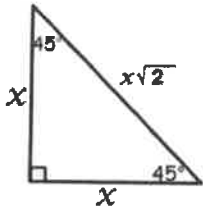


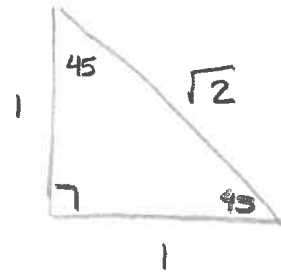
8.3 Special Right Triangles
Geometry CP

45° - 45° - 90° Triangle: or 1 - 1 - $\sqrt{2}$

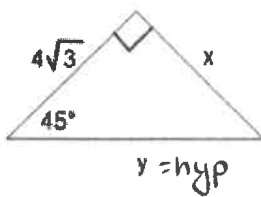
In a 45° - 45° - 90° Triangle, the hypotenuse is $\sqrt{2}$ times as long as each leg.



$\sqrt{2}$ leg = hypotenuse



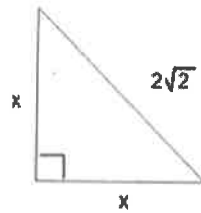
1. Find the missing sides:



$x = 4\sqrt{3}$

$y = \sqrt{2} \cdot 4\sqrt{3}$

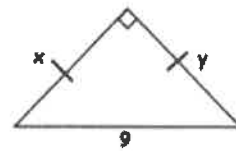
$y = 4\sqrt{6}$



hyp = $\sqrt{2}$ leg

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

$2 = \text{leg} = x$



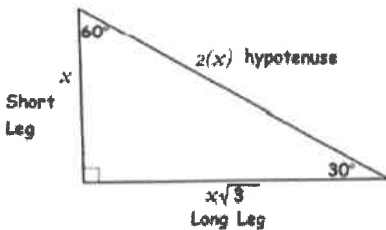
$9 = \sqrt{2} x$

$9/\sqrt{2} = x$

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

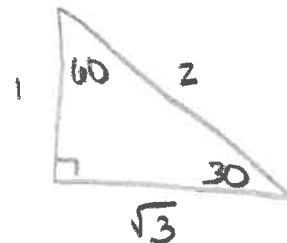
30° - 60° - 90° Triangle: or 1 - 2 - $\sqrt{3}$

In a 30° - 60° - 90° Triangle, the hypotenuse is 2 times longer than the shortest leg and the longest leg is $\sqrt{3}$ times as long as the shortest leg.



hypotenuse = 2 short

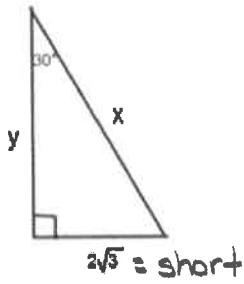
long = $\sqrt{3}$ short



★ get short side first ★

8.3 Special Right Triangles
Geometry CP

2. Find the missing sides:



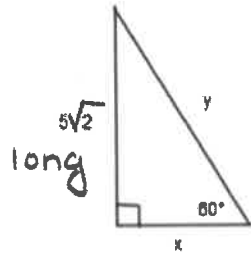
$$x = 2(2\sqrt{3})$$

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

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

$$y = 2(3)$$

$$y = 6$$



$$\text{long} = \sqrt{3} \text{ short} \quad \text{hyp} = 2 \text{ short}$$

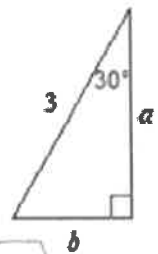
$$5\sqrt{2} = \sqrt{3} x$$

$$\frac{5\sqrt{2}}{\sqrt{3}} = x$$

$$\frac{5\sqrt{6}}{3} = x$$

$$y = 2\left(\frac{5\sqrt{2}}{3}\right)$$

$$y = \frac{10\sqrt{6}}{3}$$

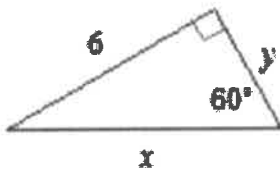


$$3 = 2b$$

$$\frac{3}{2} = b$$

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

$$a = \frac{3\sqrt{3}}{2}$$



$$\text{long} = \sqrt{3} \text{ short}$$

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

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

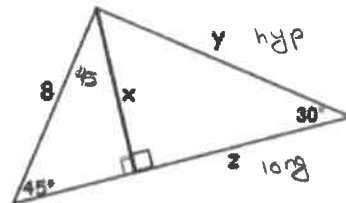
$$\frac{6\sqrt{3}}{3} = y$$

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

$$\text{hyp} = 2 \text{ short}$$

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

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



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

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

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

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

$$x = 4\sqrt{2}$$

$$\text{hyp} = 2 \text{ short}$$

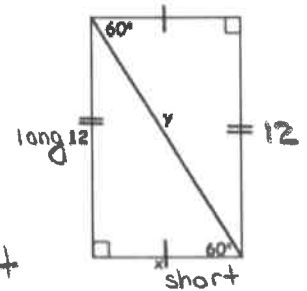
$$y = 2(4\sqrt{2})$$

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

$$\text{long} = \sqrt{3} \text{ short}$$

$$z = \sqrt{3}(4\sqrt{2})$$

$$z = 4\sqrt{6}$$



$$\text{long} = \sqrt{3} \text{ short}$$

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

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

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

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

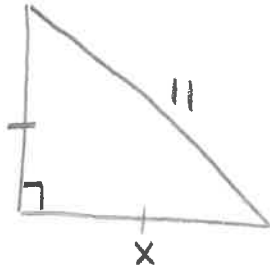
$$\text{hyp} = 2 \text{ short}$$

$$y = 2(4\sqrt{3})$$

$$y = 8\sqrt{3}$$

8.3 Special Right Triangles
Geometry CP

3. Determine the length of the leg of a $45^\circ - 45^\circ - 90^\circ$ triangle with a hypotenuse length of 11.



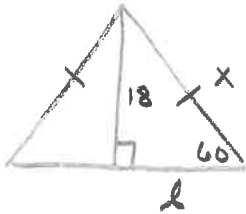
$$\sqrt{2} \text{ leg} = \text{hyp}$$

$$\sqrt{2} x = 11$$

$$x = \frac{11}{\sqrt{2}}$$

$$x = \frac{11\sqrt{2}}{2}$$

4. An equilateral triangle has an altitude length of 18 feet. Determine the length of a side of the triangle.



$$\text{long} = \sqrt{3} \text{ short}$$

$$18 = \sqrt{3} l$$

$$\frac{18}{\sqrt{3}} = l$$

$$\frac{18\sqrt{3}}{3} = l$$

$$\text{hyp} = 2 \text{ short}$$

$$x = 2 \left(\frac{18\sqrt{3}}{3} \right)$$

$$x = \frac{36\sqrt{3}}{3}$$

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

