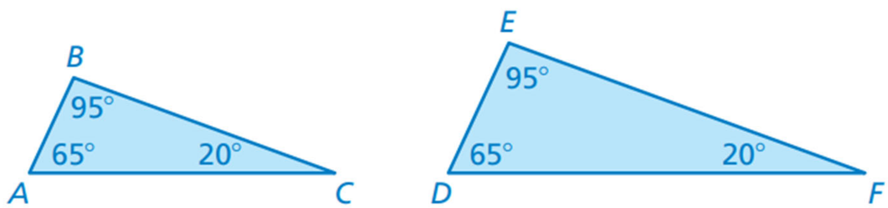
3.4 Using Similar Triangles p.126

When two angles in one triangle are congruent to two angles in another triangle, the third angles are also congruent (since they must add up to 180 degrees) and the triangles are SIMILAR. We use the symbol ~ for similar.

(for all shapes, SIMILAR means same shape, different size)

Example

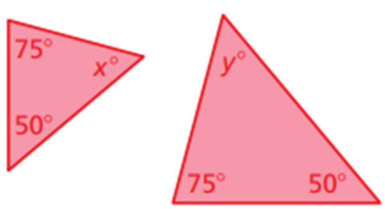


Triangle ABC is similar to Triangle DEF: $\triangle ABC \sim \triangle DEF$.

Use the segments to find corresponding sides for your proportions.

Tell whether the triangles are similar. Be able to explain why or why not.

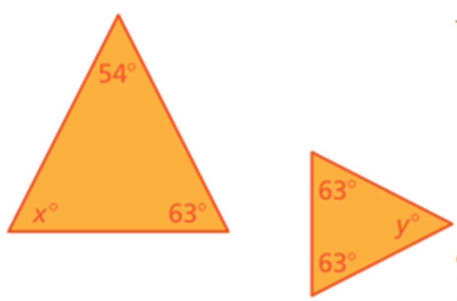
a.



The triangles have two pairs of congruent angles.

So, the third angles are congruent, and the triangles are similar.

b.



Write and solve an equation to find x.

$$x + 54 + 63 = 180$$

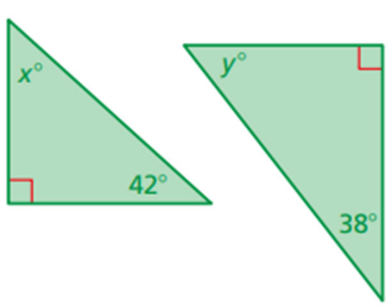
$$x + 117 = 180$$

$$x = 63$$

The triangles have two pairs of congruent angles.

So, the third angles are congruent, and the triangles are similar.

c.



Write and solve an equation to find x.

$$x + 90 + 42 = 180$$

$$x + 132 = 180$$

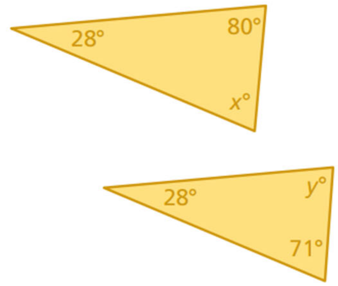
$$x = 48$$

The triangles do not have two pairs of congruent angles.

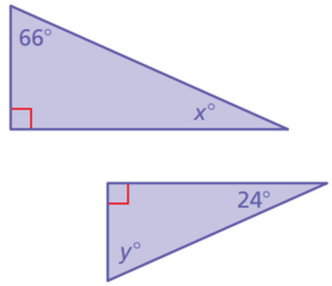
So, the triangles are not similar.

Tell whether the triangles are similar. Explain.

1.

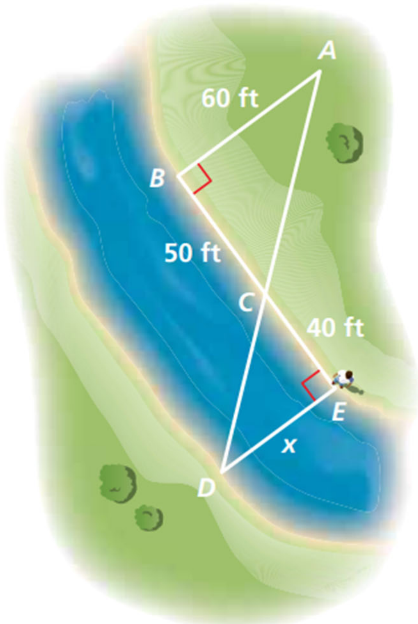


2.



1. No; the triangles do not have the same angle measures.
2. Yes; the angle measures are the same: 90°, 66° and 24°

Indirect Measurement uses similar figures to find a missing measure when it is difficult to find directly. We use proportions to find the missing measure.



Why are triangles ABC and DEC similar?

Because <B and <E are right angles and there are vertical angles at point C (which are always congruent), that means the third angles are also equal.

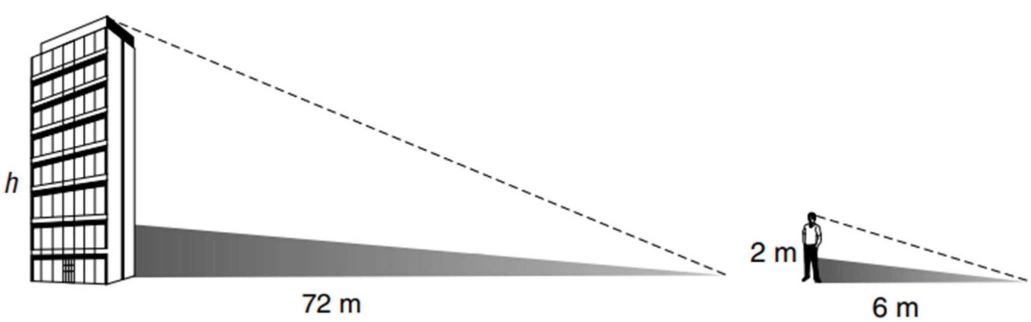
What is the distance across the river?

Corresponding side lengths in similar triangles are proportional.

$$\frac{x}{60} = \frac{40}{50} \qquad x = 48$$

So, the distance across the river is 48 feet.

1. Use similar triangles to find the height of the building. ____________________



2. Use similar triangles to find the height of the taller tree. ____________________