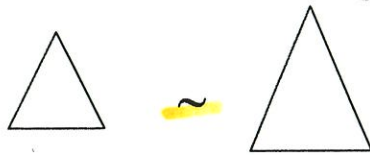


### Finding the Missing Side of Similar Polygons

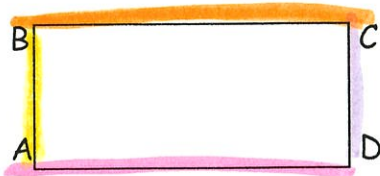
Polygon - a closed figure with at least 3 sides



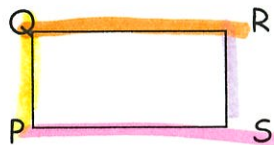
Similar ~ means:

- same shape
- different size

Corresponding Sides → matching side



~



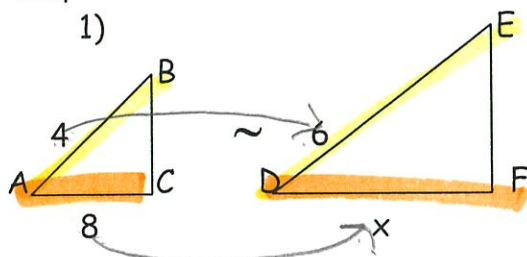
$$\begin{aligned} \overline{AB} &\sim \overline{PQ} \\ \overline{BC} &\sim \overline{QR} \\ \overline{CD} &\sim \overline{RS} \\ \overline{AD} &\sim \overline{PS} \end{aligned}$$

They are in the same position on both figures (ex. both top, both bottom, etc.)

\*\* Corresponding sides are in ratio to one another (in proportion)  
 ⇔ Corresponding angles are congruent

- Find the missing side using a proportion.

Example:

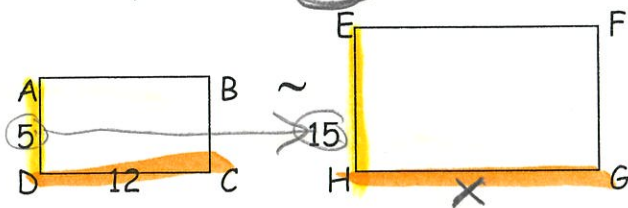


~~$$\frac{4}{6} = \frac{8}{x}$$~~

$$\frac{4x}{4} = \frac{48}{4}$$

$$x = 12$$

2) Find side HG



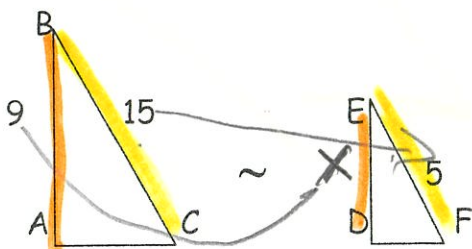
~~$$\frac{5}{15} = \frac{12}{x}$$~~

$$\frac{5x}{5} = \frac{180}{5}$$

$$x = 36$$

$$\text{HG} = 36$$

3) Find side DE



~~$$\frac{15}{5} = \frac{9}{x}$$~~

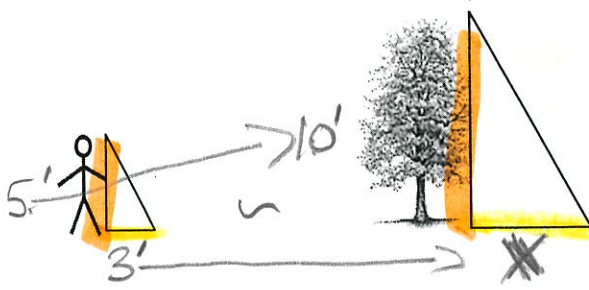
$$\frac{15x}{15} = \frac{45}{15}$$

$$x = 3$$

$$\text{DE} = 3$$

Word Problems

1) If a 5 foot man cast a 3 foot shadow, how long of a shadow would a 10 foot tree have?



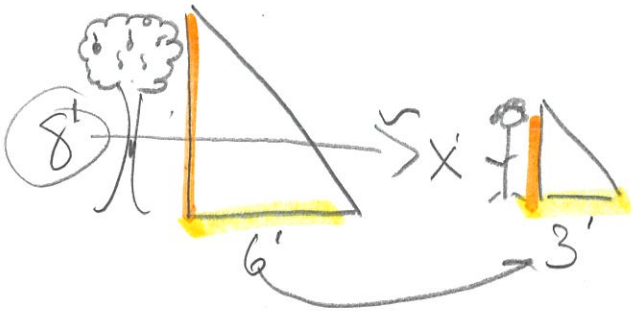
$$\frac{5}{10} = \frac{3}{x}$$

$$5x = 30$$

$$x = 6$$

6ft

2) If an 8 foot tree casts a 6 foot shadow, how tall is a man that casts a 3 foot shadow?  
(Draw the triangles and label with units)



$$\frac{8}{6} = \frac{x}{3}$$

$$6x = 24$$

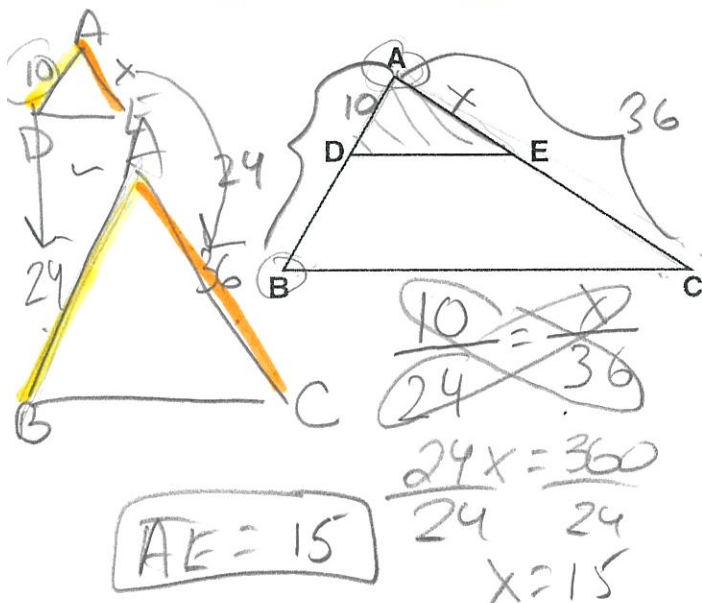
$$x = 4$$

4ft

**Angle-Angle Similarity**

The **angle-angle similarity postulate** states that if two pairs of angles in two triangles are congruent, then the triangles are similar. Given a triangle you can create a similar triangle by drawing a line parallel to a side, inside the triangle.

1) In the accompanying figure,  $\overline{DE} \parallel \overline{BC}$ ,  $AD = 10$ ,  $AB = 24$ , and  $AC = 36$ . Find  $AE$ .



2) In the accompanying diagram of  $\triangle ABC$ ,  $\overline{AFB}$ ,  $\overline{AEC}$ ,  $\overline{AC} \perp \overline{CB}$ ,  $\overline{AE} \perp \overline{EF}$ ,  $BF = 8$ ,  $FA = 12$ ,  $FE = 9$ , and  $BC = x$ . What is the value of  $x$ ?

