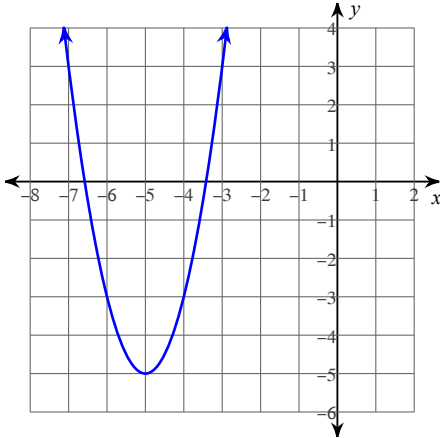


Unit 9 Conic Sections Review

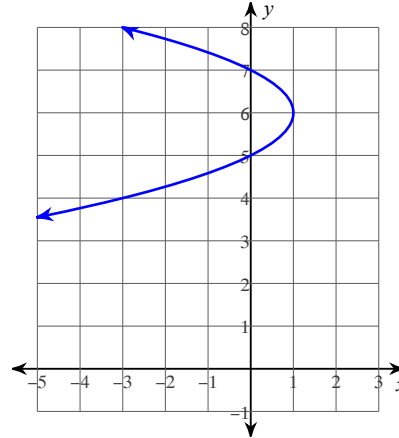
Use the information provided to write the vertex form equation of each parabola.

1)



$$y = 2(x + 5)^2 - 5$$

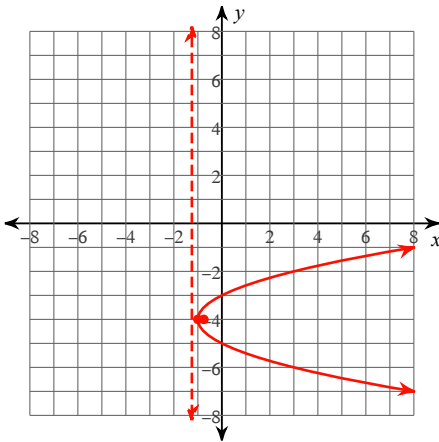
2)



$$x = -(y - 6)^2 + 1$$

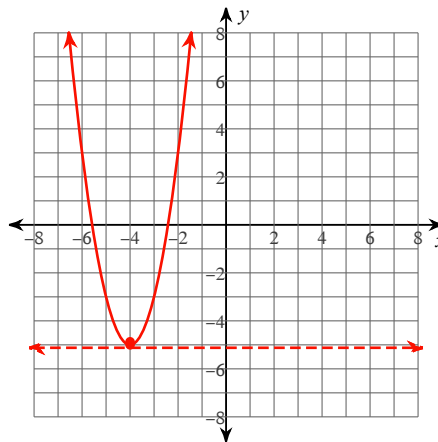
Identify the vertex, focus, directrix, and direction of opening of each. Then sketch the graph.

3)  $x + 1 = (y + 4)^2$



Vertex:  $(-1, -4)$   
 Focus:  $(-\frac{3}{4}, -4)$   
 Directrix:  $x = -\frac{5}{4}$   
 Opens: Right

4)  $\frac{1}{2}(y + 5) = (x + 4)^2$



Vertex:  $(-4, -5)$   
 Focus:  $(-4, -\frac{39}{8})$   
 Directrix:  $y = -\frac{41}{8}$   
 Opens: Up

Write each equation in transformational form.

5)  $y = \frac{1}{3}x^2 + \frac{2}{3}x - \frac{20}{3}$

$$3(y + 7) = (x + 1)^2$$

6)  $y = -4x^2 - 32x - 60$

$$-\frac{1}{4}(y - 4) = (x + 4)^2$$

$$7) x = -4y^2 + 8y - 8$$

$$-\frac{1}{4}(x + 4) = (y - 1)^2$$

$$8) x = -2y^2 - 24y - 67$$

$$-\frac{1}{2}(x - 5) = (y + 6)^2$$

Use the information provided to write the transformational form equation of each parabola.

$$9) \text{ Vertex: } (-7, 0), \text{ Focus: } \left(-7, -\frac{9}{4}\right)$$

$$-9y = (x + 7)^2$$

$$10) \text{ Vertex: } (-8, -4), \text{ Focus: } \left(-8, -\frac{15}{4}\right)$$

$$y + 4 = (x + 8)^2$$

$$11) \text{ Vertex: } (-2, 9), \text{ Focus: } \left(-\frac{33}{16}, 9\right)$$

$$-\frac{1}{4}(x + 2) = (y - 9)^2$$

$$12) \text{ Vertex: } (3, 5), \text{ Focus: } \left(\frac{37}{12}, 5\right)$$

$$\frac{1}{3}(x - 3) = (y - 5)^2$$

$$13) \text{ Focus: } \left(5, \frac{7}{4}\right), \text{ Directrix: } y = \frac{9}{4}$$

$$-(y - 2) = (x - 5)^2$$

$$14) \text{ Focus: } \left(-10, \frac{3}{4}\right), \text{ Directrix: } y = \frac{5}{4}$$

$$-(y - 1) = (x + 10)^2$$

$$15) \text{ Vertex: } (-5, 8), \text{ Focus: } \left(-\frac{19}{4}, 8\right)$$

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

$$16) \text{ Vertex: } (3, -5), \text{ Focus: } \left(\frac{95}{32}, -5\right)$$

$$-\frac{1}{8}(x - 3) = (y + 5)^2$$

17) Vertex:  $(-9, -7)$ , Directrix:  $y = -\frac{15}{2}$

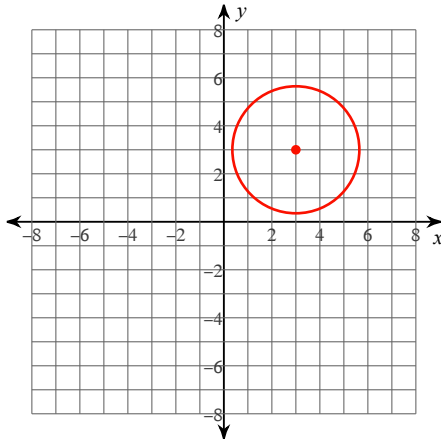
$$2(y + 7) = (x + 9)^2$$

18) Vertex:  $(4, 5)$ , Directrix:  $x = \frac{47}{12}$

$$\frac{1}{3}(x - 4) = (y - 5)^2$$

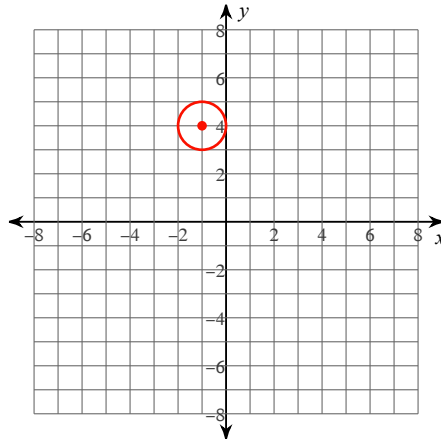
Identify the center and radius of each. Then sketch the graph.

19)  $(x - 3)^2 + (y - 3)^2 = 7$



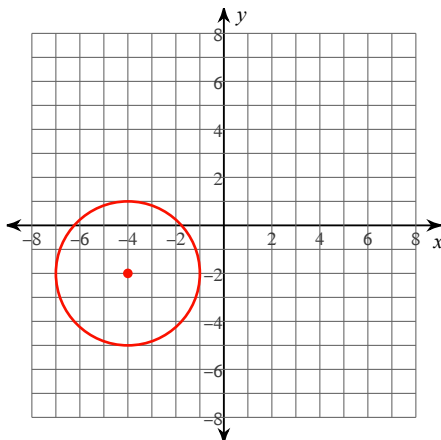
Center:  $(3, 3)$   
Radius:  $\sqrt{7}$

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



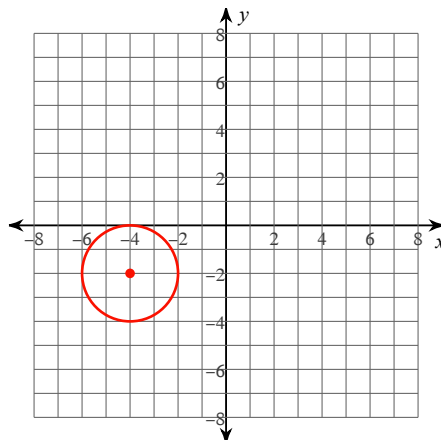
Center:  $(-1, 4)$   
Radius: 1

21)  $x^2 + y^2 + 8x + 4y + 11 = 0$



Center:  $(-4, -2)$   
Radius: 3

22)  $x^2 + y^2 + 8x + 4y + 16 = 0$



Center:  $(-4, -2)$   
Radius: 2

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

23)  $x^2 + y^2 - 24x + 20y + 235 = 0$

$$(x - 12)^2 + (y + 10)^2 = 9$$

24)  $x^2 + y^2 - 18x - 26y + 234 = 0$

$$(x - 9)^2 + (y - 13)^2 = 16$$

25)  $x^2 + y^2 + 18x + 4y + 41 = 0$

$$(x + 9)^2 + (y + 2)^2 = 44$$

26)  $x^2 + y^2 - 18x + 6y + 54 = 0$

$$(x - 9)^2 + (y + 3)^2 = 36$$

27) Center:  $(-14, -9)$   
Radius: 5

$$(x + 14)^2 + (y + 9)^2 = 25$$

28) Center:  $(\sqrt{19}, -12)$   
Radius:  $\sqrt{43}$

$$(x - \sqrt{19})^2 + (y + 12)^2 = 43$$

29) Center:  $(-6, 6)$   
Point on Circle:  $(-15, -2)$

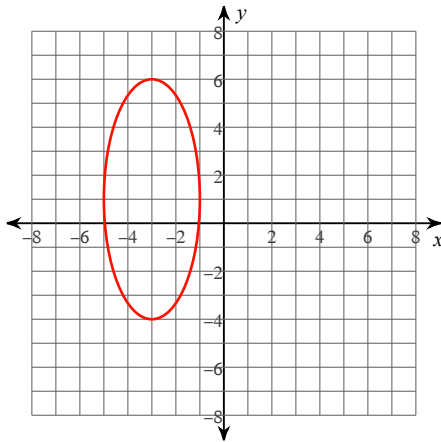
$$(x + 6)^2 + (y - 6)^2 = 145$$

30) Center:  $(9, 14)$   
Point on Circle:  $(6, 14)$

$$(x - 9)^2 + (y - 14)^2 = 9$$

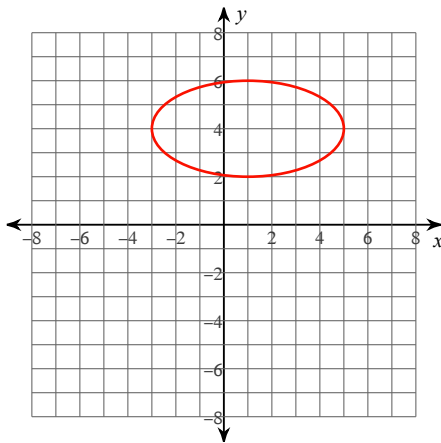
Identify the center, vertices, foci, length of the major axis, length of the minor axis, and eccentricity of each. Then sketch the graph.

$$31) \frac{(x + 3)^2}{4} + \frac{(y - 1)^2}{25} = 1$$



Center:  $(-3, 1)$   
 Vertices:  $(-3, 6)$   
 $(-3, -4)$   
 Foci:  $(-3, 1 + \sqrt{21})$   
 $(-3, 1 - \sqrt{21})$   
 Major Axis: 10 units  
 Minor Axis: 4 units  
 Eccentricity:  $\frac{\sqrt{21}}{5} \approx 0.917$

$$32) \frac{(x - 1)^2}{16} + \frac{(y - 4)^2}{4} = 1$$



Center:  $(1, 4)$   
 Vertices:  $(5, 4)$   
 $(-3, 4)$   
 Foci:  $(1 + 2\sqrt{3}, 4)$   
 $(1 - 2\sqrt{3}, 4)$   
 Major Axis: 8 units  
 Minor Axis: 4 units  
 Eccentricity:  $\frac{\sqrt{3}}{2} \approx 0.866$

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

33) Vertices:  $(-1, 1), (-1, -9)$   
 Foci:  $(-1, 0), (-1, -8)$

$$\frac{(x + 1)^2}{9} + \frac{(y + 4)^2}{25} = 1$$

34) Vertices:  $(11, -10), (-15, -10)$   
 Foci:  $(3, -10), (-7, -10)$

$$\frac{(x + 2)^2}{169} + \frac{(y + 10)^2}{144} = 1$$

35) Foci:  $(-3 + \sqrt{85}, -9), (-3 - \sqrt{85}, -9)$   
Endpoints of major axis:  $(8, -9), (-14, -9)$

$$\frac{(x+3)^2}{121} + \frac{(y+9)^2}{36} = 1$$

36) Foci:  $(9, 10), (9, -6)$   
Endpoints of major axis:  $(9, 12), (9, -8)$

$$\frac{(x-9)^2}{36} + \frac{(y-2)^2}{100} = 1$$

37)  $x^2 + 4y^2 - 16x + 24y + 84 = 0$

$$\frac{(x-8)^2}{16} + \frac{(y+3)^2}{4} = 1$$

38)  $4x^2 + 25y^2 + 32x + 250y + 289 = 0$

$$\frac{(x+4)^2}{100} + \frac{(y+5)^2}{16} = 1$$

39)  $4x^2 + 9y^2 + 24x - 162y + 189 = 0$

$$\frac{(x+3)^2}{144} + \frac{(y-9)^2}{64} = 1$$

40)  $4x^2 + y^2 - 40x - 16y + 64 = 0$

$$\frac{(x-5)^2}{25} + \frac{(y-8)^2}{100} = 1$$