}{2}$

$\sqrt{x^2} = \sqrt{162}$

$x = 9\sqrt{2}$

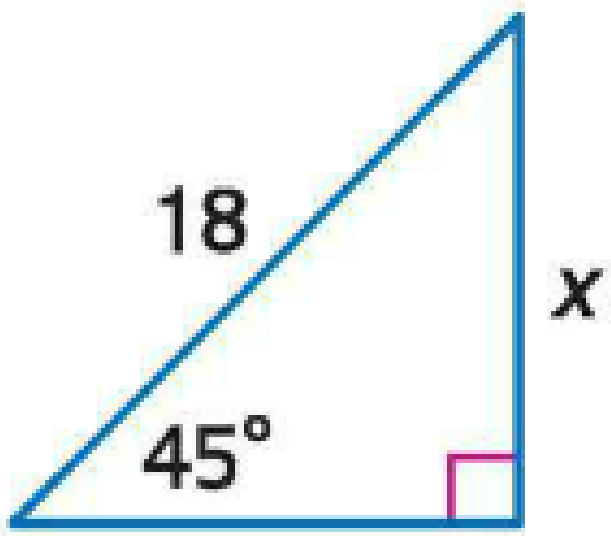
$\frac{18}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{18\sqrt{2}}{2}$

Shortcut

$\frac{\sqrt{2}}{2}$

Examples

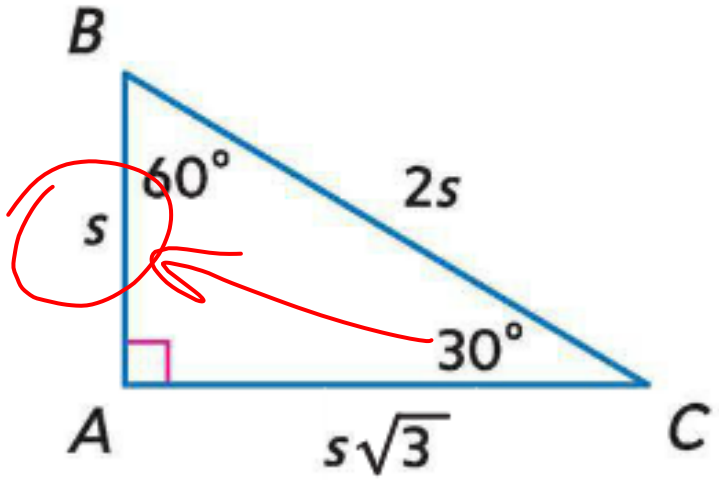
- Find x.



- $18 = x\sqrt{2}$
- $x = 18/\sqrt{2}$
- $x = 9\sqrt{2}$

30-60-90 Triangle Theorem

- In a 30-60-90 triangle, the length of the hypotenuse is 2 times the length of the shorter leg and the longer leg is $\sqrt{3}$ times the length of the shorter leg.



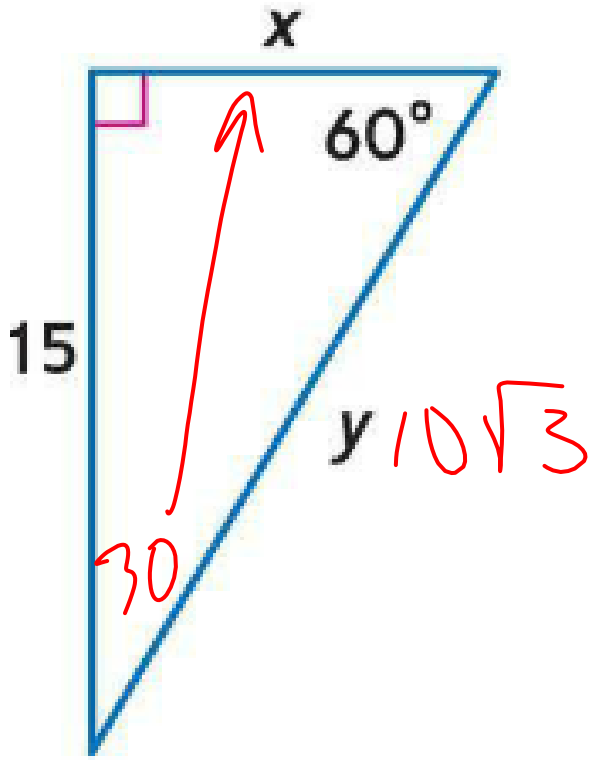
Examples

- Find x and y.

Shortcut

$$\frac{15}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{15\sqrt{3}}{3} = 5\sqrt{3}$$

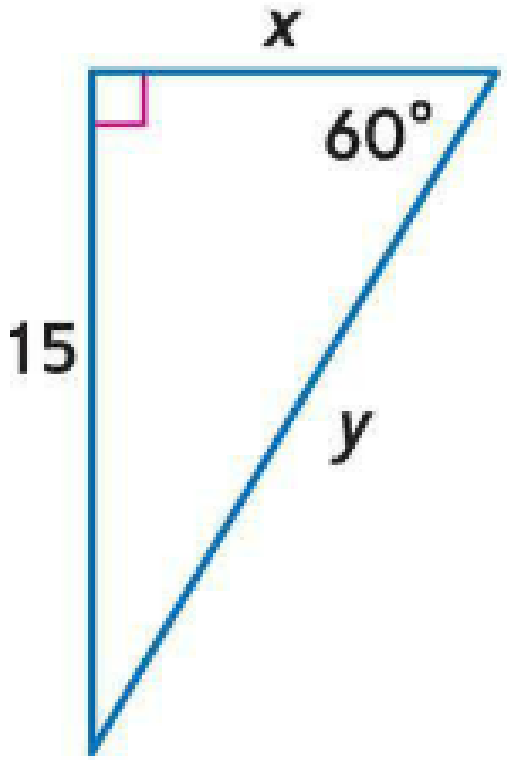
$S = 5\sqrt{3}$



$y\ 10\sqrt{3}$

Examples

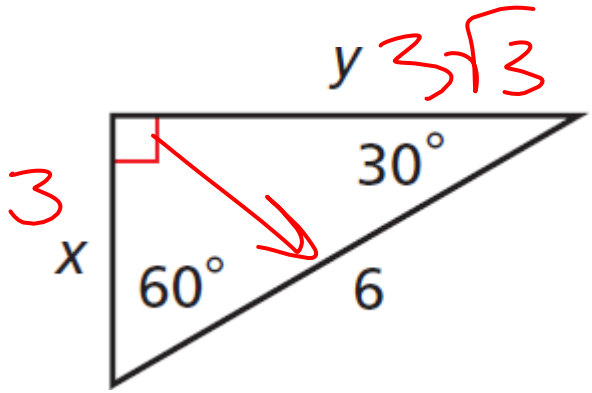
- Find x and *y*.



- $15 = x\sqrt{3}$
- $x = 15/\sqrt{3}$
- $x = 5\sqrt{3}$
- $y = 2x$
- $y = 2 * 5\sqrt{3} = 10\sqrt{3}$

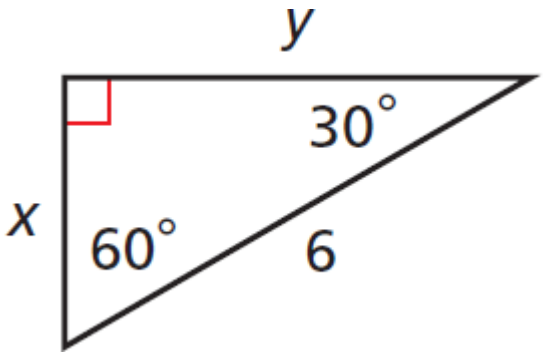
Examples

- Find the values of x and y. Give your answers in simplest radical form.



Examples

- Find the values of x and y. Give your answers in simplest radical form.



$6 = 2x$

$x = 3$

$y = x\sqrt{3}$

$y = 3\sqrt{3}$