

# Challenge: Skills and Applications

For use with pages 603–611

1. Write a paragraph proof.

**Given:**  $X, Y,$  and  $Z$  are noncollinear points.

**Prove:** There exists a circle that contains  $X, Y,$  and  $Z$ .

2. Use a circle to write a paragraph proof for the following theorem, which you learned in Chapter 5:

The perpendicular bisectors of a triangle intersect at a point that is equidistant from the vertices of a triangle.

3. Write an indirect proof to show that no circle contains three distinct, collinear points.

4. Trace the arc shown at the right. Use a compass and straightedge to construct the center of the circle. Then construct the circle. Explain what you did.

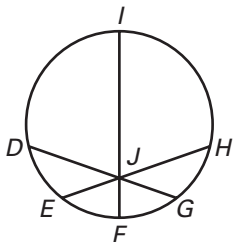


5. Refer to the diagram. Write a paragraph proof.

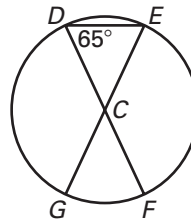
**Given:**  $\overline{IF}$  is a diameter,  $\overline{DG} \cong \overline{EH}$ .

**Prove:**  $\angle DJI \cong \angle HJI$

(Hint: Construct perpendicular bisectors.)



6. Refer to the diagram. If  $C$  is the center of the circle, find  $m\widehat{DE}$ ,  $m\widehat{EF}$ ,  $m\widehat{FG}$ , and  $m\widehat{GD}$ .



In Exercises 7–9,  $C$  is the center of the circle. Find the possible values of  $x$ .

