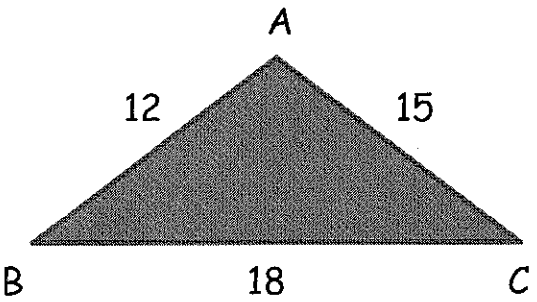
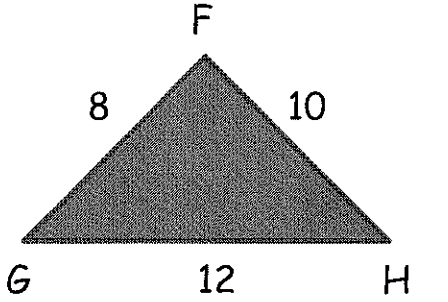
4.2-> PROPORTIONS & SIMILAR FIGURES

Similar Figures-> have the same shape, but not necessarily the same size.

~ (Tilde) means " is similar to "





* All have a ratio of $\frac{2}{3}$

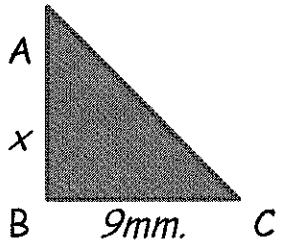
$$\frac{AB}{FG} = \frac{AC}{FH} = \frac{BC}{GH} \rightarrow \frac{8}{12} = \frac{10}{15} = \frac{12}{18}$$

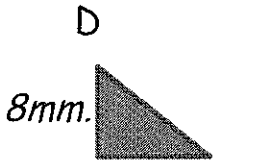
In Similar figures, corresponding Angles are Congruent (≅) and corresponding Sides are proportional. In the triangles above,

▲ ABC ~ ▲ FGH .

4.2 Notes

1. In the figure, $\triangle ABC \sim \triangle DEF$. Find AB:





Big	x	9
Small	8	6

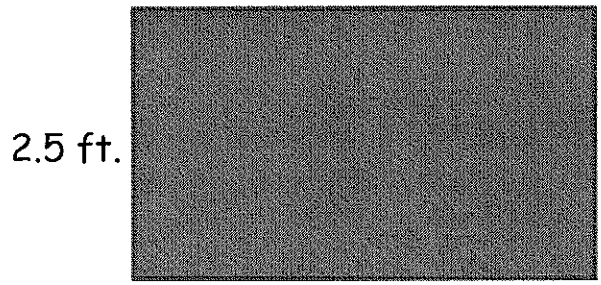
$\frac{x}{8} = \frac{9}{6}$

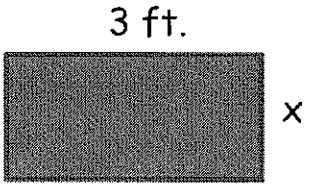
$\frac{6x}{6} = \frac{72}{6}$

$x = 12mm.$

*Set up a table to solve. It doesn't matter whether you put the big triangle or small triangle on top, but you must stay consistent.

2. The following rectangles are similar. Find the value of x.





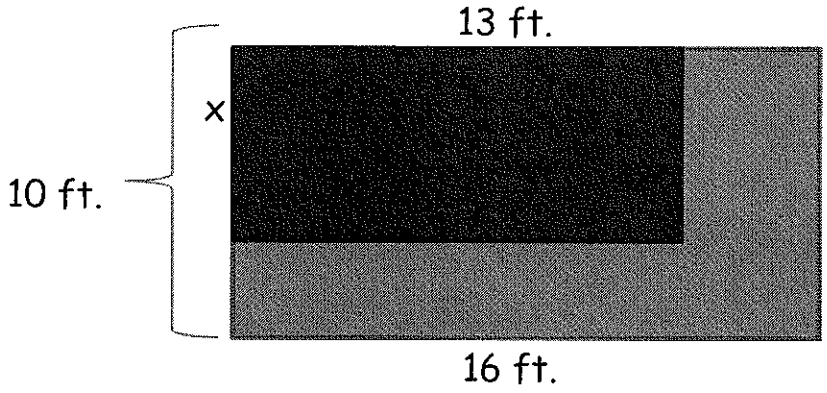
Big / Small → $\frac{2.5}{x} = \frac{5}{3}$

$5x = 2.5(3)$

$\frac{5x}{5} = \frac{7.5}{5}$

$x = 1.5$ feet

3. The following rectangles are similar. Find the length of x.

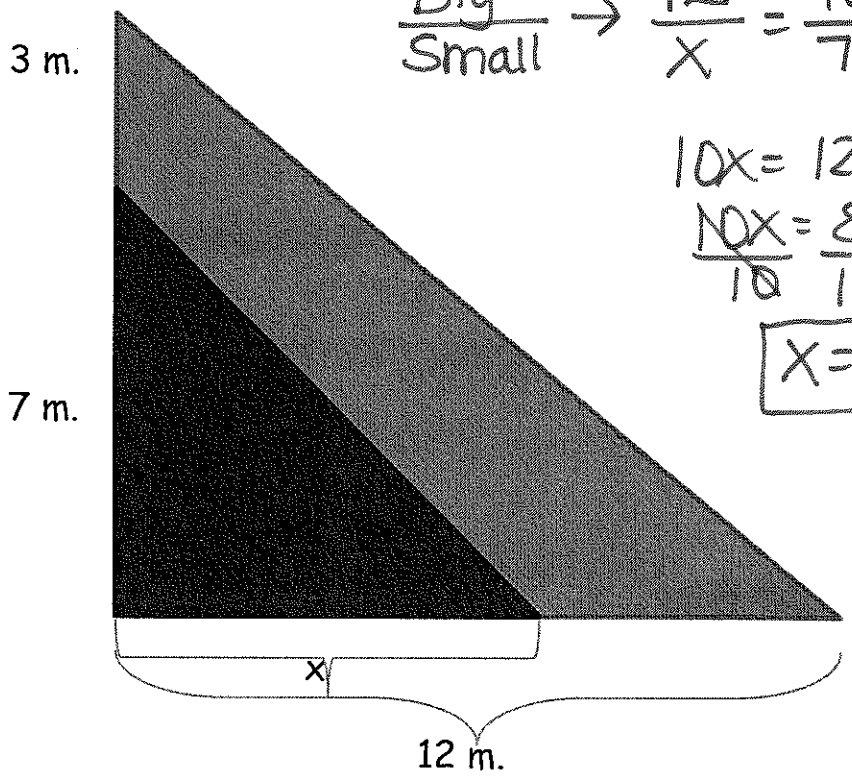


$\frac{\text{Big}}{\text{Small}} \rightarrow \frac{16}{13} = \frac{10}{x}$

$\frac{16x}{16} = \frac{130}{16}$

$x = 8.125$ feet

4. The following triangles are similar. Solve for the length of x.



$\frac{\text{Big}}{\text{Small}} \rightarrow \frac{12}{x} = \frac{10}{7}$

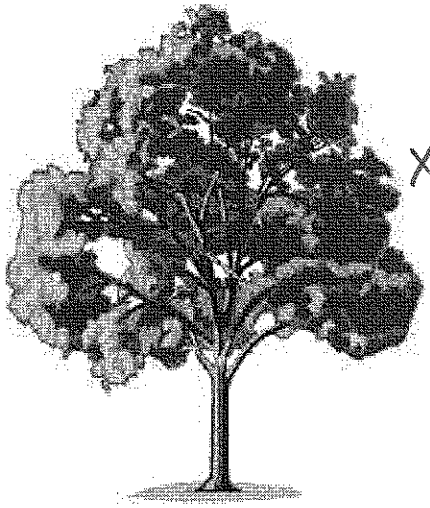
$10x = 12(7)$

$\frac{10x}{10} = \frac{84}{10}$

$x = 8.4$ meters

WORD PROBLEMS (SHADOW PROBLEMS):

5. A tree casts a 26 foot shadow. A boy standing nearby casts a 12 foot shadow. His height is 4.5 feet. How tall is the tree?

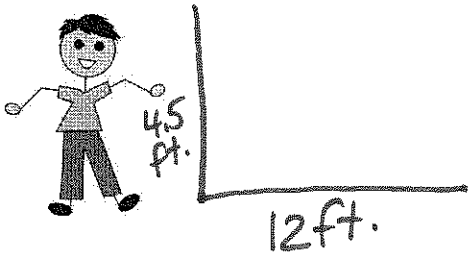


$\frac{\text{Tree}}{\text{Boy}} \rightarrow \frac{x}{4.5} = \frac{26}{12}$

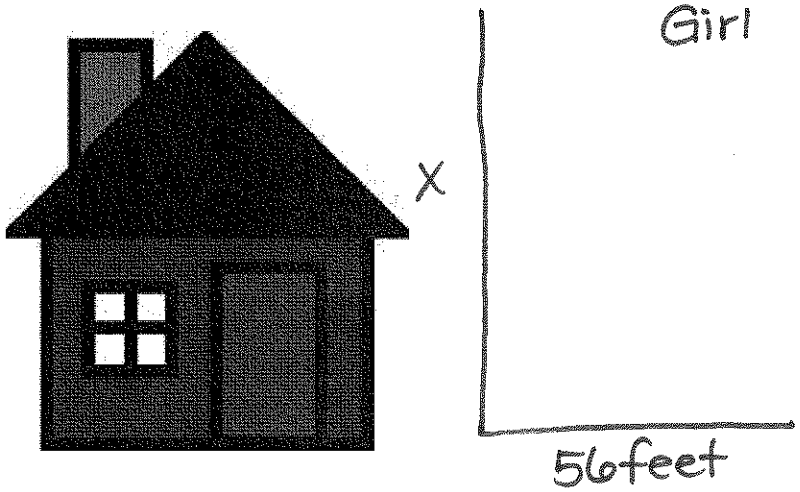
$12x = 4.5(26)$

$\frac{12x}{12} = \frac{117}{12}$

$x = 9.75$ feet



6. A house casts a 56 foot shadow. A girl standing nearby casts a 7.2 foot shadow. Her height is 5.4 feet. How tall is the house?

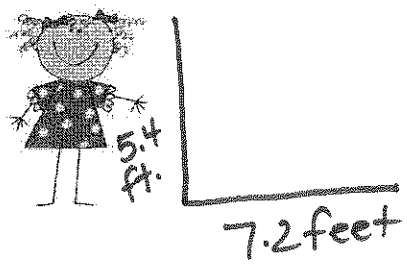


$\frac{\text{House}}{\text{Girl}} \rightarrow \frac{x}{5.4} = \frac{56}{7.2}$

$7.2x = 5.4(56)$

$\frac{7.2x}{7.2} = \frac{302.4}{7.2}$

$x = 42$ feet

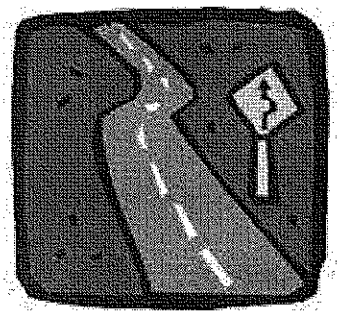


SCALE DRAWINGS & SCALES:

Scale Drawing-> an enlarged or reduced drawing that is similar to an actual object or place.
Examples: maps, blue prints, floor plans, pictures

Scale-> the ratio of a distance in the drawing to the corresponding actual distance.

7. The scale of a map is 1 inch: 10 miles. The map distance from Valkaria to Gifford is 2.25 inches. How far is the actual distance?



$$\frac{\text{Map}}{\text{Actual}} \rightarrow \frac{1\text{inch}}{10\text{miles}} = \frac{2.25\text{inches}}{x}$$

$$1x = 10(2.25)$$

$$\boxed{x = 22.5\text{miles}}$$