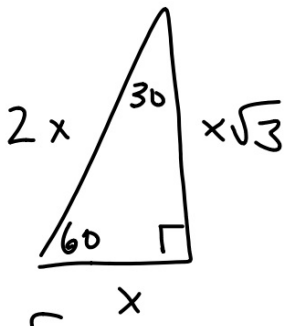
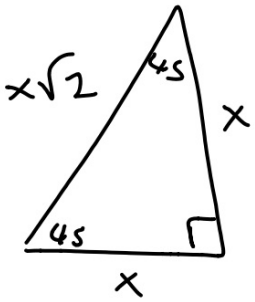
Geometry 8.3

Use the properties of 45-45-90 triangles

Use the properties of 30-60-90 triangles

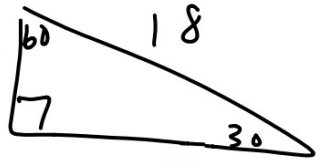
isosceles
isosceles right triangle
equilateral triangle
30-60-90 triangle
special right triangle
rationalizing the denominator
triangle cut-outs





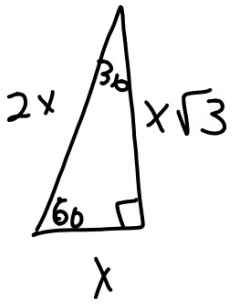
$$\frac{6}{\sqrt{3}}\left(\frac{\sqrt{3}}{\sqrt{3}}\right) = \frac{6\sqrt{3}}{3} = 2\sqrt{3}$$

4.

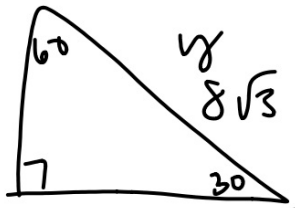


$$\frac{9\sqrt{3}}{\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}}$$

$$9 = x$$



5.



$$\frac{12}{\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}}$$

$$\frac{12}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = x$$

$$\frac{12\sqrt{3}}{3} = 4\sqrt{3}$$

6.

36^2+48^2

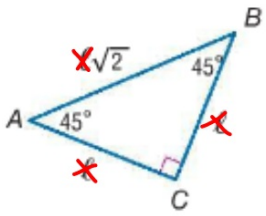
$.7^2+2.4^2=$

$4^2+7.5^2$

Theorem 8.8 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.

Symbols In a 45°-45°-90° triangle, $\ell = \ell$ and $h = \ell\sqrt{2}$.



From an equilateral triangle...

StudyTip

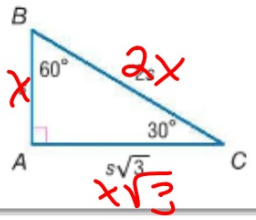
Use Ratios The lengths of the sides of a 30°-60°-90° triangle are in a ratio of 1 to $\sqrt{3}$ to 2 or $1 : \sqrt{3} : 2$.

This algebraic proof verifies the following theorem.

Theorem 8.9 30°-60°-90° Triangle Theorem

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

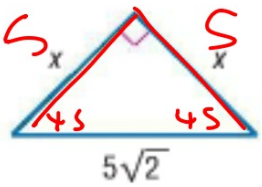
Symbols In a 30°-60°-90° triangle, $h = 2s$ and $\ell = s\sqrt{3}$.



Whiteboards

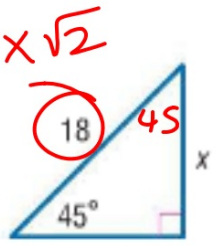
GuidedPractice

2A.



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

2B.



$$\frac{x\sqrt{2}}{\sqrt{2}} = \frac{18}{\sqrt{2}}\left(\frac{\sqrt{2}}{\sqrt{2}}\right)$$

$$x = \frac{18\sqrt{2}}{2} = 9\sqrt{2}$$

21√4
21.2

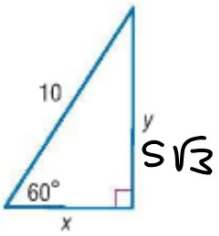
GuidedPractice

Find x and y.

3A.

2 · 4√3
8√3

3B.



5

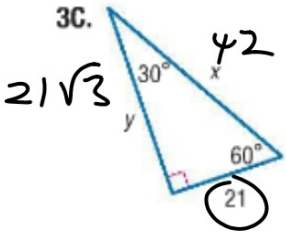
$$\frac{x\sqrt{3}}{\sqrt{3}} = \frac{12}{\sqrt{3}}\left(\frac{\sqrt{3}}{\sqrt{3}}\right)$$

$$x = \frac{12\sqrt{3}}{3} = 4\sqrt{3}$$

2x x√3 30° x

x√2 x 45° x

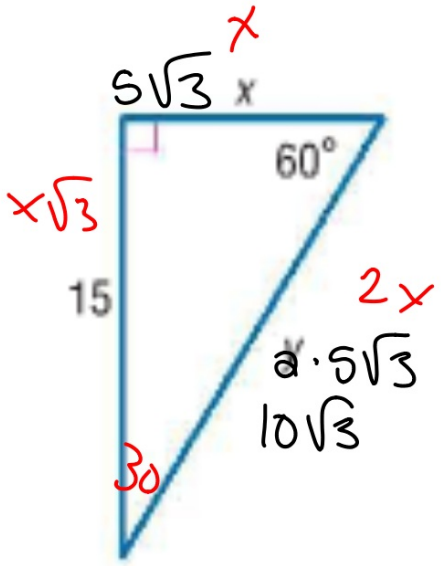
3C.



y2

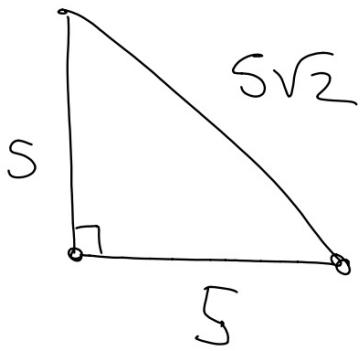
Example 3 Find Lengths in a 30°-60°-90° Triangle

Find x and y.



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

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


5√2
5
5