

Circles in the Coordinate Plane

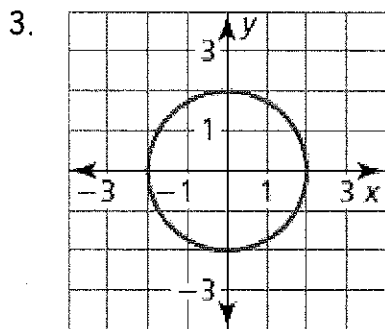
1. What is the standard equation of a circle?

$$(x-h)^2 + (y-k)^2 = r^2$$

Center
(h, k)
radius = r

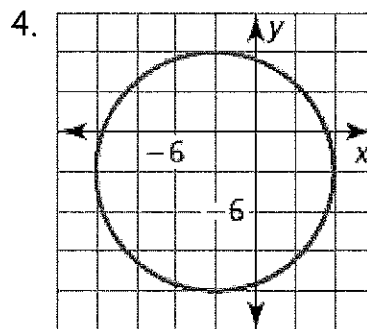
2. Explain why knowing the location of the center and one point on a circle is enough to graph the circle. Include an example in your explanation.

For #3 - 11, write the standard equation of the circle



Center : _____
r = _____
h = _____
k = _____

Equation: _____



Center : _____
r = _____
h = _____
k = _____

Equation: _____

5. A circle with center (0, 0) and radius $\sqrt{5}$

Equation: _____

6. A circle with center (4, 1) and radius 5

Equation: _____

7. A circle with center (-3, 4) and radius 1

Equation: _____

8. A circle with center (3, -5) and radius 7

Equation: _____

9. The center is (0, 0), and a point on the circle is (0, 6).

r = _____

Equation: _____

10. The center is (1, 2), and a point on the circle is (4, 2).

Equation: _____

11. The center is (0, 0), and a point on the circle is (3, -7).

Equation: _____

12. Describe and correct the error in writing the standard equation of a circle.



The standard equation of a circle with center $(-3, -5)$ and radius 3 is $(x - 3)^2 + (y - 5)^2 = 9$.

For #13 - 14, find the center and radius of the circle. Then graph the circle.

13. $x^2 + y^2 = 49$

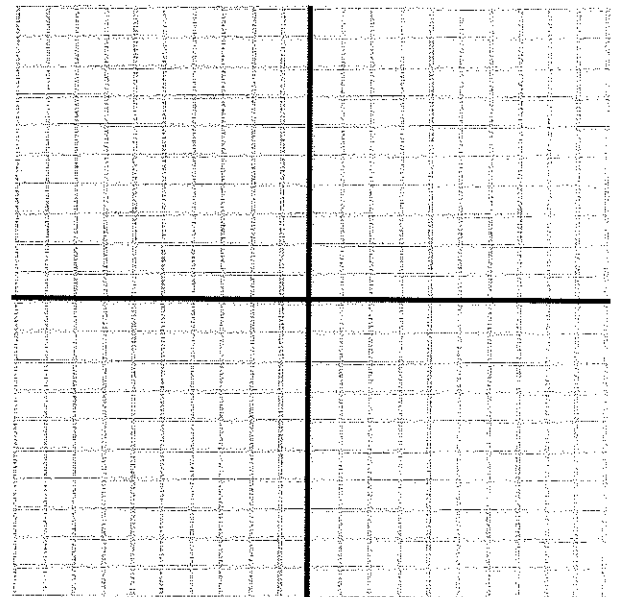
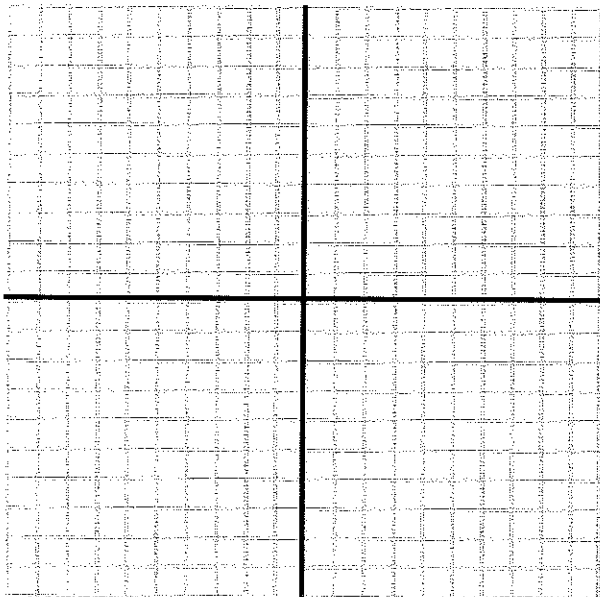
Center: _____

Radius: _____

14. $(x + 5)^2 + (y - 3)^2 = 8$

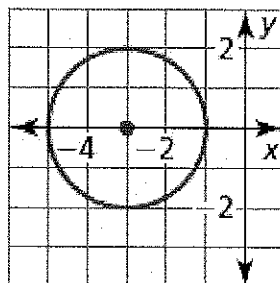
Center: _____

Radius: _____



21. Match each equation with its graph. Write the letter of the equation in the box.

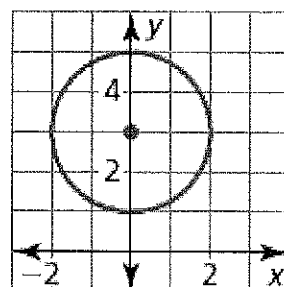
A. $x^2 + (y + 3)^2 = 4$



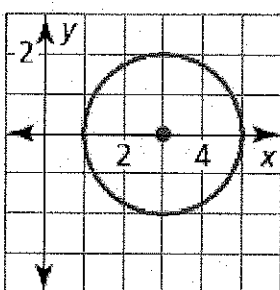
Center : _____

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

Center : _____



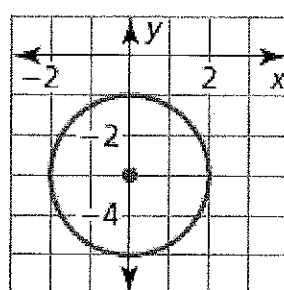
C. $(x + 3)^2 + y^2 = 4$



Center : _____

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

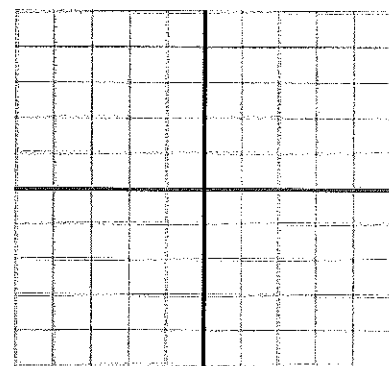
Center : _____



22. The point (3, 0) is on a circle with center (0, 2). Graph the circle. Write the standard equation of the circle.

Radius: _____

Equation: _____



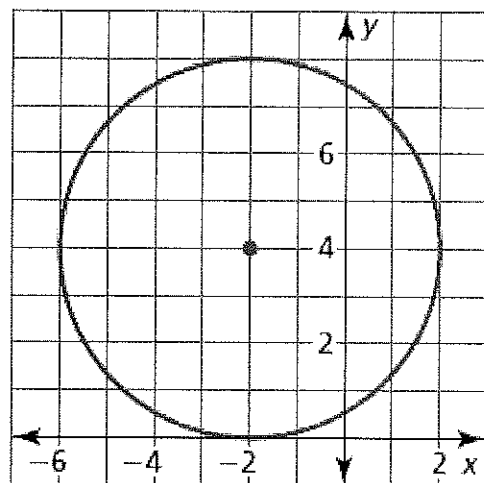
23. Write the standard equation of the circle shown

Radius: _____

$h =$ _____

$k =$ _____

Equation: _____



24. The point $(-7, 1)$ is on a circle with center $(-7, 6)$. Write the standard equation of the circle.

Radius = _____

Equation: _____

25. Prove or disprove that the point $(4, -3)$ lies on the circle centered at the origin and containing the point $(-5, 0)$.

Radius: _____

Equation: _____

Point lies on the circle? Yes/No

Reasoning:

26. A bank of lighting hangs over a stage. Each light illuminates a circular region on the stage. A coordinate plane is used to arrange the lights, using a corner of the stage as the origin. The equation $(x - 13)^2 + (y - 4)^2 = 16$ represents the boundary of the region illuminated by one of the lights. Three actors stand at the points $A(11, 4)$, $B(8, 5)$, and $C(15, 5)$. Graph the given equation. Then determine which actors are illuminated by the light.

Radius: _____

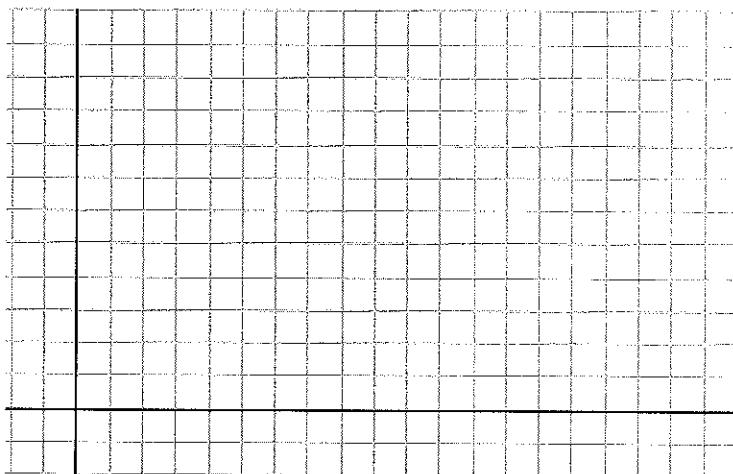
$h =$ _____

$k =$ _____

$A(11, 4)$ Yes/No

$B(8, 5)$ Yes/No

$C(15, 5)$ Yes/No



Writing Equations of Circles

Use the information provided to write the standard form equation of each circle.

1) $8x + x^2 - 2y = 64 - y^2$

2) $137 + 6y = -y^2 - x^2 - 24x$

3) $x^2 + y^2 + 14x - 12y + 4 = 0$

4) $y^2 + 2x + x^2 = 24y - 120$

5) $x^2 + 2x + y^2 = 55 + 10y$

6) $8x + 32y + y^2 = -263 - x^2$

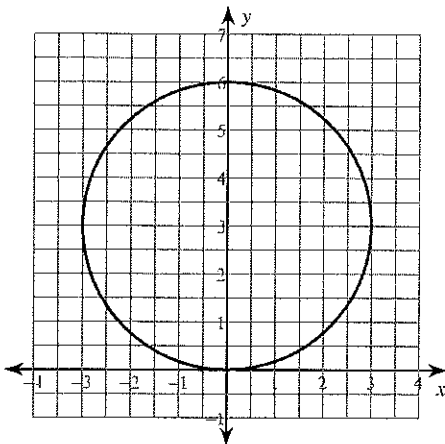
7) Center: $(-11, -8)$
Radius: 4

8) Center: $(-6, -15)$
Radius: $\sqrt{5}$

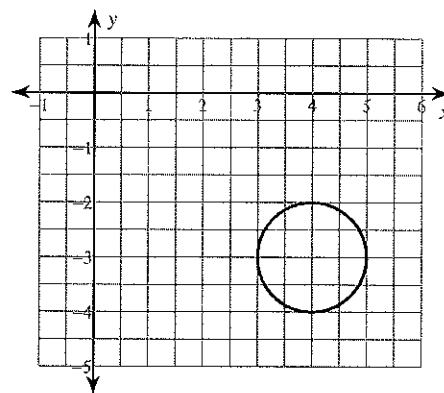
9) $(x - 16)^2 + (y - 6)^2 = 1$
Translated 4 left, 2 up

10) $(x + 5)^2 + (y + 7)^2 = 36$
Translated 5 left, 4 down

11)



12)



13) Ends of a diameter: $(-17, -9)$ and $(-19, -9)$

14) Ends of a diameter: $(-3, 11)$ and $(3, -13)$

15) Center: $(-15, 3\sqrt{7})$
Area: 2π

16) Center: $(-11, -14)$
Area: 16π

17) Center: $(-5, 12)$
Circumference: 8π

18) Center: $(15, 14)$
Circumference: $2\pi\sqrt{15}$

19) Center: $(2, -5)$
Point on Circle: $(-7, -1)$

20) Center: $(14, 17)$
Point on Circle: $(15, 17)$

21) Center: $(-15, 9)$
Tangent to $x = -17$

22) Center: $(-2, 12)$
Tangent to $x = -5$

23) Center lies on the x-axis
Tangent to $x = 7$ and $x = -13$

24) Center lies in the fourth quadrant
Tangent to $x = 7$, $y = -4$, and $x = 17$

25) Three points on the circle:
 $(-18, -5)$, $(-7, -16)$, and $(4, -5)$

26) Three points on the circle:
 $(-7, 6)$, $(9, 6)$, and $(-4, 13)$

27) $x^2 + y^2 + 14x + 12y + 76 = 0$
Translated 2 right, 4 down

28) $x^2 + y^2 - 10x + 20y + 61 = 0$
Translated 1 left, 2 down

29) $x^2 + y^2 + 14x - 8y + 29 = 0$
Translated 3 right, 4 down

30) $4y + y^2 = -28x - x^2 - 191$
Translated 4 right