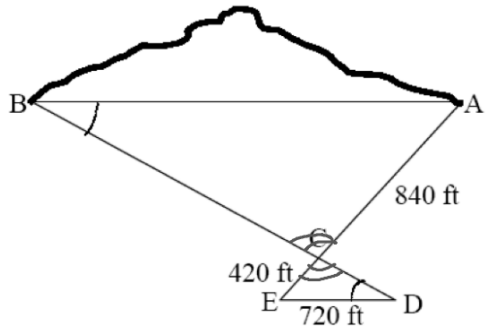
A surveyor needs to determine the distance across the base (AB) of a mountain. This surveyor can directly measure the lengths given below.




Note: The figure is not drawn to scale.

Is $\Delta EDC$ similar to $\Delta ABC$? Use mathematics to justify your answer.

SAS
AA
SSS

$\frac{420}{840} = \frac{720}{AB}$

$\frac{420x}{420} = \frac{604,800}{420}$

$x = 1440$ ft

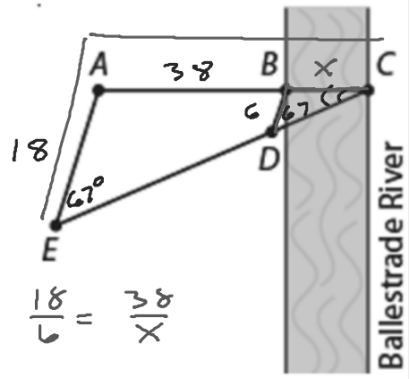
What is the measure of the base of the mountain?

Two surveyors measured the distance $BC$ across the Ballestrade River. Both $\angle CDB$ and $\angle CEA$ measure $67°$.

Prove that $\triangle ACE$ is similar to $\triangle BCD$.

| Statement | Reason |
|---|---|
| 1) $\angle CDB \cong \angle CEA$ | 1) Given |
| 2) $\angle C \cong \angle C$ | 2) Reflexive prop |
| 3) $\triangle ACE \sim \triangle BCD$ | 3) AA |

$$\frac{x}{6} = \frac{x+38}{18}$$




$$\frac{18}{6} = \frac{38}{x}$$

**b.** One of the surveyors measured $AE = 18$ meters, $AB = 38$ meters, and $BD = 6$ meters. The surveyor then used similar triangles to find $BC$. Find $BC$ using this surveyor's method. Show your work.

$$\frac{x}{6} = \frac{x+38}{18}$$

$$18x = 6x + 228$$

$$12x = 228$$

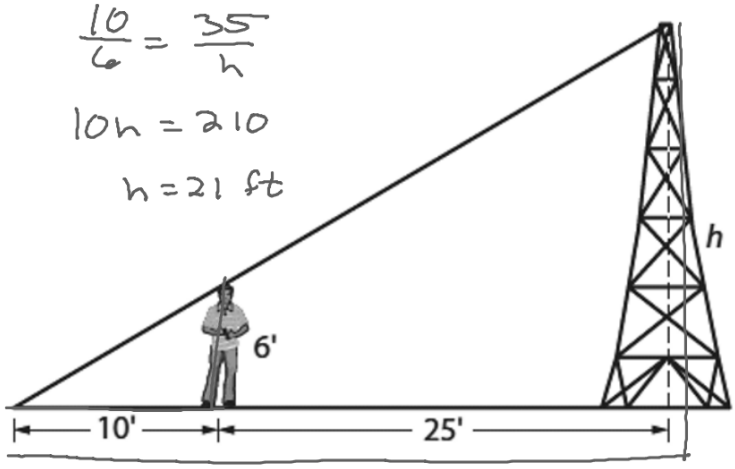
$$x = 19$$

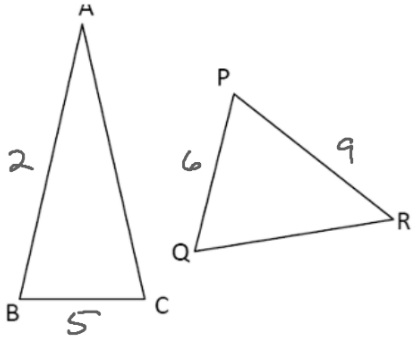
You want to estimate the height of a tower that is supported by a wire as shown in the diagram. Suppose that Robert, who is exactly 6 ft tall, stands so that his head just touches the wire. When he does this, he is 10 ft from the point where the wire touches the ground and 25 ft from the center of the base of the tower. Use this information to determine the approximate height of the tower.

$\frac{10}{6} = \frac{35}{h}$

$10h = 210$

$h = 21$ ft






BC=5

PQ=6

AB=2

PR=9

In the figure given to the left, $\Delta ABC$ is similar to $\Delta PQR$.

Find the value of QR

$$\frac{AB}{PQ} = \frac{BC}{QR}$$

$$\frac{2}{6} = \frac{5}{x}$$

$$2x = 30$$

$$x = 15$$

Find the value of AC

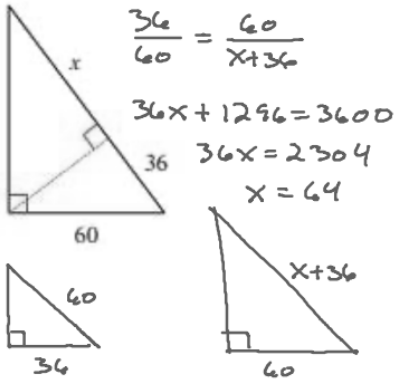
$$\frac{AB}{PQ} = \frac{AC}{PR}$$

$$\frac{2}{6} = \frac{x}{9}$$

$$6x = 18$$

$$x = 3$$

Directions: Solve for $x$, be sure to show your proportion.

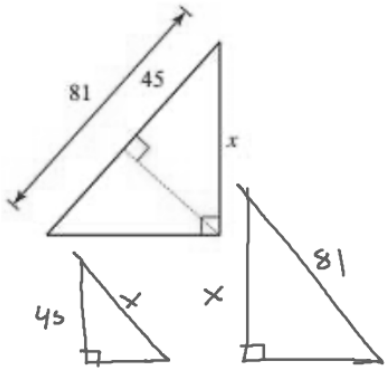



$$\frac{36}{60} = \frac{60}{X+36}$$

$$36x + 1296 = 3600$$

$$36x = 2304$$

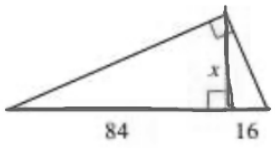
$$x = 64$$




$$\frac{45}{x} = \frac{x}{81}$$

$$x^2 = 3645$$

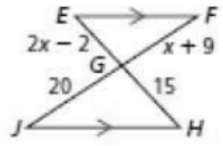
$$x = 60.37$$




$$\frac{84}{x} = \frac{x}{16}$$

$$x^2 = 1344$$

$$x = 36.66$$

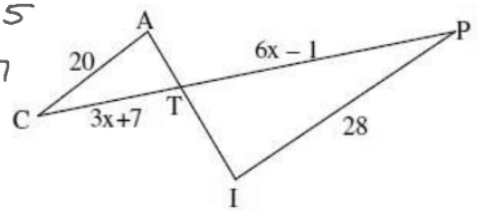



$$\frac{x+9}{20} = \frac{2x-2}{15}$$

$$15x + 135 = 40x - 40$$

$$175 = 25x$$

$$x = 7$$




$$\frac{20}{28} = \frac{3x+7}{6x-1}$$

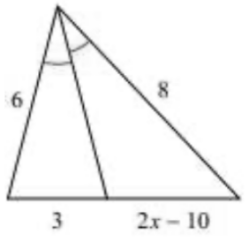
$$\frac{5}{7} = \frac{3x+7}{6x-1}$$

$$30x - 5 = 21x + 49$$

$$9x = 54$$

$$x = 6$$

Solve for x:

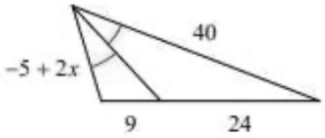



$\frac{6}{3} = \frac{8}{2x-10}$

$12x - 60 = 24$

$12x = 84$

$x = 7$



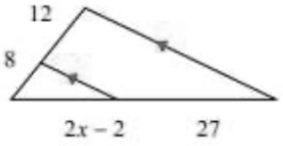

$\frac{-5+2x}{9} = \frac{40}{24}$

$\frac{-5+2x}{9} = \frac{5}{3}$

$-15 + 6x = 45$

$6x = 60$

$x = 10$




$\frac{8}{2x-2} = \frac{12}{27}$

$\frac{8}{2x-2} = \frac{4}{9}$

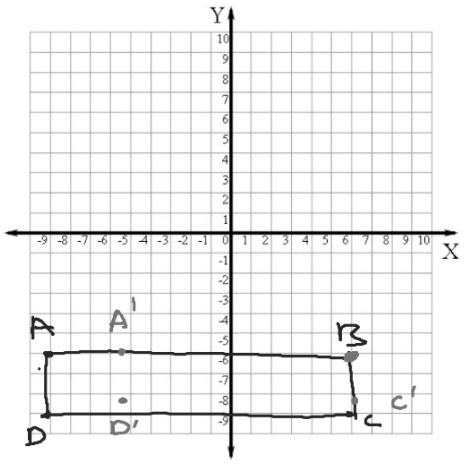
$8x - 8 = 72$

$8x = 80$

$x = 10$

1. A quadrilateral has vertices A(-9,-6) B(6,-6) C(6,-9) D(-9,-9).

| | Length AB | Length BC | Length CD | Length DA | Perimeter | Area |
|---|---|---|---|---|---|---|
| Pre-image | 15 | 3 | 15 | 3 | 36 | 45 |




a. Apply a dilation of $D_{(\frac{3}{4}, B)}$. Give the new coordinates, and graph the image.

A'(-5.25 -6) B'(6 , -6) C'(6 -8.25) D'( -5.25 , -8.25 )

$A = (11.25)(2.25)$
$= 25.31$

b. How does the image perimeter relate to the original perimeter and $k$ ?

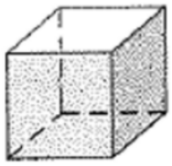
$(\frac{3}{4})(36) = 27$

$45(\frac{9}{16})$

c. How does the image area relate to the original area and $k$ ?

The solid is similar to a larger solid with the given scale factor. Find the surface area of the larger solid

Scale factor 2:3

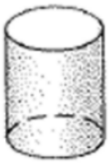


$S = 96\ \text{m}^2$

$\frac{4}{9} = \frac{96}{X}$

$X = 216\ \text{m}^2$

Scale factor 3:5



$S = 104\pi\ \text{ft}^2$

$\frac{9}{25} = \frac{104\pi}{X}$

$X = 288.8\pi\ \text{ft}^2$

$= \frac{2600\pi}{9}$

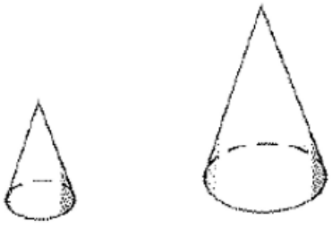
Scale factor 5:7

$S = 100\pi\ \text{cm}^2$

$\frac{25}{49} = \frac{100\pi}{X}$

$X = 196\pi\ \text{cm}^2$

Use the given information about the two similar solids to find their scale factor.



$S = 24\pi$ in.$^2$ $S = 384\pi$ in.$^2$

$$\frac{24\pi}{384\pi} = \frac{24}{384} = \frac{1}{16}$$

$$\frac{1}{4}$$