

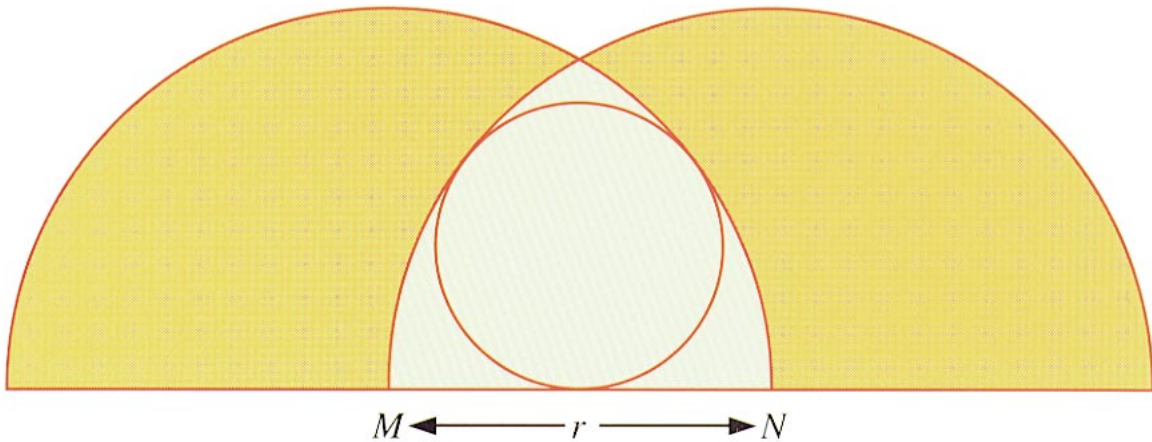
The Gothic Window

Problem-of-the-Week

The Problem

Circles M and N pass through each other's centers as shown. The only known length in the drawing is the radius, r , equal to the distance from M to N .

Find algebraic expressions for the coordinates of the center of the small circle inscribed in the white "window."
The coordinates should be expressed in terms of r .



Strategies and Hints

1. Start by choosing a center for the coordinate system. One choice is shown at the right.
2. What is the value of the x -coordinate of the center of the inscribed circle?
3. Connect the center of the inscribed circle to the points of tangency with the right-hand arc and the x -axis. How do these two segments relate to the circle?
4. To find the y -coordinate of the inscribed circle, you will need to write two different expressions for the radius.

