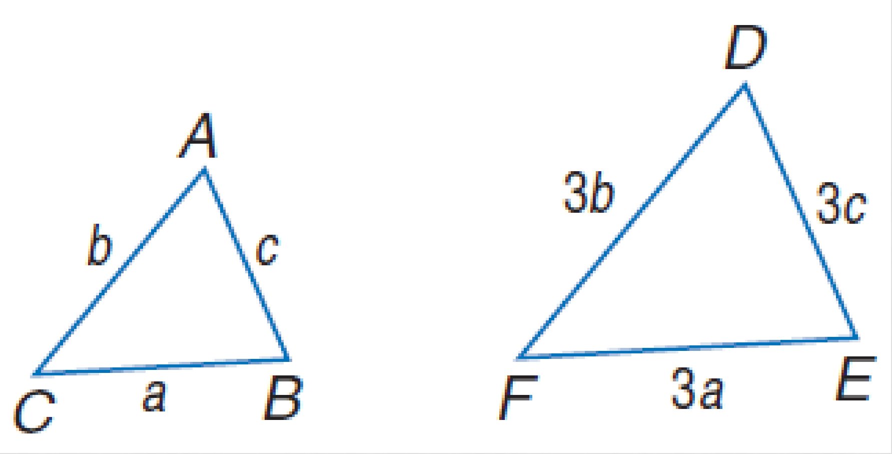
PARTS OF SIMILAR TRIANGLES

PROPORTIONAL PERIMETERS THEOREM

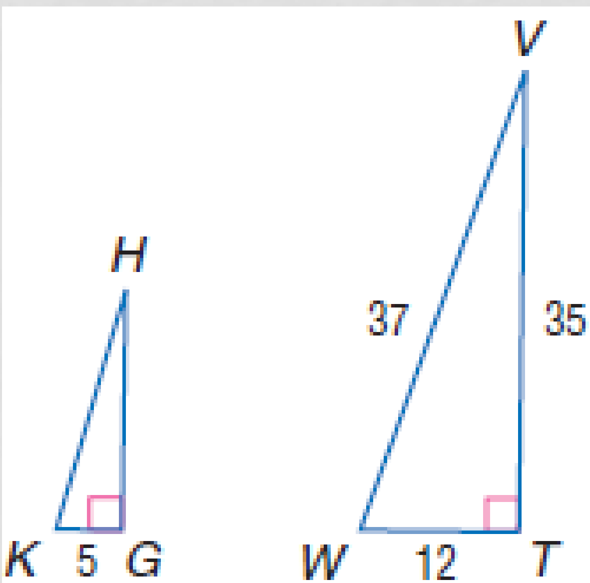
- If two triangles are similar, then the perimeters are proportional to the measure of corresponding sides.



$$\frac{\text{perimeter of } \triangle ABC}{\text{perimeter of } \triangle DEF} = \frac{a+b+c}{3a+3b+3c} = \frac{1(a+b+c)}{3(a+b+c)} \text{ or } \frac{1}{3}$$

EXAMPLES

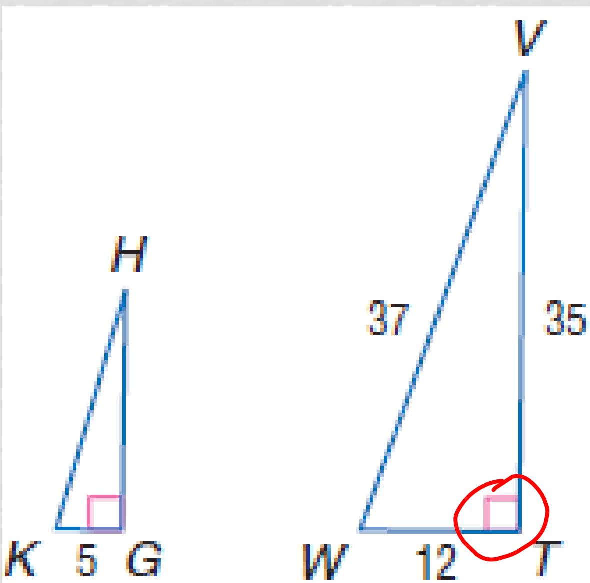
- If △GHK ~ △TVW, TV = 35, VW = 37, WT = 12, and KG = 5, find the perimeter of △GHK.



$\frac{5 \times 7}{12 \times 7} = \frac{x = 35}{84}$

EXAMPLES

- If $\triangle GHK \sim \triangle TVW$, TV = 35, VW = 37, WT = 12, and KG = 5, find the perimeter of $\triangle GHK$.



The perimeter of $\triangle TVW$ = 35 + 37 + 12 or 84.

$$\frac{5}{12} = \frac{x}{84}$$

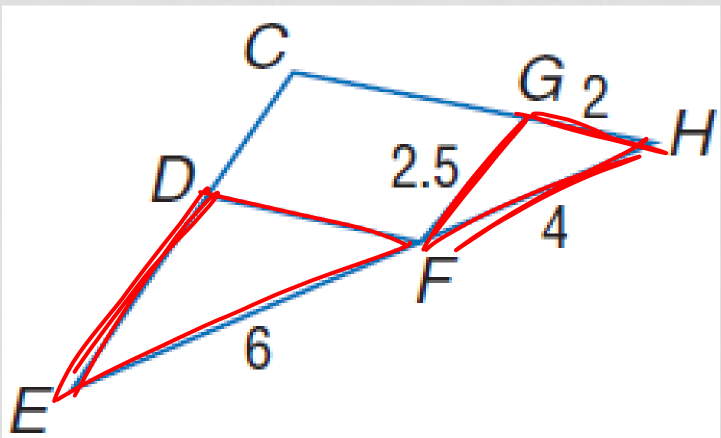
12x = 420

x = 35

The perimeter of $\triangle GHK$ is 35 units.

EXAMPLES

- If △DEF ~ △GFH, find the perimeter of △DEF.



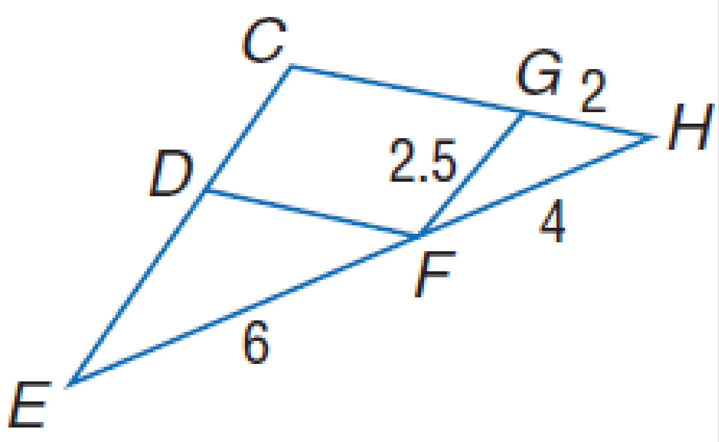
$\frac{3}{2} \quad \frac{6}{4} = \frac{x}{8.5}$

$\frac{2x}{2} = \frac{25.5}{2}$

$x = 12.75$

EXAMPLES

- If △DEF ~ △GFH, find the perimeter of △DEF.



The perimeter of △GFH = 2 + 2.5 + 4 = 8.5.

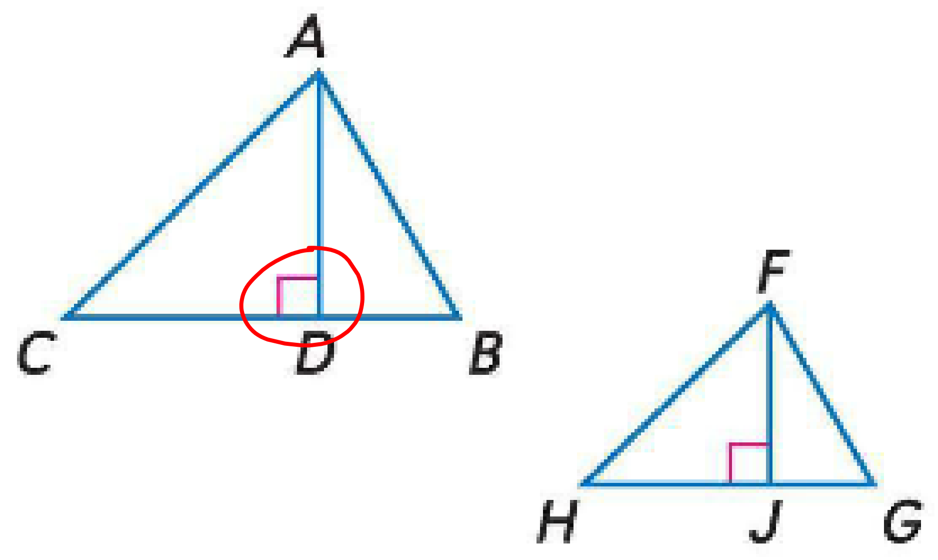
$\frac{6}{4} = \frac{x}{8.5}$

4x = 51

x = 12.75

ALTITUDES

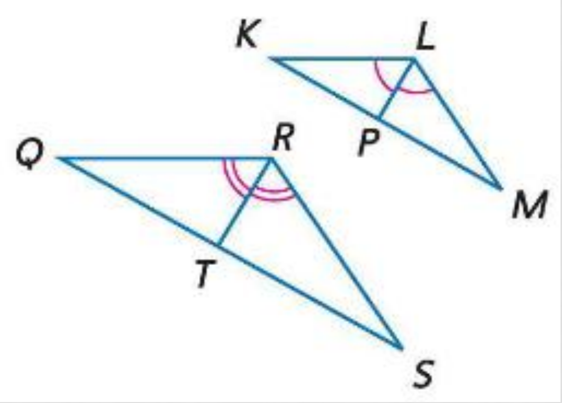
- If two triangles are similar, the lengths of corresponding altitudes are proportional to the lengths of the corresponding sides.



If $\triangle ABC \sim \triangle FGH$, then $\frac{AD}{FJ} = \frac{AB}{FG}$.

ANGLE BISECTORS

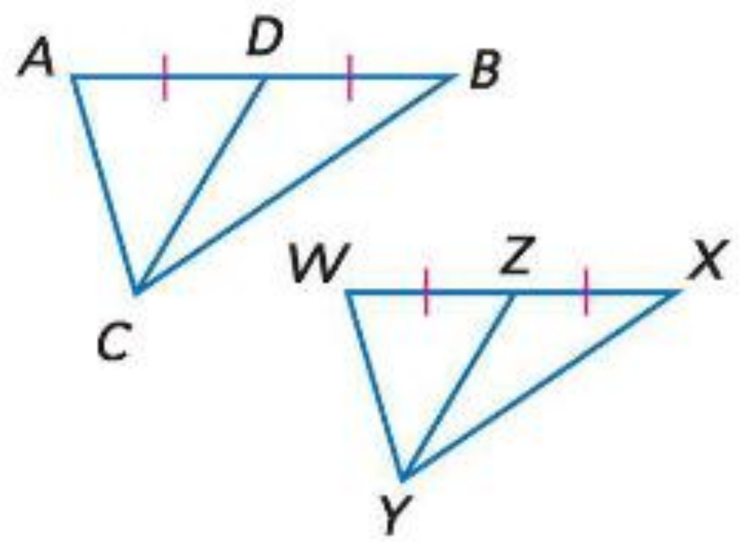
- If two triangles are similar, the lengths of corresponding angle bisectors are proportional to the lengths of the corresponding sides.



If $\triangle KLM \sim \triangle QRS$, then $\frac{LP}{RT} = \frac{LM}{RS}$.

MEDIANS

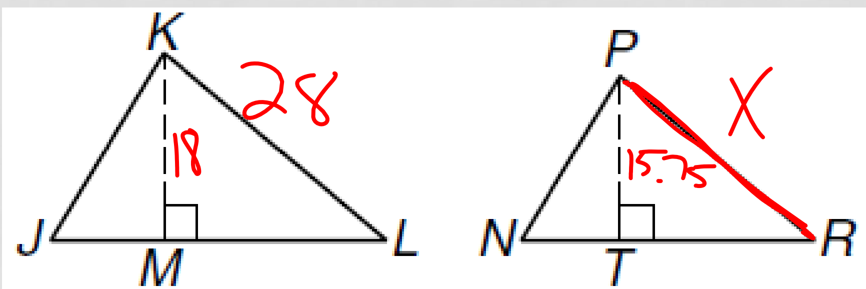
- If two triangles are similar, the lengths of corresponding medians are proportional to the lengths of the corresponding sides.



If $\triangle ABC \sim \triangle WXY$, then $\frac{CD}{YZ} = \frac{AB}{WX}$.

EXAMPLES

- **Use the given information to find each measure.**
- Find *PR* if $\triangle JKL \sim NPR$, $\overline{KM}$ is an altitude of $\triangle JKL$, $\overline{PT}$ is an altitude of *NPR*, *KL* = 28, *KM* = 18, and *PT* = 15.75.

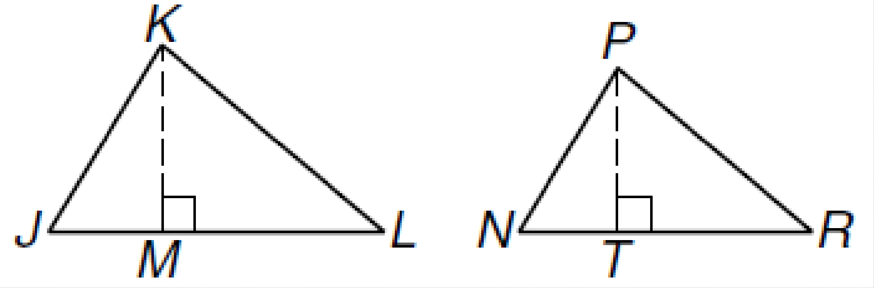


$x = 24.5$

$\frac{18}{28} = \frac{15.75}{x}$

EXAMPLES

- **Use the given information to find each measure.**
- Find *PR* if $\triangle JKL \sim NPR$, $\overline{KM}$ is an altitude of $\triangle JKL$, $\overline{PT}$ is an altitude of *NPR*, *KL* = 28, *KM* = 18, and *PT* = 15.75.



$$\frac{KM}{KL} = \frac{PT}{PR}$$

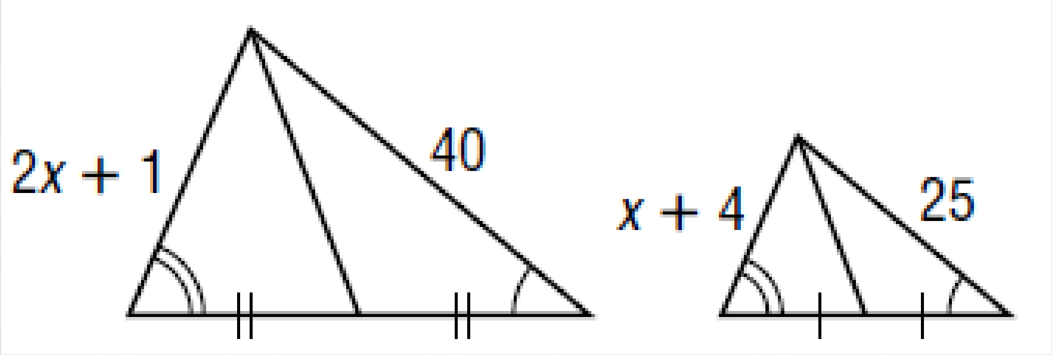
$$\frac{18}{28} = \frac{15.75}{x}$$

18x = 441

x = 24.5

EXAMPLES

- Find x.

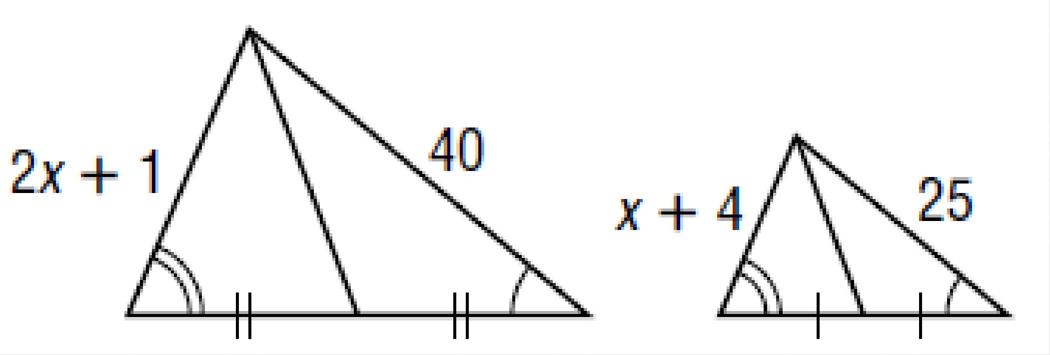


X = 160

= 75

EXAMPLES

- Find x.



$$\frac{2x+1}{40} = \frac{x+4}{25}$$

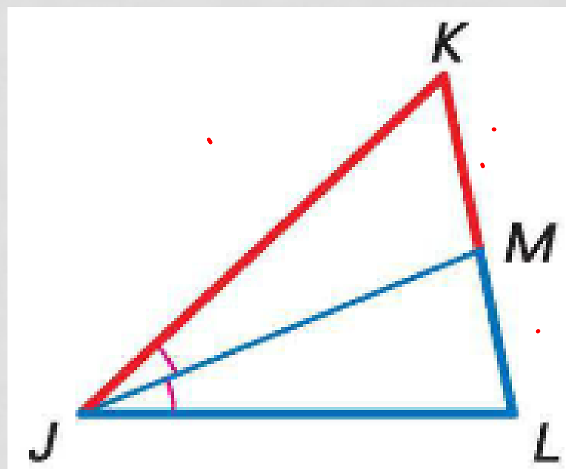
50x + 25 = 40x + 160

10x = 135

x = 13.5

TRIANGLE ANGLE BISECTOR

- An angle bisector in a triangle separates the opposite side into two segments that are proportional to the lengths of the other two sides.



If $\overline{JM}$ is an angle bisector of $\triangle JKL$,

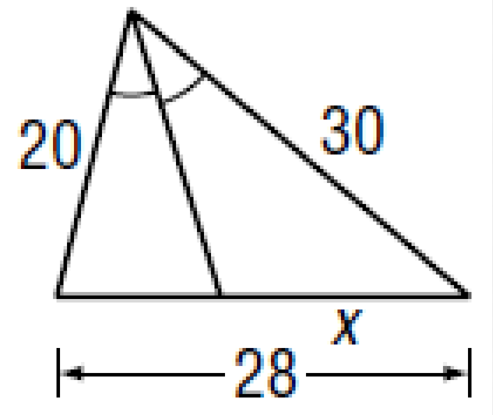
then $\frac{KM}{LM} = \frac{KJ}{LJ}$.

← segments with vertex *K*

← segments with vertex *L*

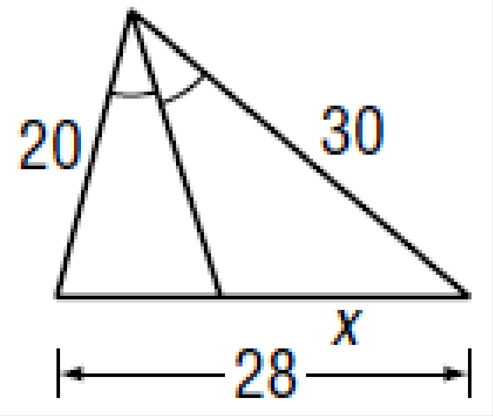
EXAMPLES

- Find x.



EXAMPLES

- Find x.



$$\frac{30}{x} = \frac{20}{28-x}$$

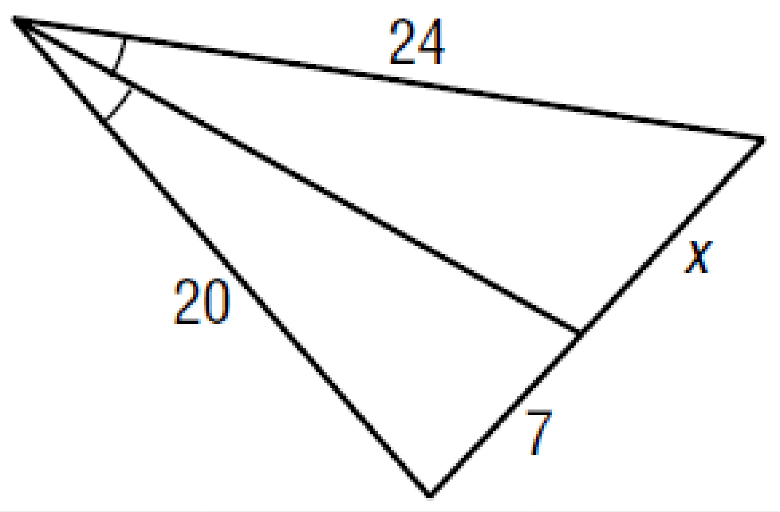
20x = 840 – 30x

50x = 840

x = 16.8

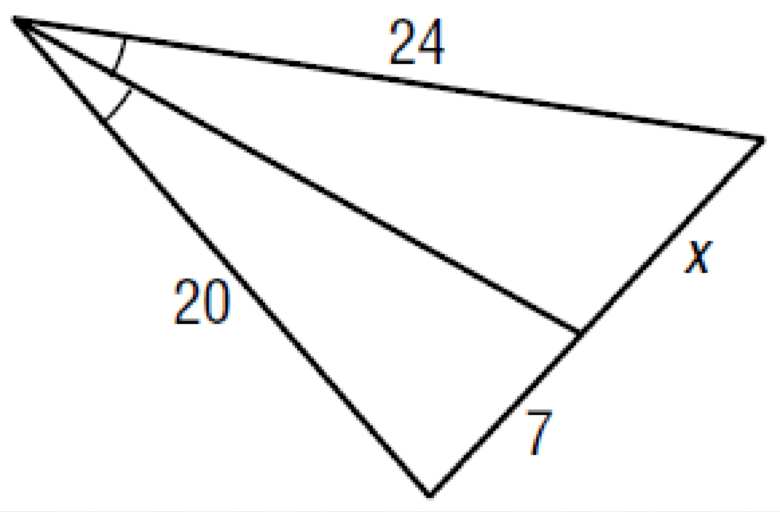
EXAMPLES

- Find x.



EXAMPLES

- Find x.



$$\frac{24}{x} = \frac{20}{7}$$

20x = 168

x = 8.4