

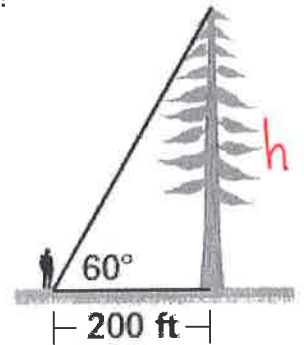
Objective: To use properties of special right triangles to find the lengths of sides.

Warm Up: You are standing 200 feet from the base of a redwood tree. You estimate the angle of elevation to the top of the tree is 60 degrees. What is the approximate height of the tree?

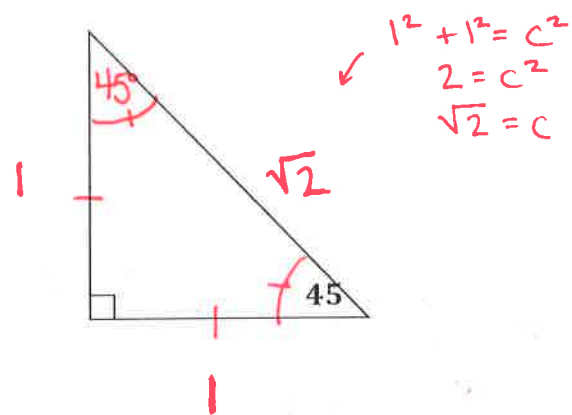
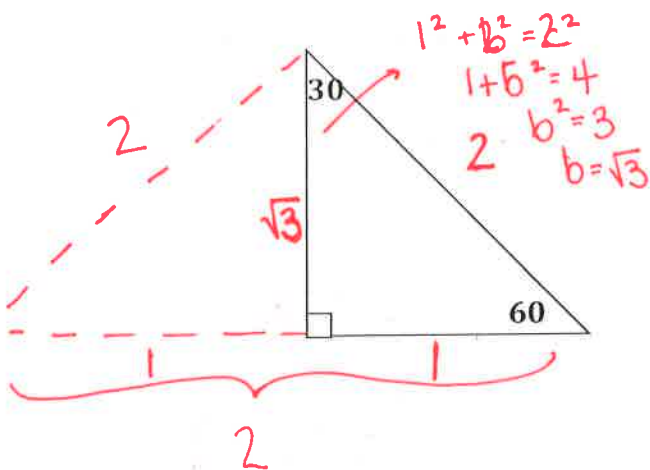
$$\tan 60^\circ = \frac{h}{200 \text{ ft.}}$$

$$h = 200 \cdot \tan 60^\circ$$

$$h = 346.41 \text{ ft.}$$

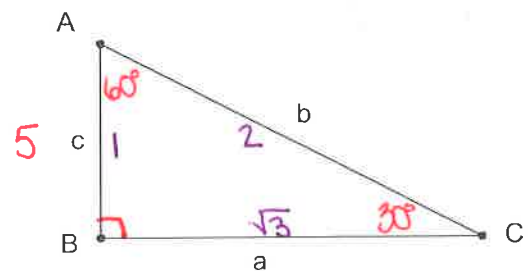


SPECIAL RIGHT TRIANGLES: 30-60-90 and 45-45-90



Example 1: Use trig to solve the following triangles given the following. Let angle B be a right angle:

- $a = 5\sqrt{3}$ $A = 60$ degrees
- $b = 10$ $B = 90^\circ$
- $c = 5$ $C = 30^\circ$



$$\frac{5}{1} = \frac{b}{2}$$

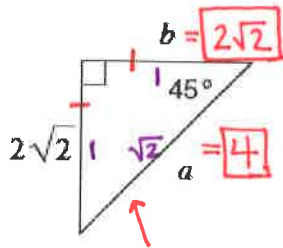
$$b = 10$$

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

$$a = 5\sqrt{3}$$

Example 2: Find the missing side(s) lengths. Leave your answers as simplified radical expressions.

A.)



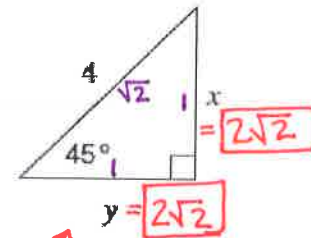
$$\frac{2\sqrt{2}}{1} = \frac{a}{\sqrt{2}}$$

$$a = 2\sqrt{2} \cdot \sqrt{2}$$

$$a = 2 \cdot 2$$

$$a = 4$$

B.)



$$\frac{4}{\sqrt{2}} = \frac{y}{1}$$

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

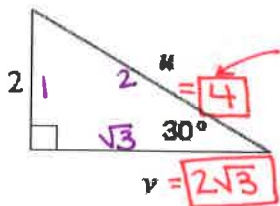
$$\frac{y\sqrt{2}}{\sqrt{2}} = \frac{4}{\sqrt{2}}$$

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

$$y = \frac{4\sqrt{2}}{2}$$

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

C.)



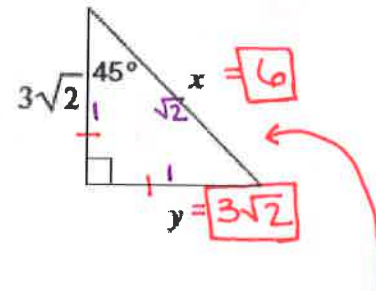
$$\frac{2}{1} = \frac{u}{2}$$

$$u = 4$$

$$\frac{2}{1} = \frac{v}{\sqrt{3}}$$

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

D.)



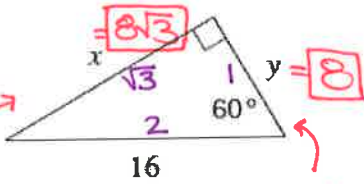
$$\frac{3\sqrt{2}}{1} = \frac{x}{\sqrt{2}}$$

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

$$x = 3 \cdot 2$$

$$x = 6$$

E.)



$$\frac{x}{\sqrt{3}} = \frac{16}{2}$$

$$\frac{2x}{2} = \frac{16\sqrt{3}}{2}$$

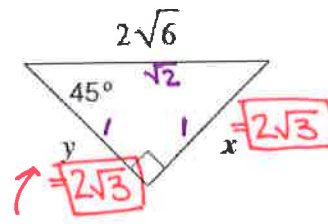
$$x = 8\sqrt{3}$$

$$\frac{16}{2} = \frac{y}{1}$$

$$\frac{16}{2} = \frac{2y}{2}$$

$$8 = y$$

F.)

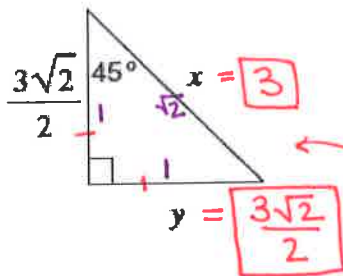


$$\frac{2\sqrt{6}}{\sqrt{2}} = \frac{y}{1}$$

$$\frac{y\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{6}}{\sqrt{2}}$$

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

G.)



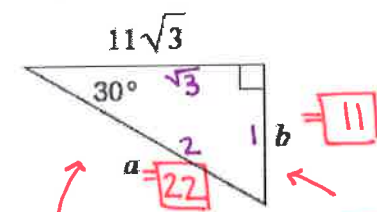
$$\frac{\frac{3\sqrt{2}}{2}}{1} = \frac{x}{\sqrt{2}}$$

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

$$x = \frac{3 \cdot 2}{2}$$

$$x = 3$$

H.)



$$\frac{11\sqrt{3}}{\sqrt{3}} = \frac{a}{2}$$

$$\frac{22\sqrt{3}}{\sqrt{3}} = \frac{a\sqrt{3}}{\sqrt{3}}$$

$$22 = a$$

$$\frac{b}{1} = \frac{11\sqrt{3}}{\sqrt{3}}$$

$$\frac{b\sqrt{3}}{\sqrt{3}} = \frac{11\sqrt{3}}{\sqrt{3}}$$

$$b = 11$$

