Special Right Triangles

Simplify.

1. $\frac{7}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{7\sqrt{2}}{2}$

2. $\frac{5}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{5\sqrt{3}}{3}$

3. $\frac{1}{\sqrt{5}} = \frac{\sqrt{5}}{5}$

Solve the equation.

4. $\frac{3x}{3} = \frac{15}{3}$

$x = 5$

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

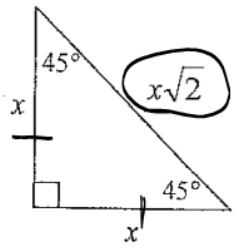
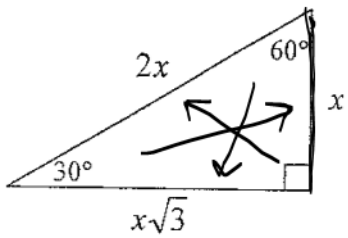
$x = \frac{5}{\sqrt{2}}$

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

6. $\frac{x\sqrt{7}}{\sqrt{7}} = \frac{12}{\sqrt{7}}$

$x = \frac{12\sqrt{7}}{7}$

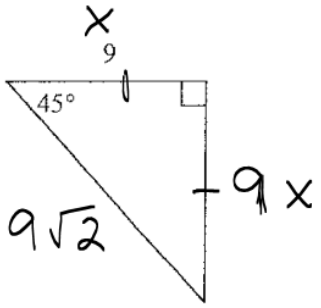
There are many ways to remember these formulas. Here are just a few…

Formulas & "Special Numbers"	*Visual Patterns*
45°- 45°- 90° Δ HYPOTENUSE = $x\sqrt{2}$ **(Just remember $\sqrt{2}$ is the special # for a 45°- 45°- 90° Δ)**	
30°- 60° - 90° Δ HYPOTENUSE = $2x$ **(Just remember 2 is the special # for HYPOTENUSE in a 30°- 60°- 90° Δ)** LONG LEG = $x\sqrt{3}$ **(Just remember $\sqrt{3}$ is the special # for the LONG LEG)**	

Ex 1 Try some problems. Find all the missing sides.

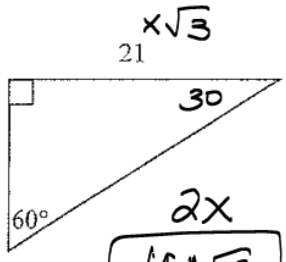
(It may be helpful to write the special number, formula or "pattern" by problem.)

a.)



$x\sqrt{2}$ $9\sqrt{2}$

b.)



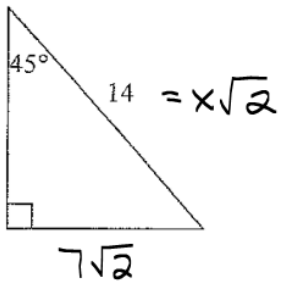
$7\sqrt{3}$ $14\sqrt{3}$

$$\frac{x\sqrt{3}}{\sqrt{3}} = \frac{21}{\sqrt{3}} = \frac{21\sqrt{3}}{3}$$

$x = 7\sqrt{3}$

$2(7\sqrt{3})$

c.)

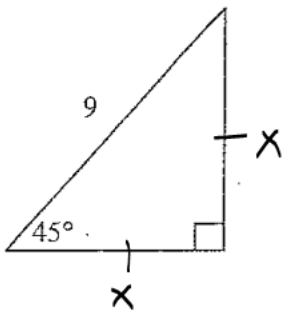


$7\sqrt{2}$

$$\frac{x\sqrt{2}}{\sqrt{2}} = \frac{14}{\sqrt{2}} = \frac{14\sqrt{2}}{2}$$

$x = 7\sqrt{2}$

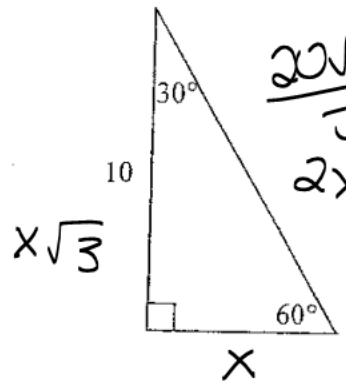
d.)



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

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

e.)



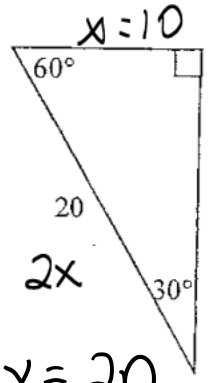
$\frac{20\sqrt{3}}{3}$ $2x$ $x\sqrt{3}$

$$\frac{x\sqrt{3}}{\sqrt{3}} = \frac{10}{\sqrt{3}}$$

$x = \frac{10\sqrt{3}}{3}$

$$\frac{2}{1}\left(\frac{10\sqrt{3}}{3}\right) = \frac{20\sqrt{3}}{3}$$

f.)

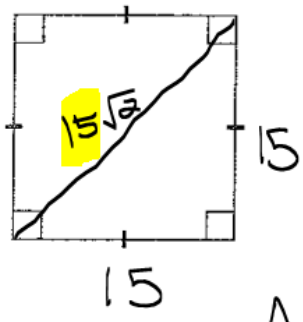


$x\sqrt{3}$ $10\sqrt{3}$

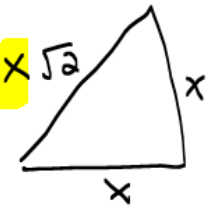
$2x = 20$

$x = 10$

When you draw the diagonal of a square, what kind of triangles do you get?

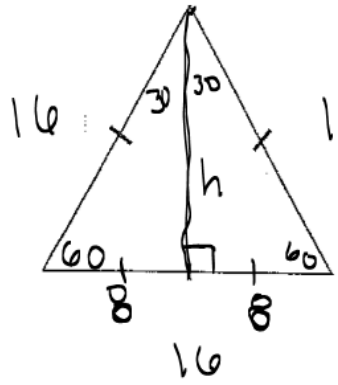


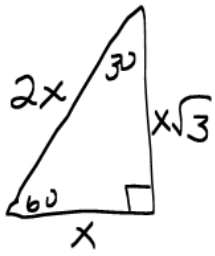
45-45-90



$A = bh$

When you draw the altitude of an equilateral triangle, what kind of triangles do you get?





Ex 2

If the diagonal of a square is $15\sqrt{2}$, find the area of the square.

$A = bh$

$= 15(15)$

$= 225$

Ex 3

$A = \frac{1}{2}bh$

If the side of an equilateral triangle is 16, find the area of the triangle.

$h = 8\sqrt{3}$

$= \frac{1}{2}(16)(8\sqrt{3})$

$= 8(8\sqrt{3})$

$= 64\sqrt{3}$