

5.5

Proving Triangle Congruence by SSS

For use with Exploration 5.5

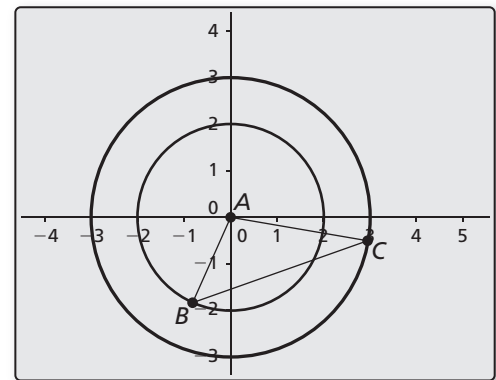
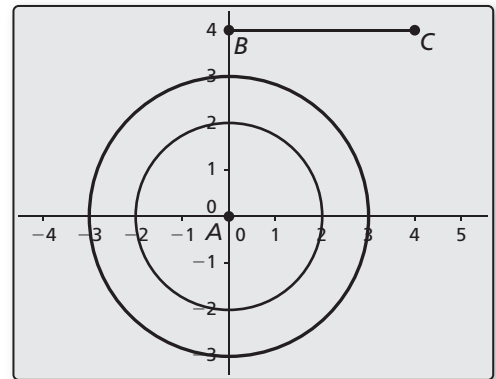
Essential Question What can you conclude about two triangles when you know the corresponding sides are congruent?

1 EXPLORATION: Drawing Triangles

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software.

- Construct circles with radii of 2 units and 3 units centered at the origin. Label the origin A . Then draw \overline{BC} of length 4 units.
- Move \overline{BC} so that B is on the smaller circle and C is on the larger circle. Then draw $\triangle ABC$.
- Explain why the side lengths of $\triangle ABC$ are 2, 3, and 4 units.
- Find $m\angle A$, $m\angle B$, and $m\angle C$.



- Repeat parts (b) and (d) several times, moving \overline{BC} to different locations. Keep track of your results by completing the table on the next page. What can you conclude?

5.5**Notetaking with Vocabulary**

For use after Lesson 5.5

In your own words, write the meaning of each vocabulary term.

legs

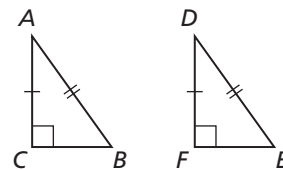
hypotenuse

Theorems**Theorem 5.8 Side-Side-Side (SSS) Congruence Theorem**

If three sides of one triangle are congruent to three sides of a second triangle, then the two triangles are congruent.

If $\overline{AB} \cong \overline{DE}$, $\overline{BC} \cong \overline{EF}$, and $\overline{AC} \cong \overline{DF}$, then $\triangle ABC \cong \triangle DEF$.**Notes:****Theorem 5.9 Hypotenuse-Leg (HL) Congruence Theorem**

If the hypotenuse and a leg of a right triangle are congruent to the hypotenuse and a leg of a second right triangle, then the two triangles are congruent.

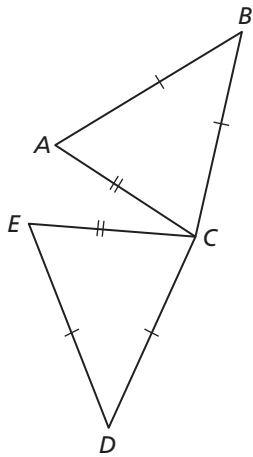
If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $m\angle C = m\angle F = 90^\circ$, then $\triangle ABC \cong \triangle DEF$.**Notes:**

5.5 Notetaking with Vocabulary (continued)

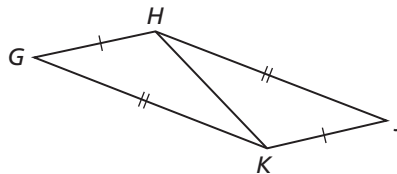
Extra Practice

In Exercises 1–4, decide whether the congruence statement is true. Explain your reasoning.

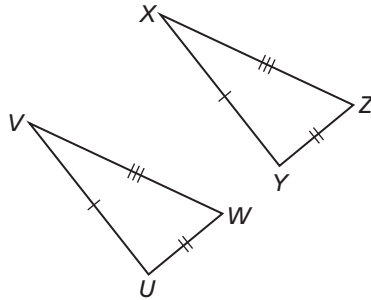
1. $\triangle ABC \cong \triangle EDC$



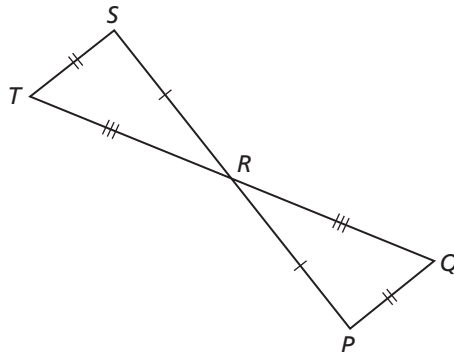
2. $\triangle KGH \cong \triangle HJK$



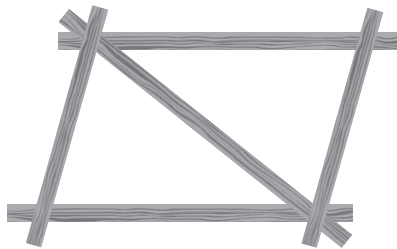
3. $\triangle UVW \cong \triangle XYZ$



4. $\triangle RST \cong \triangle RPQ$



5. Determine whether the figure is stable. Explain your reasoning.

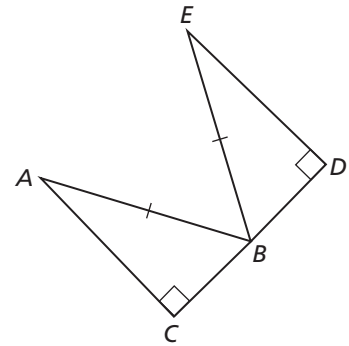


5.5 Notetaking with Vocabulary (continued)

6. Redraw the triangles so they are side by side with corresponding parts in the same position. Then write a proof.

Given B is the midpoint of \overline{CD} ,
 $\overline{AB} \cong \overline{EB}$, $\angle C$ and $\angle D$ are right angles.

Prove $\triangle ABC \cong \triangle EBD$

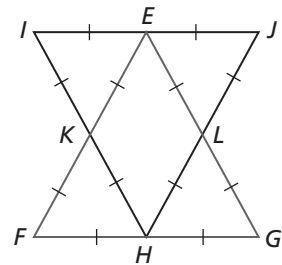


STATEMENTS	REASONS

7. Write a proof.

Given $\overline{IE} \cong \overline{EJ} \cong \overline{JL} \cong \overline{LH} \cong \overline{HK} \cong \overline{KI} \cong$
 $\overline{EK} \cong \overline{KF} \cong \overline{FH} \cong \overline{HG} \cong \overline{GL} \cong \overline{LE}$

Prove $\triangle EFG \cong \triangle HIJ$



STATEMENTS	REASONS