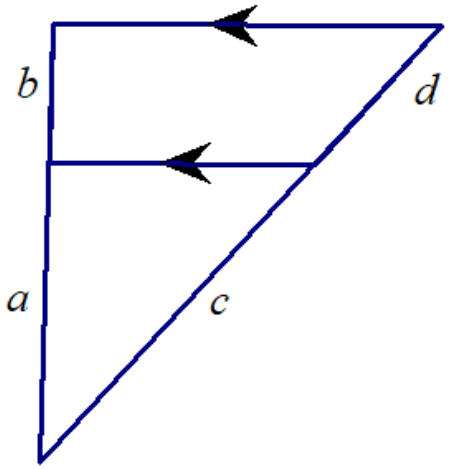
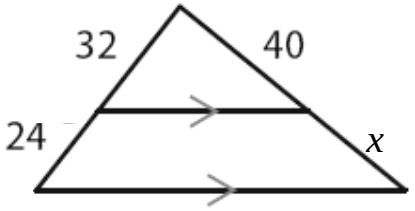
Using Proportions

If a line parallel to a side of a triangle intersects the other two sides, then it divides those sides proportionally.



$$\frac{b}{a} = \frac{d}{c}$$

Find x.

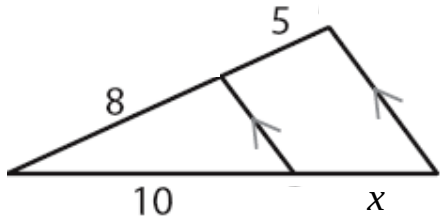


$\frac{32}{24} \times \frac{40}{x}$

$32x = 24 \cdot 40$

$32x = 960$

$x = 30$



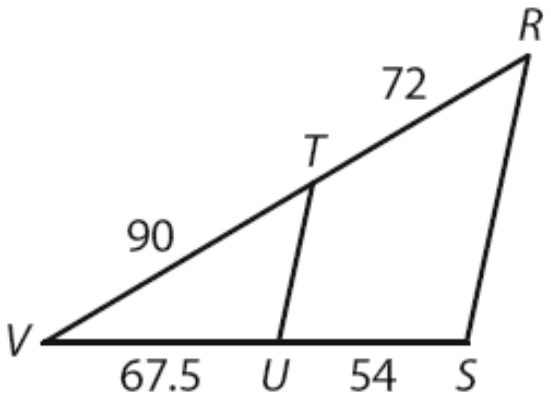
$\frac{8}{5} \times \frac{10}{x}$

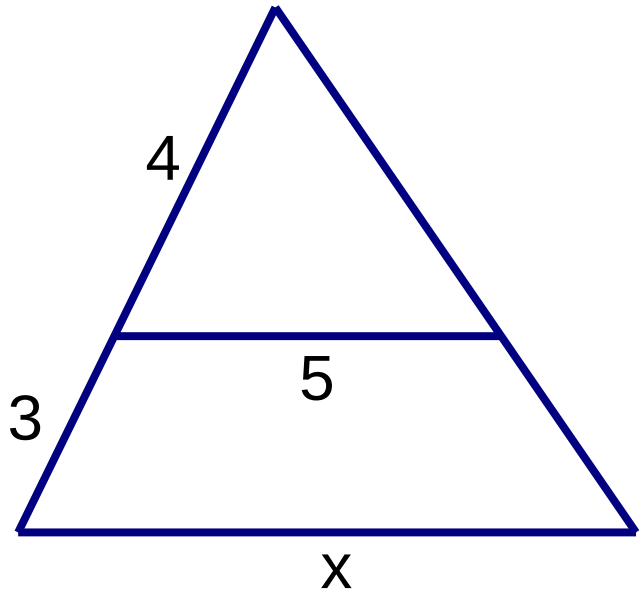
$8x = 50$

$x = \frac{50}{8} = \frac{25}{4}$

$\frac{8}{10} = \frac{5}{x}$

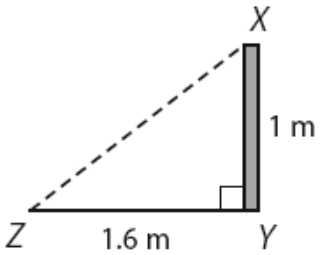
Verify that $\overline{TU}$ and $\overline{RS}$ are parallel.

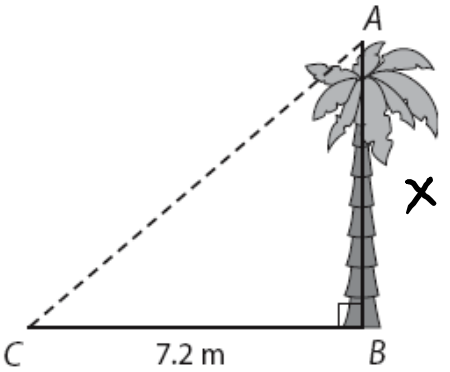



4
5
3
x

Indirect measurement involves using similarity and proportions to measure distances that can't be directly measured.

In order to find the height of a palm tree, you measure the tree's shadow and, at the same time of day, you measure the shadow cast by a meter stick that you hold at a right angle to the ground. Find the height h of the tree.



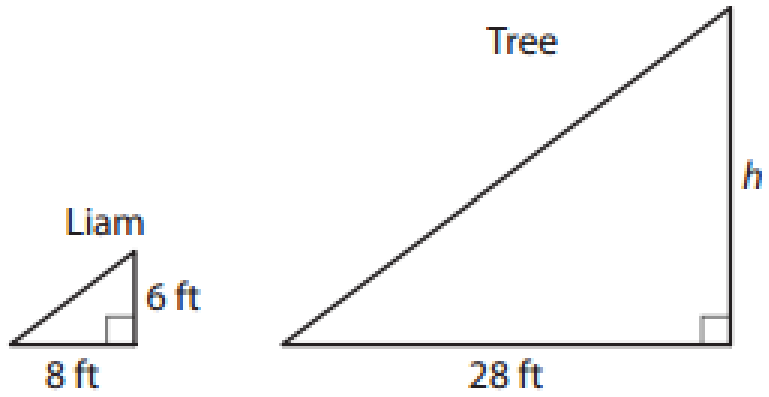


$\frac{1}{x} \cancel{\leftrightarrow} \frac{1.6}{7.2}$

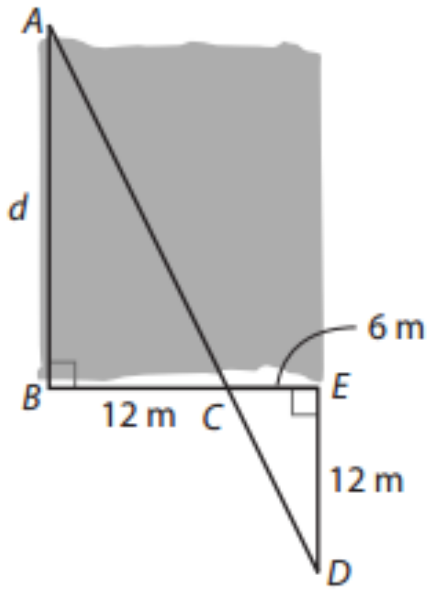
$1.6x = 7.2$

$x = \frac{7.2}{1.6} = 4.5 \text{ m}$

Liam is 6 feet tall. To find the height of a tree, he measures his shadow and the tree's shadow. The measurements of the two shadows are shown. Find the height h of the tree.



To find the distance d across a stream, Levi located points as shown in the figure. Use the given information to find d.



$$\frac{d}{12} = \frac{12}{6}$$

$$6d = 144$$

$$d = 24$$