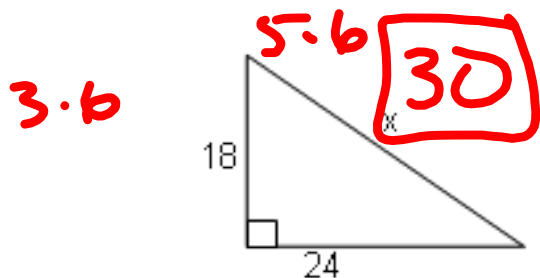# Pythagorean Theorem $a^2 + b^2 = c^2$
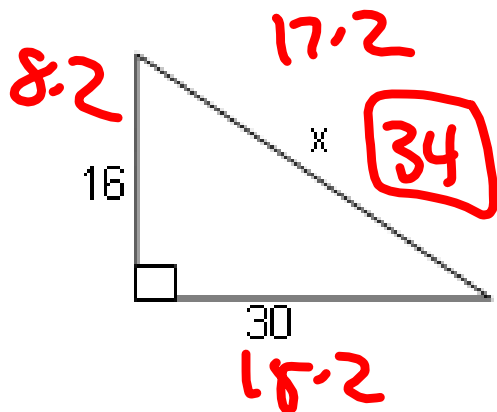
9.1

Triples   **3,4,5;   5,12,13;   7,24,25;   8,15,17**
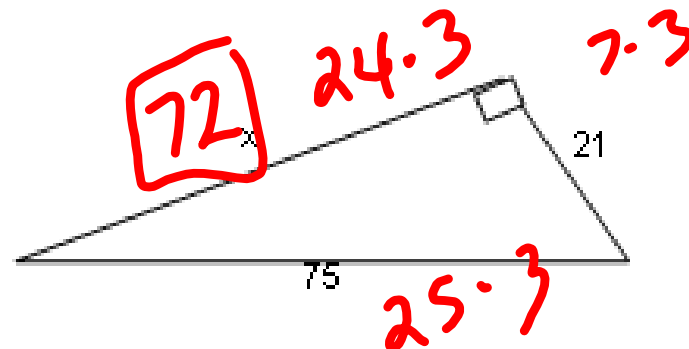
6 8 10   10,24,26

Solve for x and state the triple used.

5·6   **30**
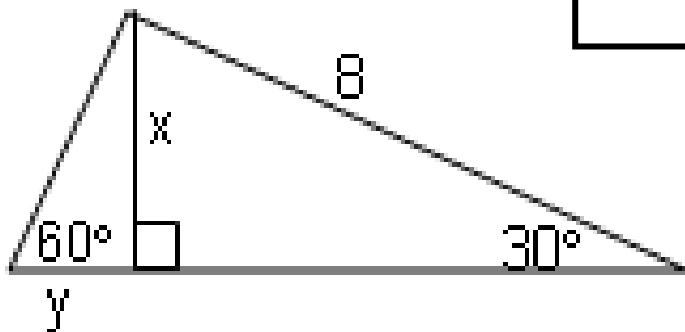
3·6

18

24

4-6

13·5

65   5·5

25

12-5

60

17·2

8·2   **34**

16

30

18·2

72 24·3   7·3

21

75   25·3
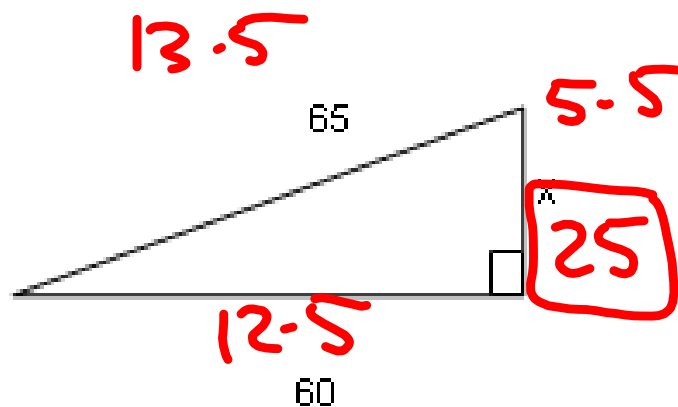
30° - 60° - 90°

30°	60°	90°
sl	ll	hyp
1	$\sqrt{3}$	2
y	10	x

original

$$\frac{1}{y} = \frac{\sqrt{3}}{10}$$

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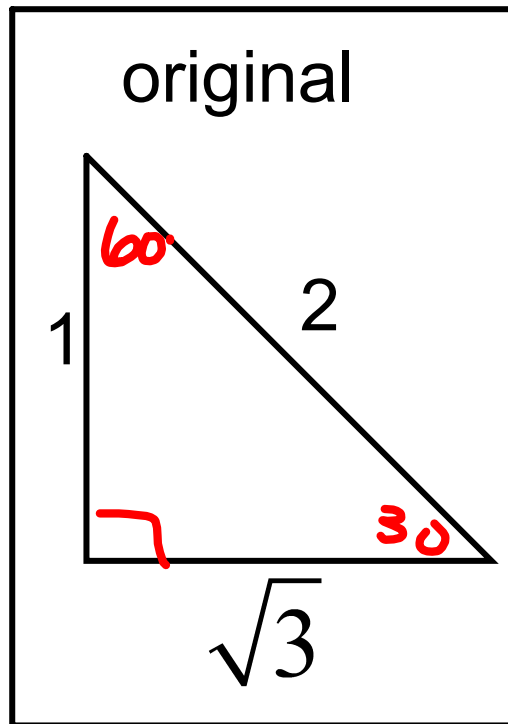
$$\frac{y\sqrt{3}}{\sqrt{3}} = \frac{10}{\sqrt{3}}$$

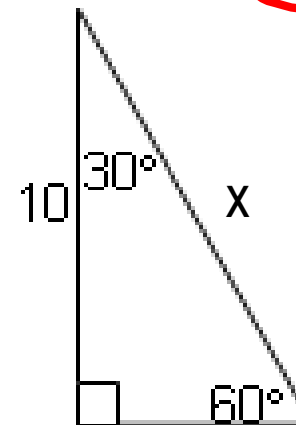$$y = \frac{10}{\sqrt{3}} = \boxed{\frac{10\sqrt{3}}{3}}$$

$$\frac{\sqrt{3}}{10} = \frac{2}{x}$$

$$x\sqrt{3} = 20$$
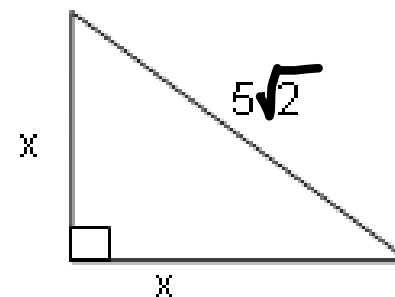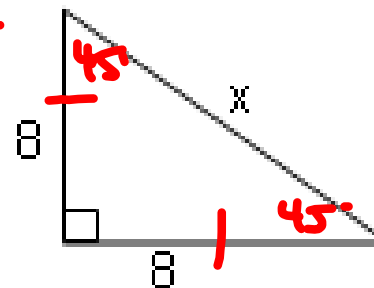
$$x = \frac{20}{\sqrt{3}} = \boxed{\frac{20\sqrt{3}}{3}}$$

45º - 45º - 90º

$$a^2 + b^2 = c^2$$

45º leg	45º leg	90º hyp
1	1	$\sqrt{2}$
8	8	x
x	x	$5\sqrt{2}$

$$\frac{1}{8} = \frac{\sqrt{2}}{x}$$

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

original

$\sqrt{2}$

1

1

8 x

8 $45°$ 8

$5\sqrt{2}$

x

x

$$\frac{1}{x} = \frac{\sqrt{2}}{5\sqrt{2}}$$
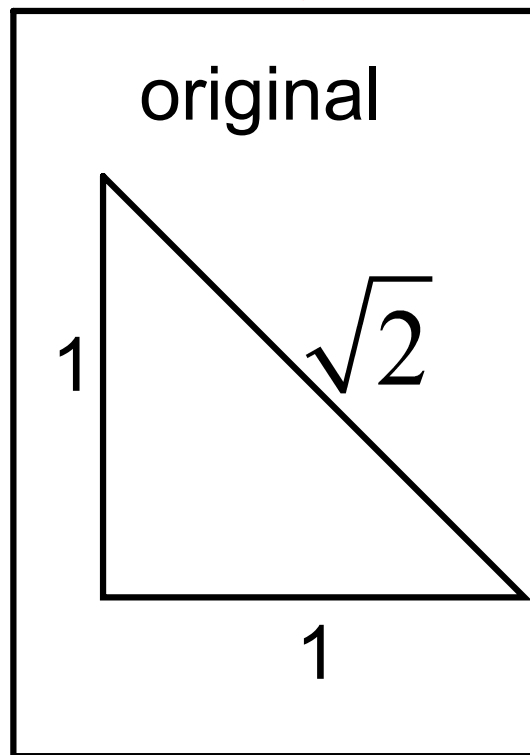
$$\boxed{x = 5}$$

Simplifying Radicals

$3\sqrt{45} + 3\sqrt{80}$

$\sqrt{175}$

$(9\sqrt{5})^2 = \boxed{405}$

$(9\sqrt{5})(9\sqrt{5})$

$81\sqrt{25} = 81 \cdot 5$

$\sqrt{5} * \sqrt{5} = \sqrt{25}$

$\boxed{5}$

$\dfrac{7}{\sqrt{8}} \cdot \dfrac{\sqrt{8}}{\sqrt{8}} = \dfrac{7\sqrt{8}}{\sqrt{64}} = \boxed{\dfrac{7\sqrt{8}}{8}}$
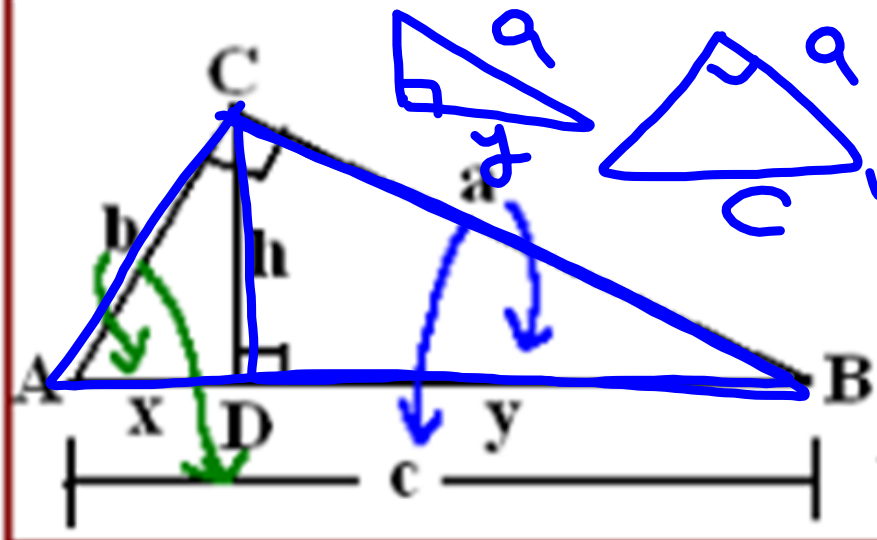
$\sqrt{8 \cdot 8}$

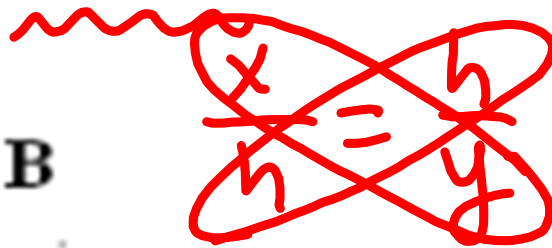$\dfrac{\sqrt{5}}{\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}} = \boxed{\dfrac{\sqrt{15}}{3}}$

$\sqrt{9}$
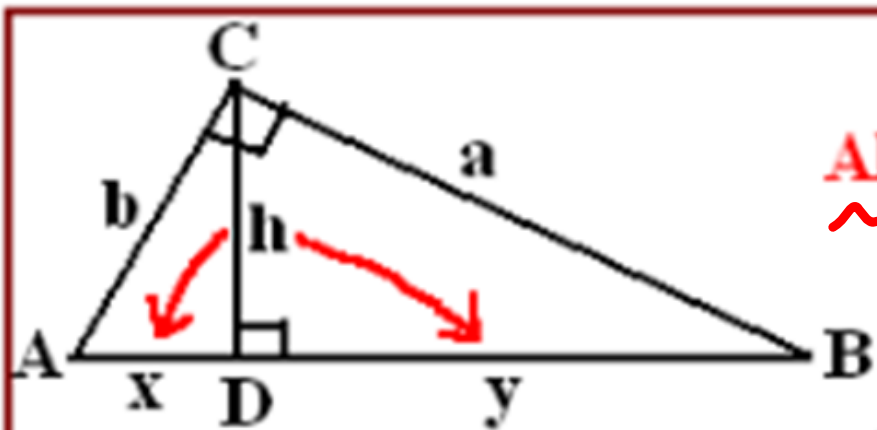
Altitude Rule : $h^2 = x \cdot y$

Leg Rule : $a^2 = y \cdot c$

$b^2 = x \cdot c$

Application

The base of one ladder is 4 ft from the foot a building. Another ladder is next to the first ladder, but it's base is 6 ft from the base of the building. If both ladders reach 11 ft up the building, what is the difference between the heights of the ladders?

$$x^2 + 6^2 = 11^2$$

$$y^2 + 36 = 121$$

$$\sqrt{y^2} = \sqrt{85}$$

$$y = \sqrt{85}$$

$$x^2 + 4^2 = 11^2$$

$$x^2 + 16 + 121$$

$$\sqrt{x^2} = \sqrt{105}$$

$$x = \sqrt{105}$$

$$\sqrt{105} - \sqrt{85} \approx 1.027 \text{ ft}$$

Homework

9.1 : pg. 468: 3, 7, 11 - 17 (o), 21, 31, 44 - 47

9.2: pg. 475: 3, 7, 9, 11, 17, 27

9.3: pg. 482:3, 5, 9, 11, 13, 19, 23, 27, 31, 46 - 49