

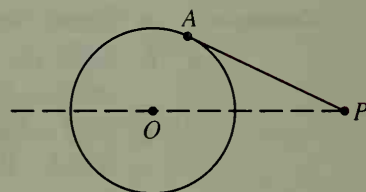
Exercises

1. a. What is the equation of a circle with center $(6, 0)$ and radius 5?
 b. Is the point $Q(2, 3)$ on the circle?
 c. Plot $P(12, 8)$. Is \overline{PQ} tangent to the circle?

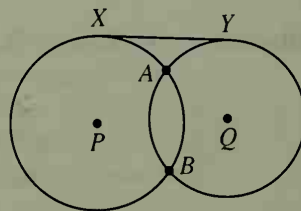
In Exercises 2–4, (a) verify that points A and B lie on circle O , (b) make a sketch and find M , the midpoint of \overline{AB} , and (c) use slopes to verify that $\overline{OM} \perp \overline{AB}$.

2. Circle O has radius 5. The points are $A(0, 5)$ and $B(4, 3)$.
3. Circle O has radius 10. The points are $A(6, 8)$ and $B(-8, 6)$.
4. Circle O has radius $5\sqrt{2}$. The points are $A(5, 5)$ and $B(-7, 1)$.
5. Sketch the circles $x^2 + y^2 = 225$ and $(x - 6)^2 + (y - 8)^2 = 25$ and explain why the circles must be internally tangent. (*Hint:* Find the two radii and the distance between the centers of the circles.)
6. a. Sketch the circle $x^2 + y^2 = 25$ and the line $y = 2x - 5$.
 b. Solve the two equations simultaneously by substituting $2x - 5$ for y in the equation $x^2 + y^2 = 25$. Solve the resulting quadratic equation by factoring. For each value of x , find the corresponding value of y by substituting into the equation $y = 2x - 5$.
 c. Your two solutions in part (b) correspond to two points on the circle. Show them on your sketch.

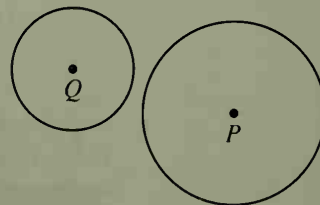
7. \overleftrightarrow{PA} is tangent to circle O at A .
 a. If the figure shown is reflected in \overleftrightarrow{PO} , what is the image of circle O ? of \overline{PA} ?
 b. Since a reflection is an isometry, what do you know about \overline{PA} and its image?
 c. State the corollary that part (b) proves.



8. Circles P and Q intersect at A and B .
 a. What is the image of A when reflected in \overleftrightarrow{PQ} ?
 b. What does part (a) tell you about \overline{AB} and \overleftrightarrow{PQ} ?
 c. Sketch the image of \overline{XY} when reflected in \overleftrightarrow{PQ} .
 d. What can you deduce from part (c) about the common external tangents of two circles?



- ★ 9. Find an equilateral triangle ABC with vertex B on $\odot P$ and vertex C on $\odot Q$. (*Hint:* Rotate $\odot P$ 60° about A . Its image will intersect $\odot Q$ in two points. Either of these points can be the desired vertex C . How do you find B ?)



A