

Parts of Similar Triangles

G.7 (2016)

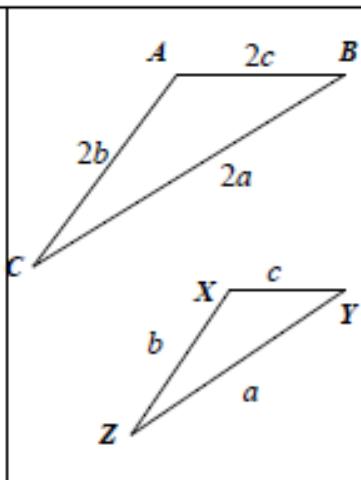
Proportional Perimeters Theorem

If two polygons are similar, then the perimeters are proportional to the measures of the corresponding sides.

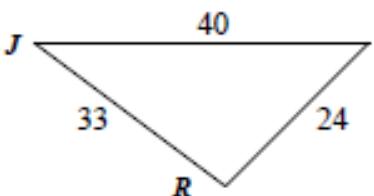
$$\Delta ABC \sim \Delta XYZ$$

Scale factor = 2

$$\begin{aligned} \frac{P\Delta ABC}{P\Delta XYZ} &= \frac{2a + 2b + 2c}{a + b + c} \\ \therefore \frac{P\Delta ABC}{P\Delta XYZ} &= \frac{2(a + b + c)}{a + b + c} \\ \frac{2(a + b + c)}{1(a + b + c)} &= \frac{2}{1} = 2 \end{aligned}$$



Example 1: If $\Delta JAR \sim \Delta LID$, find the perimeter of ΔLID .



$$\frac{P\Delta JAR}{P\Delta LID} = \frac{JR}{LD}$$

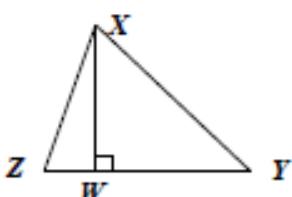
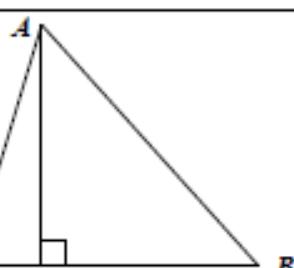
$$\frac{97}{x} = \frac{33}{24.75}$$

$$33x = 2400.75$$

$$x = 72.75$$

The perimeter is 72.75 units

1. Write a proportion using the Proportional Perimeters Theorem.
2. Substitute known distances.
3. Solve for x .



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

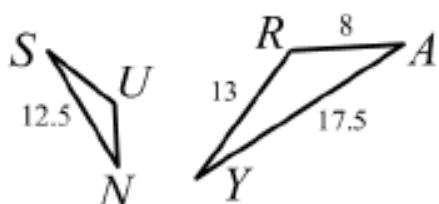
$\sim \Delta$'s have corr. altitudes proportional to corr. sides

$$\Delta ABC \sim \Delta XYZ \therefore$$

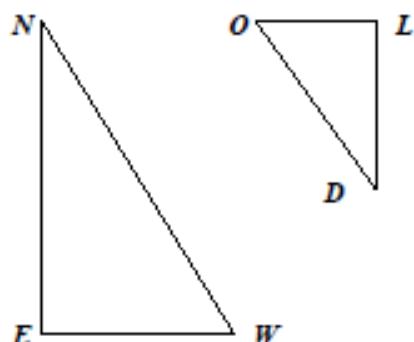
$$\frac{AC}{XZ} = \frac{AB}{XY} = \frac{BC}{YZ} = \frac{AD}{XW}$$

Practice

1. Find the perimeter of ΔSUN if $\Delta SUN \sim \Delta YRA$



2. If $\Delta NEW \sim \Delta DLO$, $NE = 36$, $EW = 15$, $NW = 39$, and $DL = 12$. Find the perimeter of ΔDLO .

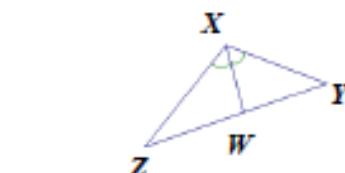
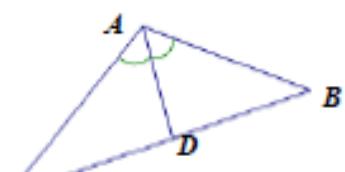


If two triangles are similar, then the measures of the corresponding angle bisectors are proportional to the measures of the corresponding sides.

$\sim \Delta$'s have corr. angle bisectors proportional to corr. sides

$$\Delta ABC \sim \Delta XYZ \therefore$$

$$\frac{AC}{XZ} = \frac{AB}{XY} = \frac{BC}{YZ} = \frac{AD}{XW}$$

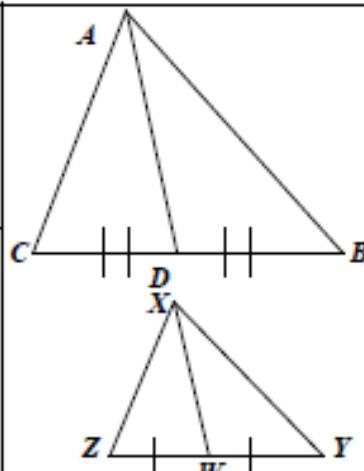


If two triangles are similar, then the measures of the corresponding medians are proportional to the measures of the corresponding sides.

$\sim \Delta$'s have corr. medians proportional to corr. sides

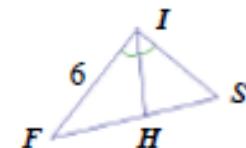
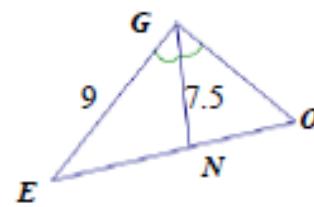
$$\Delta ABC \sim \Delta XYZ \therefore$$

$$\frac{AC}{XZ} = \frac{AB}{XY} = \frac{BC}{YZ} = \frac{AD}{XW}$$



Example 2:

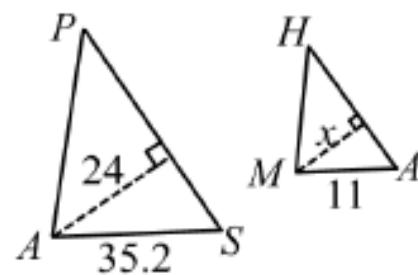
Find the length of IH if $\Delta EGO \sim \Delta FIS$.



$$\begin{aligned}\frac{GE}{IF} &= \frac{GN}{IH} \\ \frac{9}{6} &= \frac{7.5}{IH} \\ 9(IH) &= 45 \\ IH &= 5\end{aligned}$$

1. Write a proportion showing that the ratio of the angle bisectors is proportional to the ratio of the corresponding sides.
2. Substitute known distances.
3. Solve for IH .

3. Find x if $\Delta PAS \sim \Delta HMA$.



4. $\Delta ESB \sim \Delta CTR$
Find the perimeter of ΔCTR .

