

7 - 1

Geometric Mean

geometric mean:

geometric mean (x)
two numbers (a and b)

Found by...

$$\frac{a}{x} = \frac{x}{b}$$

Find the geometric mean of...

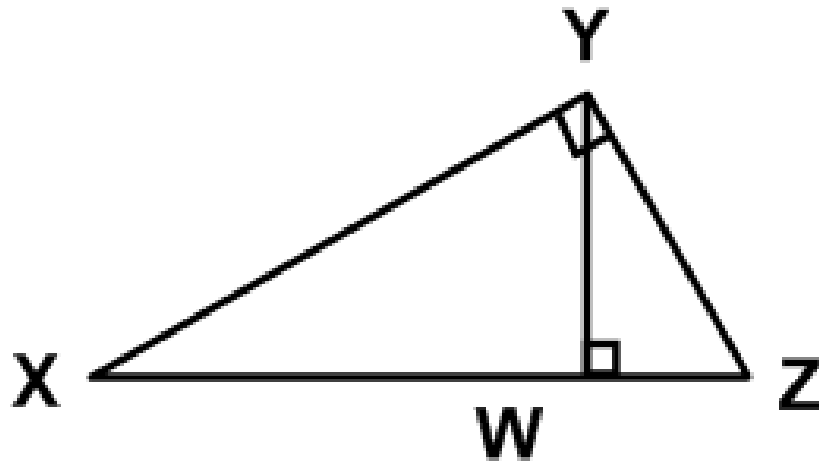
Ex: 4 and 9

$$\frac{4}{x} = \frac{x}{9}$$
$$\sqrt{x^2} = \sqrt{36}$$
$$x = 6$$

$$\sqrt{36} = \pm 6$$

Ex: 6 and 15

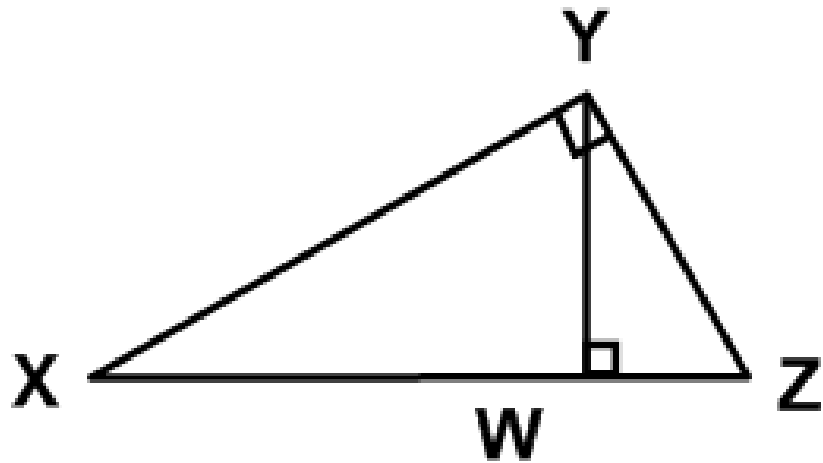
$$\sqrt{90} = 9.5$$



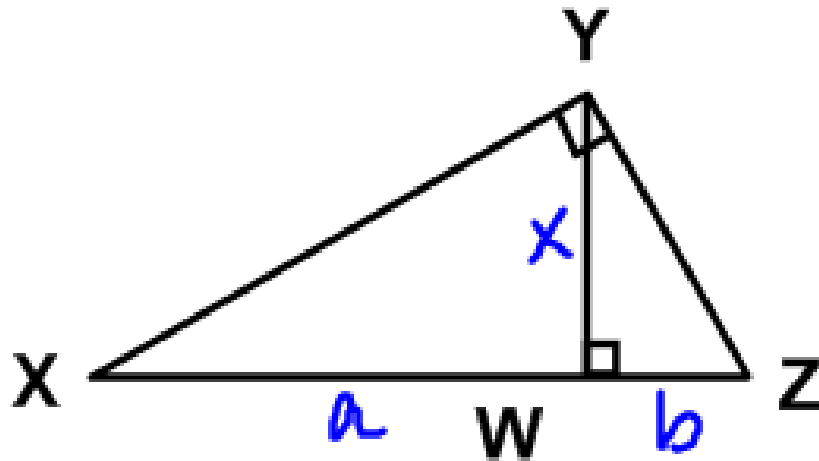
① $\triangle XYZ \sim \triangle YWZ \sim \triangle XWY$

Theorem 7.1:

If the altitude is drawn from the vertex of the right angle of a right triangle to its hypotenuse, then the two triangles formed are similar to the given triangle and to each other.



Since the triangles are similar, their sides are proportional.



②

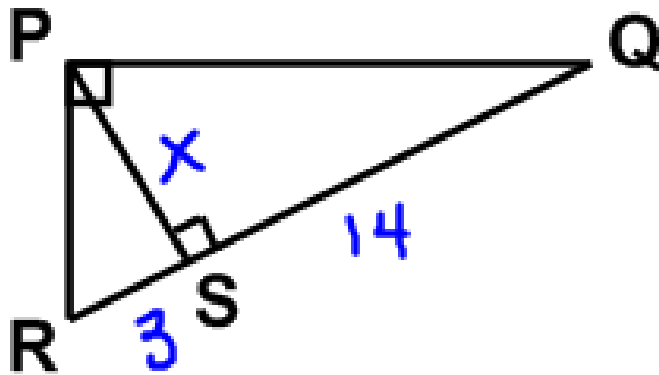
$$\frac{a}{x} = \frac{x}{b}$$

$$\frac{XW}{YW} = \frac{YW}{WZ}$$

Theorem 7.2:

The measure of the altitude drawn from the vertex of the right angle of a right triangle to its hypotenuse is the geometric mean between the measures of the two segments of the hypotenuse.

Ex: In $\triangle PQR$, $RS = 3$ and $QS = 14$.
Find PS .

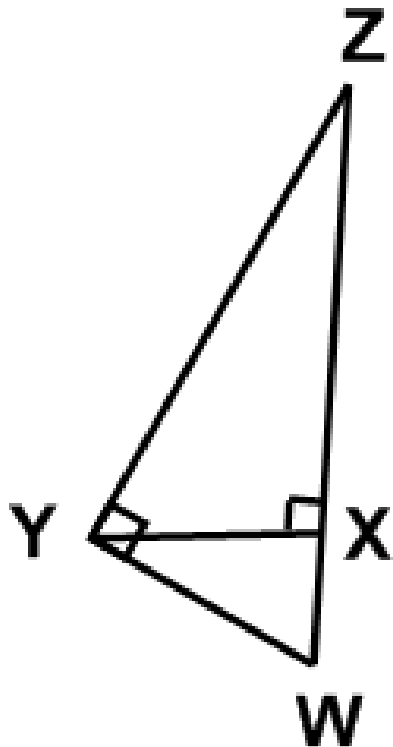


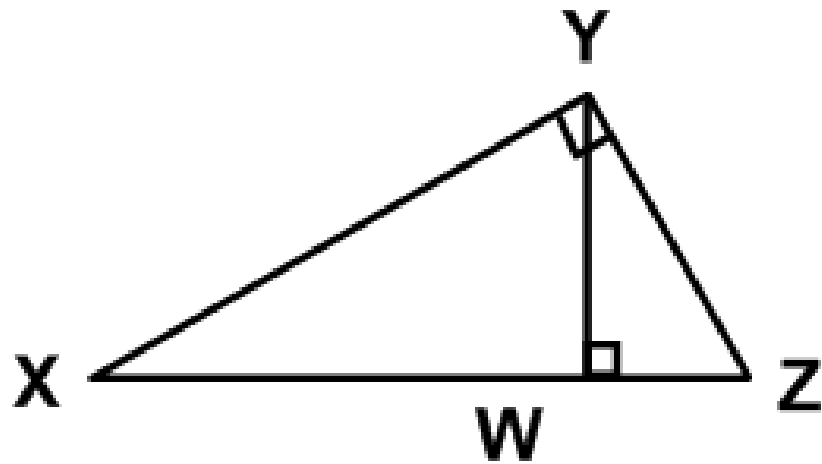
$$\frac{3}{x} = \frac{x}{14}$$

$$\sqrt{x^2} = \sqrt{42}$$

$$x \approx 6.5$$

**Ex: In $\triangle WYZ$, $YX = 8.75$ and $XW = 5.5$.
Find ZW .**





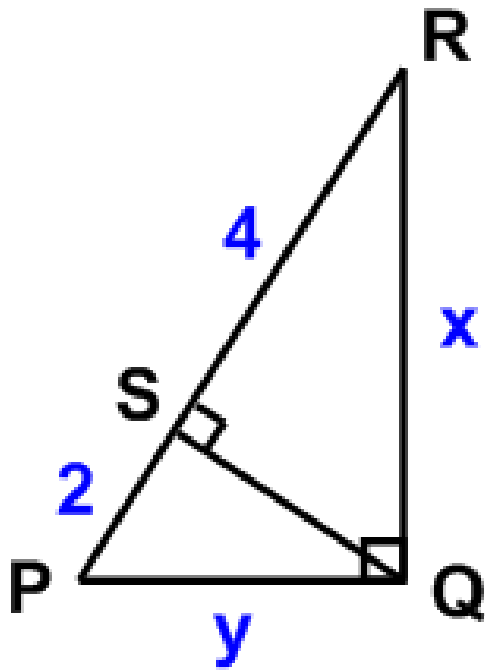
$$\textcircled{b} \quad \frac{XZ}{YZ} = \frac{YZ}{WZ}$$

$$\frac{XZ}{XY} = \frac{XY}{XW}$$

Theorem 7.3:

If the altitude is drawn from the vertex of the right angle of a right triangle to its hypotenuse, then the measure of a leg of the triangle is the geometric mean between the measures of the hypotenuse and the segment of the hypotenuse adjacent to that leg.

Ex: Find x and y in $\triangle PQR$.



$$\frac{6}{x} = \frac{x}{4}$$

$$x^2 = 24$$

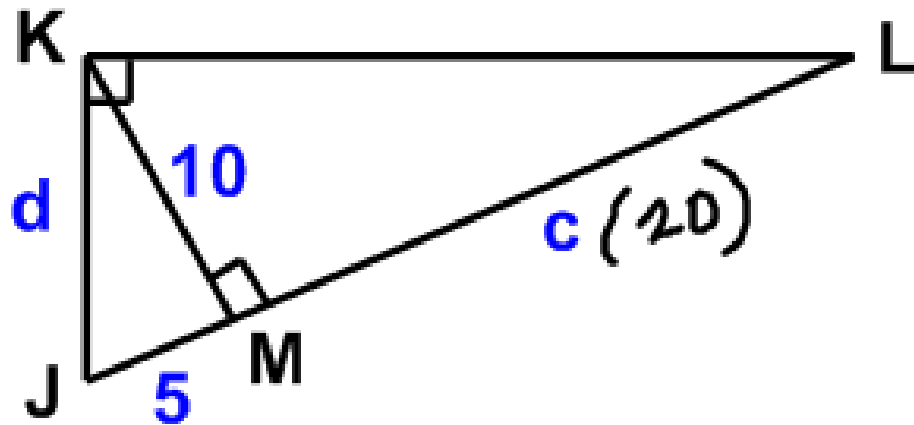
$$x \approx 4.9$$

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

$$y^2 = 12$$

$$y \approx 3.5$$

Ex: Find c and d in $\triangle JKL$.



$$\frac{5}{10} = \frac{10}{c}$$

$$\cancel{5}c = \frac{100}{\cancel{5}}$$

$$c = 20$$

$$\frac{25}{d} = \frac{d}{5}$$

$$\sqrt{d^2} = \sqrt{125}$$

$$d \approx 11.2$$



Homework:

p. 345 #1 - 11 odd