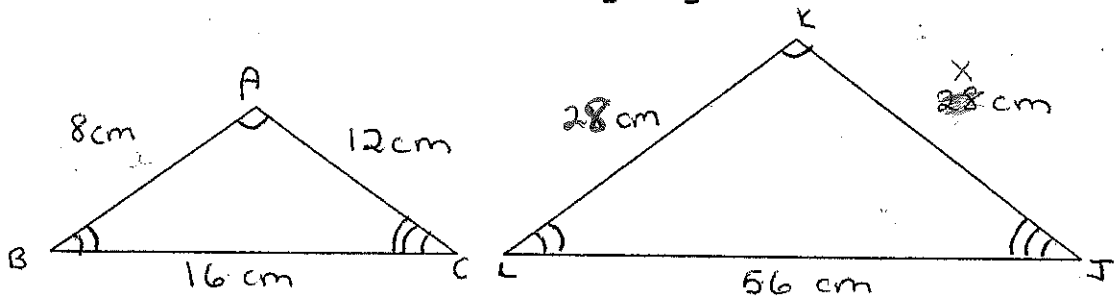


# Indirect Measurement

Indirect measurement is a technique that uses proportions to find a measurement when direct measurement is not possible.

We can use indirect measurement to find distances, heights, and lengths of things.

We can use the fact that similar polygons have corresponding sides that are proportional to solve for the missing length.



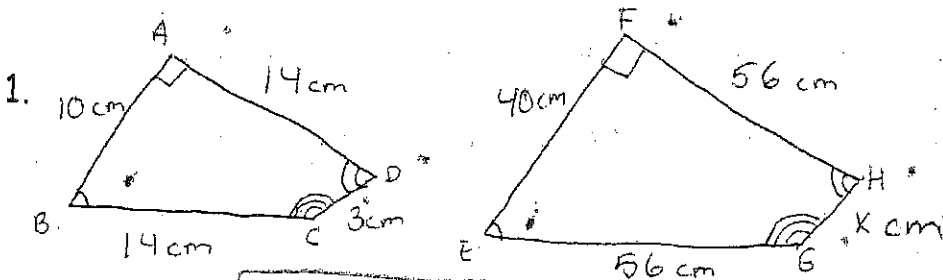
How to determine whether two polygons are similar:

- Determine whether the corresponding angles are equal.  $\angle A = \angle K$   
 $\angle B = \angle L$   
 $\angle C = \angle J$
- Determine whether the ratios of their corresponding sides are equal.
- Write a proportion:  $\frac{12}{28} = \frac{16}{56}$   
Check with cross multiplication  $12 \cdot 56 = 28 \cdot 16$
- Write a proportion with "X" the missing side.  $\frac{16}{56} = \frac{12}{X}$

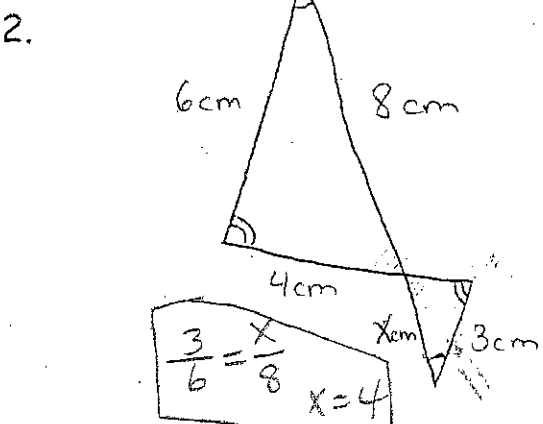
5. Solve for X with cross multiplication.  
multiplication.

$$\frac{16}{56} = \frac{8}{x} \rightarrow \frac{2}{7} = \frac{8}{x} \quad \begin{matrix} 2x = 56 \\ x = 28 \end{matrix}$$

Examples:



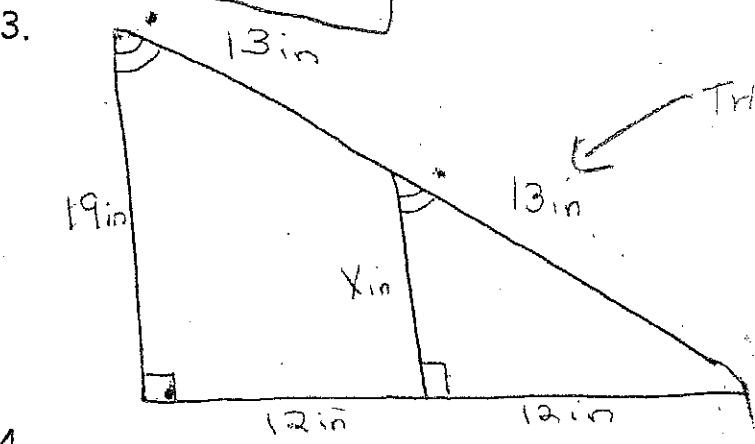
$$\frac{40}{10} = \frac{x}{3} \quad \begin{matrix} 10x = 120 \\ x = 12 \end{matrix}$$



\* rotate the shape so that the angles line up.

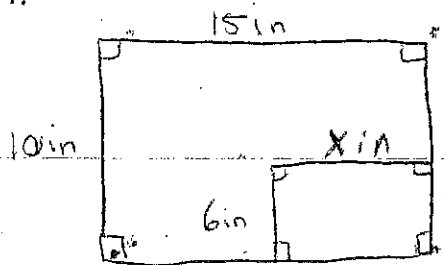
\* you only need to know 2 angles of a triangle (because the 3 together equal 180°)

$$\frac{3}{6} = \frac{x}{8} \quad x = 4$$



Triangle inside a triangle - important for homework worksheet  
Of course these are similar

$$\frac{12}{24} = \frac{x}{19} \quad \boxed{x = 9.5}$$



$$\frac{10}{15} = \frac{6}{x} \quad \begin{matrix} 10x = 90 \\ x = 9 \end{matrix}$$