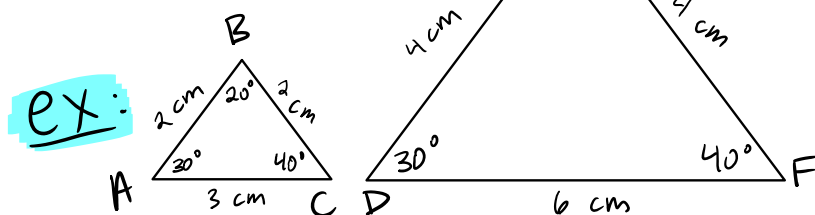


- Similar triangles - corresponding angles are equal and corresponding sides are proportional

↳ Write as:  $\triangle ABC \sim \triangle DEF$

↑ means these triangles are similar



$\triangle ABC \sim \triangle DEF$ . They are similar because they are proportional to each other.  $\triangle DEF$  is much bigger, but it is just scaled up!

In the above example, we know they're similar triangles because :

① the corresponding angles are equal

$$\angle A = \angle D, \angle B = \angle E, \text{ and } \angle C = \angle F$$

② the corresponding sides are proportional

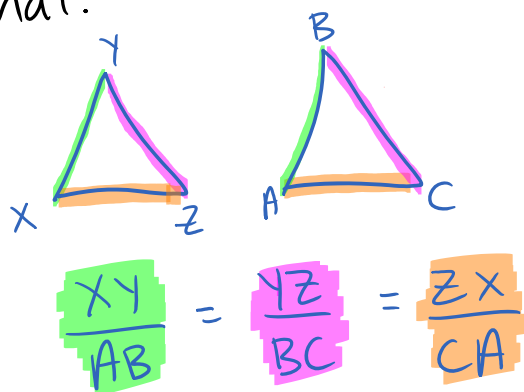
$$\frac{AB}{DE} = \frac{1}{2}, \frac{BC}{EF} = \frac{1}{2}, \frac{AC}{DF} = \frac{1}{2}$$

i.e. all sides were doubled

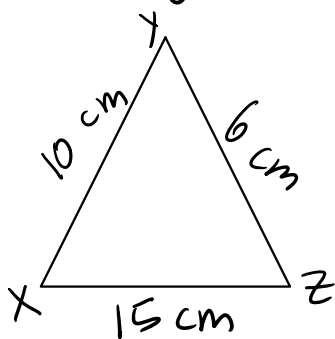
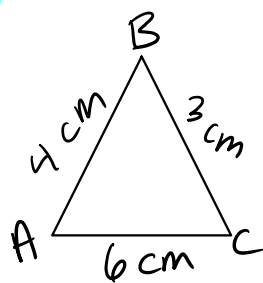
To prove triangles are similar, you only need to prove ONE of the above. If ① is true, then ② is true, and vice versa.

ex:  $\triangle XYZ \sim \triangle ABC$ . Which angles are equal? Which pairs of sides are proportional?

$\angle X = \angle A$  (first ones listed)  
 $\angle Y = \angle B$  (second ones listed)  
 $\angle Z = \angle C$  (third ones listed)



ex: Are these triangles similar? Prove your answer.



No angles given = okay!  
 Just look at side proportions.

$$\textcircled{1} \frac{AB}{XY} = \frac{4}{10} = \frac{2}{5}$$

✓

$$\textcircled{2} \frac{AC}{XZ} = \frac{6}{15} = \frac{2}{5}$$

✓

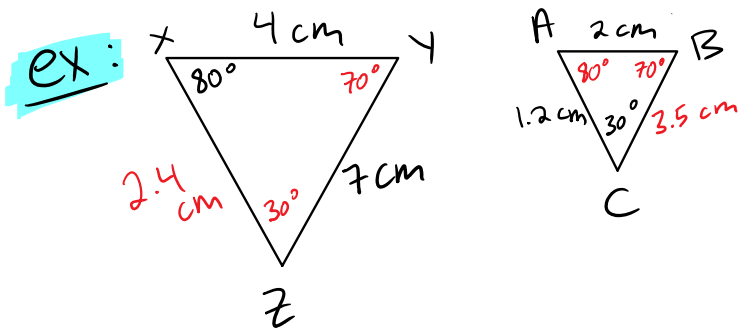
$$\textcircled{3} \frac{BC}{YZ} = \frac{3}{6} = \frac{1}{2}$$

✗

∴ No, they are not similar because the third

Side is not proportional.

i.e. sides AB and AC were multiplied by 2.5  
Side BC was only multiplied by 2  
 $\therefore$  not proportional or similar



These triangles are similar. Find the unknown angles and side lengths.

$$\angle X = \angle A = 80^\circ$$
$$\angle C = \angle Z = 30^\circ$$

Inside angles of a triangle =  $180^\circ$

$$\angle Y = \angle B = 180^\circ - 80^\circ - 30^\circ = 70^\circ$$

$$\Rightarrow \frac{XY}{AB} = \frac{4}{2} = 2$$

$$\Rightarrow \frac{XZ}{AC} = \frac{XZ}{1.2} = 2$$

$$XZ = 2(1.2) = 2.4$$

$$\Rightarrow \frac{YZ}{BC} = \frac{7}{BC} = 2$$

$$7 = 2(BC)$$
$$BC = \frac{7}{2} = 3.5$$

$$\begin{aligned} \angle Y &= 70^\circ \\ \angle Z &= 30^\circ \\ \angle A &= 80^\circ \\ \angle B &= 70^\circ \end{aligned}$$

$$\begin{aligned} XZ &= 2.4\text{ cm} \\ BC &= 3.5\text{ cm} \end{aligned}$$