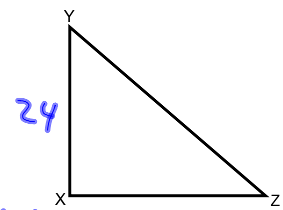
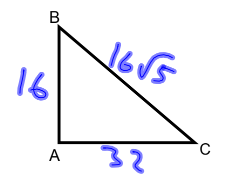
Proportional Perimeters Theorem:

*If 2 Triangles are similar, *then* the perimeters are proportional to the measures of the corresponding sides.

Example 1:

If $\triangle ABC \sim \triangle XYZ$, AC = 32, AB = 16, BC = $16\sqrt{5}$, and XY = 24, find the perimeter of $\triangle XYZ$.





perimeter sides

$$\frac{x}{83.777} = \frac{24}{16}$$

$$\frac{16x}{16} = \frac{24(83.777)}{16}$$

$$x = 125.6655$$

$P = 16 + 32 + 16\sqrt{5}$

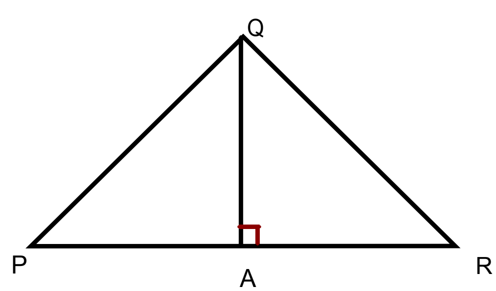
$P = 48 + 16\sqrt{5}$

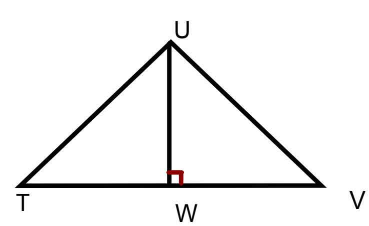
$P = 83.777$

Special Segments of Similar Triangles:

If 2 triangles are similar, then the measures of the corresponding altitudes are proportional to the measures of the corresponding sides.

sides





altitudes

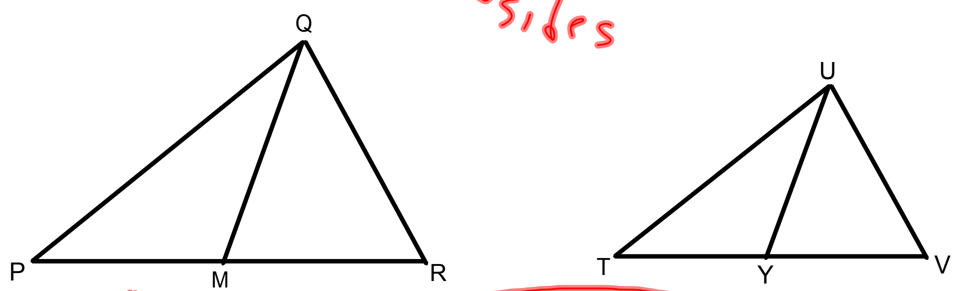
$$\frac{QA}{UW} = \frac{PR}{TV} = \frac{QR}{UV} = \frac{PQ}{TU}$$

sides

Special Segments of Similar Triangles:

If 2 triangles are similar, *then* the measures of the corresponding medians are proportional to the measures of the corresponding sides.

sides



medians

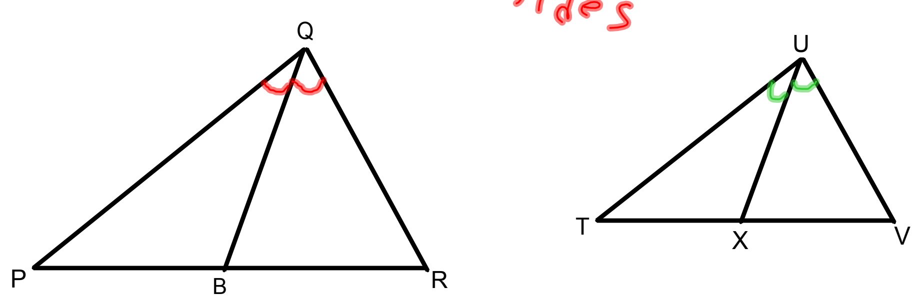
$$\frac{QM}{UY} = \frac{PR}{TV} = \frac{QR}{UV} = \frac{PQ}{TU}$$

sides

Special Segments of Similar Triangles:

If 2 triangles are similar, *then* the measures of the corresponding angle bisectors of the triangle are proportional to the measures of the corresponding sides.

sides



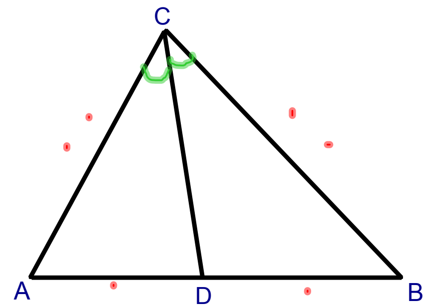
angle bisectors

$$\frac{QB}{UX} = \frac{PR}{TV} = \frac{QR}{UV} = \frac{PQ}{TU}$$

sides

Angle Bisector Theorem:

__*An angle bisector in a triangle separates the opposite side into segments that have the same ratio as the other two sides.

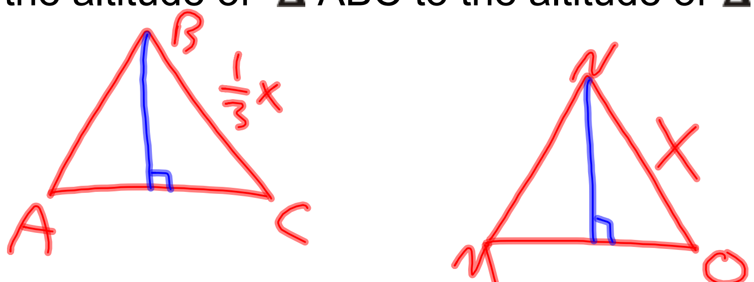


$$\frac{AD}{DB} = \frac{AC}{BC}$$

$$\frac{\text{Segments w/ Vertex A}}{\text{Segments w/ Vertex B}}$$

Example 2:

$\Delta ABC \sim \Delta MNO$ and $BC = \frac{1}{3} NO$. Find the ratio of the altitude of ΔABC to the altitude of ΔMNO

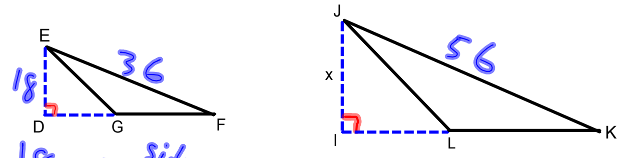


$\frac{BC}{NO} = \frac{\frac{1}{3}\cancel{x}}{\cancel{x}} = \frac{1}{3}$ is the ratio of the altitudes.

Example 3:

In the figure, $\Delta EFG \sim \Delta JKL$. $\overline{ED}$ is an altitude of ΔEFG, and $\overline{JI}$ is an altitude of ΔJKL. Find x if EF = 36, ED = 18, and JK = 56

alt.



$$\frac{18}{x} = \frac{36}{56}$$ sides

$36x = 18(56)$

$\frac{36x}{36} = \frac{1008}{36}$

$\boxed{x = 28}$

Example 4:

The drawing below illustrates two poles supported by wires.

$\Delta ABC \sim \Delta GED$. $\overline{AF} \cong \overline{CF}$ and $\overline{FG} \cong \overline{GC} \cong \overline{DC}$.
Find the height of pole $\overline{EC}$.