

## 17-1 Equation of a Circle

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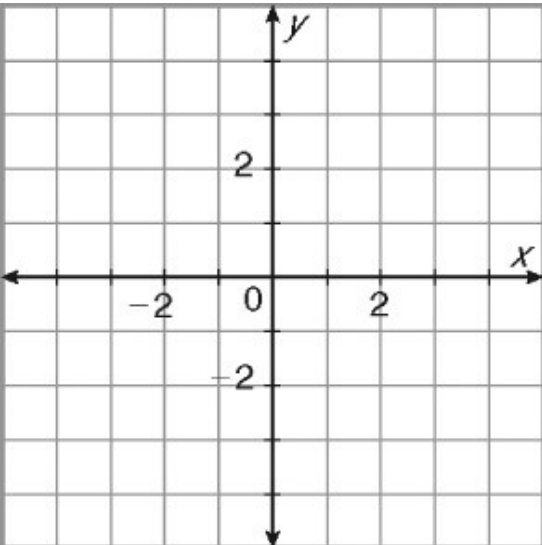
The equation of a circle with center  $(h, k)$  and radius  $r$  is  $(x - h)^2 + (y - k)^2 = r^2$ .

Write the equation of each circle.

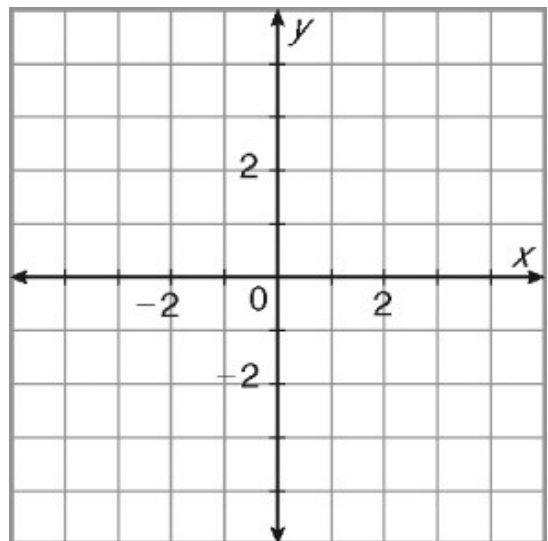
1. Circle  $X$  centered at the origin with radius 10
2. Circle  $R$  with center  $R(-1, 8)$  and radius 5
3. Circle  $P$  with center  $P(-5, -5)$  and radius  $2\sqrt{5}$
4. Circle  $O$  centered at the origin that passes through  $(9, -2)$
5. Circle  $B$  with center  $B(0, -2)$  that passes through  $(-6, 0)$

Graph each equation.

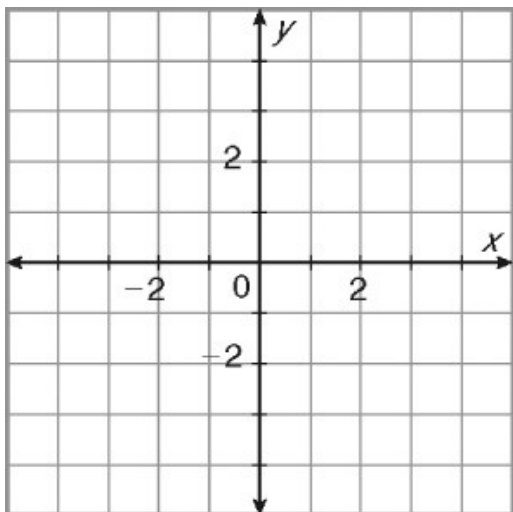
6.  $x^2 + y^2 = 25$



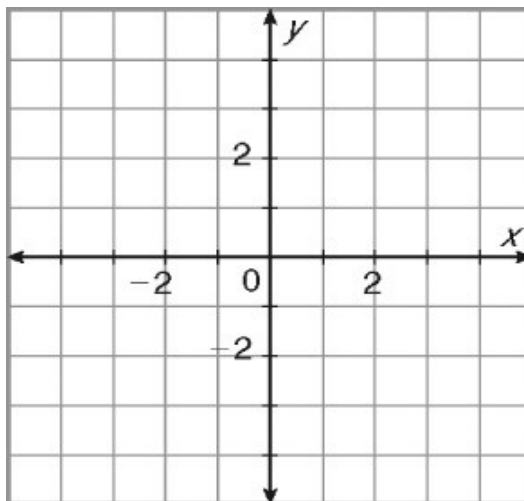
7.  $(x + 2)^2 + (y - 1)^2 = 4$



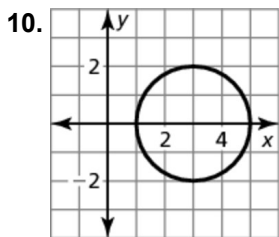
8.  $x^2 + (y + 3)^2 = 1$



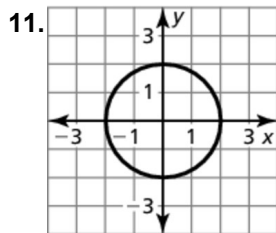
9.  $(x - 1)^2 + (y - 1)^2 = 16$



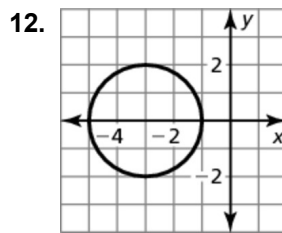
In Exercises 10 - 12, match each graph with its equation.



A.  $x^2 + y^2 = 4$



B.  $(x - 3)^2 + y^2 = 4$



C.  $(x + 3)^2 + y^2 = 4$

13. After an earthquake, you are given seismograph readings from three locations where the coordinates are miles.

The epicenter is 5 miles away from  $A(2, 1)$ .

The epicenter is 6 miles away from  $B(-2, -2)$ .

The epicenter is 4 miles away from  $(-6, 4)$ .

- Graph three circles in one coordinate plane to represent the possible epicenter locations determined by each of the seismograph readings.
- What are the coordinates of the epicenter?
- People could feel the earthquake up to 9 miles from the epicenter. Could a person at  $(4, -5)$  feel it? Explain.

Write the equation of each circle.

14. center at  $(9, 0)$ , radius 5

15. center at  $(3, 1)$ , diameter 14

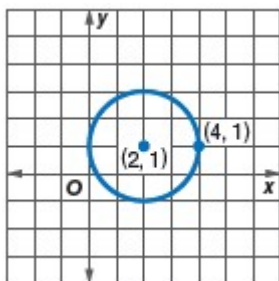
16. center at origin, passes through  $(2, 2)$

17. center at  $(-5, 3)$ , passes through  $(1, -4)$

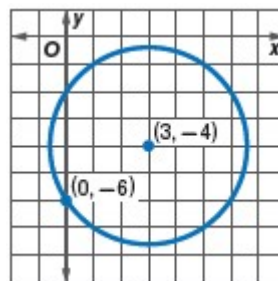
18. center at  $(6, 1)$ , radius 7

19. center at  $(-2, 0)$ , diameter 16

20.



21.



23. Different-sized engines will launch model rockets to different altitudes. The higher a rocket goes, the larger the circle of possible landing sites becomes. Under normal wind conditions, the landing radius is three times the altitude of the rocket.

a. Write the equation of the landing circle for a rocket that travels 300 feet in the air.

b. What would be the radius of the landing circle for a rocket that travels 1000 feet in the air? Assume the center of the circle is at the origin.

24. Pizza and Subs offers free delivery within 6 miles of the restaurant. The restaurant is located 4 miles west and 5 miles north of Mary's house.

a. Write and graph an equation to represent this situation if Mary's house is at the origin of the coordinate system.

b. Can Mary get free delivery if she orders pizza from Pizza and Subs? Explain.