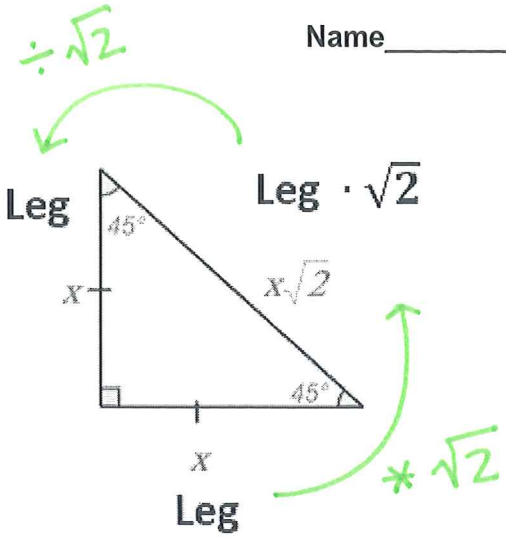
Special Right Triangles Name_____

45-45-90

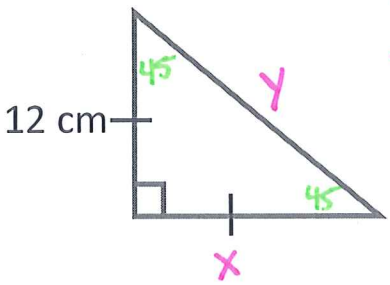
Isosceles right triangle



In a 45-45-90 Triangle, if the legs have a length of x, then the hypotenuse has a length of $x\sqrt{2}$.

Example 1: Find the missing side length(s) in each 45-45-90 triangle. Rationalize the denominators.

A.



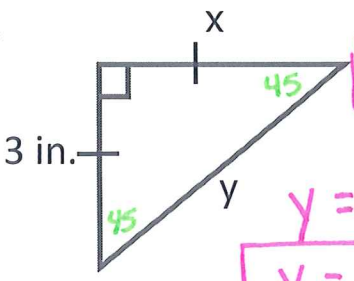
$x = 1\text{leg}$

$x = 12$

$y = 1\text{leg} \cdot \sqrt{2}$

$y = 12\sqrt{2}$

B.



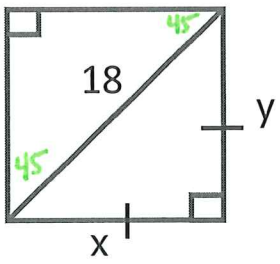
$x = 1\text{leg}$

$x = 3$

$y = 1\text{leg} \cdot \sqrt{2}$

$y = 3\sqrt{2}$

C.



$18 = 1\text{leg}\sqrt{2}$

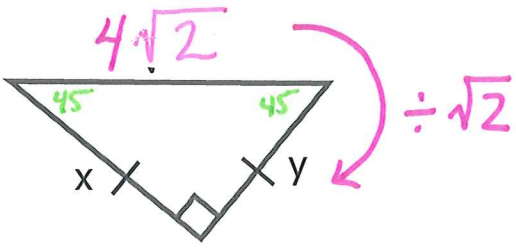
$\frac{18}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$

rationalize the denominator

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

$x = 9\sqrt{2}$

D.



$\frac{4\sqrt{2}}{\sqrt{2}} = \frac{1\text{leg}\sqrt{2}}{\sqrt{2}}$

$4 = 1\text{leg}$

$x = 4$

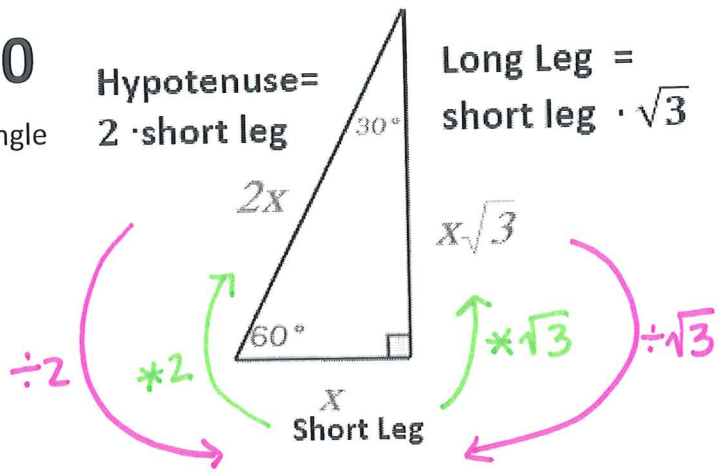
$y = 4$

30-60-90

special right triangle

Hypotenuse= 2 ·short leg

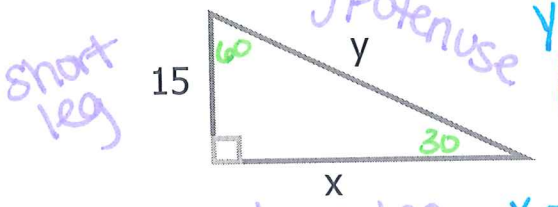
Long Leg = short leg $\cdot \sqrt{3}$



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

Example 2: Find the missing side length(s) in each 30-60-90 triangle. Rationalize the denominators.

A.



short leg

hypotenuse

long leg

y = short · 2

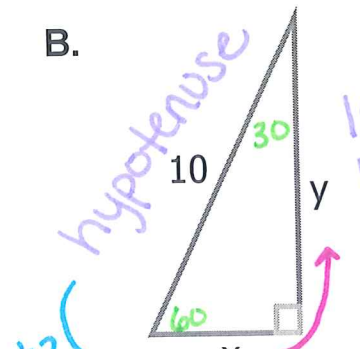
y = 15 · 2

y = 30

x = short · √3

x = 15√3

B.



hypotenuse

long leg

short leg

÷2

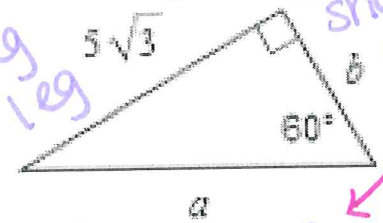
x = 10/2 = 5

x = 5

y = short · √3

y = 5√3

C.



÷√3

long leg

short leg

hypotenuse

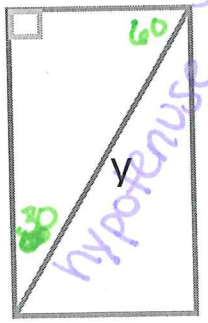
b = 5√3/√3

b = 5

a = 5 · 2

a = 10

D.



short leg

long leg

hypotenuse

20 = short √3

20/√3 = x√3/√3

rationalize the denom.

x = 20/√3 · √3/√3

x = 20√3/3

y = 2 · short

y = 40√3/3