Lesson 3.4:

Using Similar Triangles

Essential Question

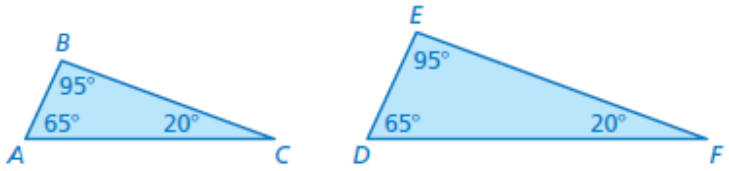
How can you use angles to tell whether triangles are similar?

Key Idea

Angles of Similar Triangles

Words When two angles in one triangle are congruent to two angles in another triangle, the third angles are also congruent and the triangles are similar.

Example

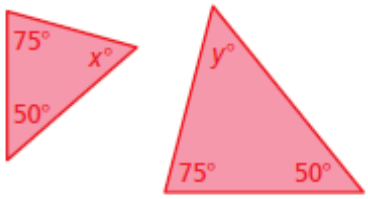


Triangle ABC is similar to Triangle DEF: $\triangle ABC \sim \triangle DEF$.

This also means that the sides are proportional to each other.

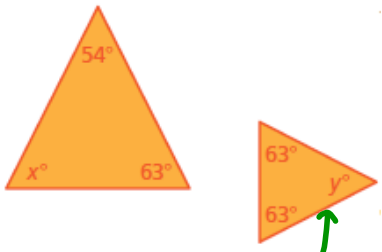
Tell whether the triangles are similar. Explain.

a.



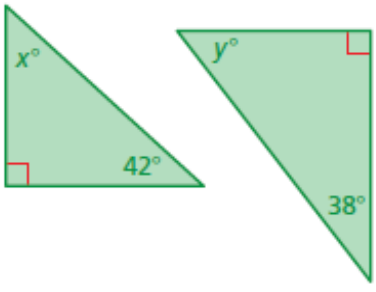
Yes! 2 ≅ ∠s

b.



63·2=126
180-126=54
Yes! 2 ≅ ∠s

c.



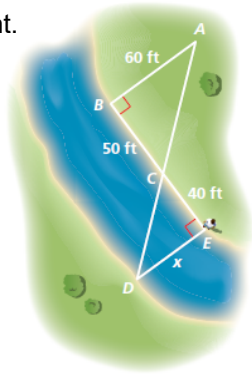
42°
+38°
80°

No! If both △s had a 42°+38° ∠, the third would be 100°.

You plan to cross a river and want to know how far it is to the other side. You take measurements on your side of the river and make the drawing shown.

a) Explain why $\triangle ABC$ and $\triangle DEC$ are similar.

$\angle B$ and $\angle E$ are right angles, so they are congruent. $\angle ACB$ and $\angle DCE$ are vertical angles, so they are congruent. Because two angles in $\triangle ABC$ are congruent to two angles in $\triangle DEC$, the third angles are also congruent and the triangles are similar.



b) What is the distance *x* across the river?

The ratios of the corresponding side lengths in similar triangles are equal. So, we can write and solve a proportion to find *x*.

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

$50x = 2400$

$x = 48$

OR

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

$50x = 2400$

$x = 48$