

## Assignment

Date \_\_\_\_\_ Period \_\_\_\_\_

Find the value that completes the square and then rewrite as a perfect square.

1)  $r^2 - 36r + \underline{\hspace{2cm}}$

$324; (r - 18)^2$

2)  $x^2 - \frac{13}{7}x + \underline{\hspace{2cm}}$

$\frac{169}{196}; \left(x - \frac{13}{14}\right)^2$

3)  $x^2 + \frac{193}{18}x + \underline{\hspace{2cm}}$

$\frac{37249}{1296}; \left(x + \frac{193}{36}\right)^2$

4)  $z^2 - 3z + \underline{\hspace{2cm}}$

$\frac{9}{4}; \left(z - \frac{3}{2}\right)^2$

Solve each equation by completing the square.

5)  $9a^2 - 18a - 24 = 3$

$\{3, -1\}$

6)  $4x^2 - 16x - 62 = 3$

$\left\{\frac{13}{2}, -\frac{5}{2}\right\}$

7)  $19 = -m^2 - 5m$

$\left\{\frac{-5 + i\sqrt{51}}{2}, \frac{-5 - i\sqrt{51}}{2}\right\}$

8)  $12 = 13m - m^2$

$\{12, 1\}$

9)  $-18x = 120 - 3x^2$

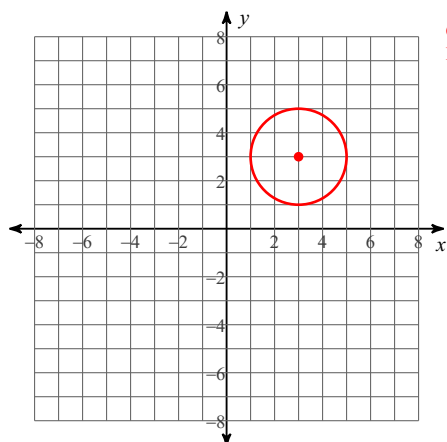
$\{10, -4\}$

10)  $-12v = -v^2 + 122$

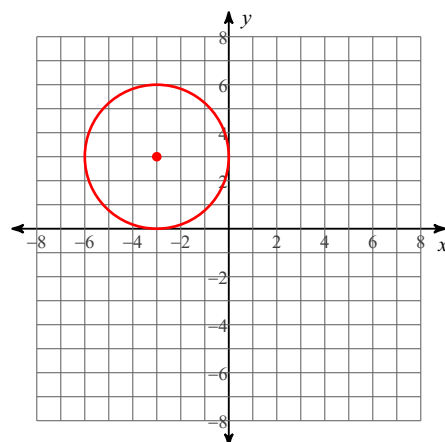
$\{6 + \sqrt{158}, 6 - \sqrt{158}\}$

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

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

Center: (3, 3)  
Radius: 2

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

Center: (-3, 3)  
Radius: 3

Identify the center and radius of each.

13)  $-14x = -y^2 - x^2 - 85 - 20y$

Center:  $(7, -10)$

Radius: 8

14)  $x^2 + y^2 - 4y\sqrt{3} - 4 = 0$

Center:  $(0, 2\sqrt{3})$

Radius: 4

15)  $x^2 + y^2 + 32x - 6y + 261 = 0$

Center:  $(-16, 3)$

Radius: 2

16)  $(x - 1)^2 + (y + 9)^2 = 15$

Center:  $(1, -9)$

Radius:  $\sqrt{15}$

17)  $x^2 + y^2 = -28y - 2x - 178$

Center:  $(-1, -14)$

Radius:  $\sqrt{19}$

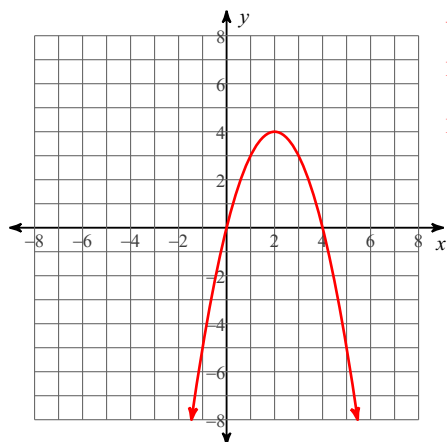
18)  $y^2 + 141 = -22y - x^2 + 12x$

Center:  $(6, -11)$

Radius: 4

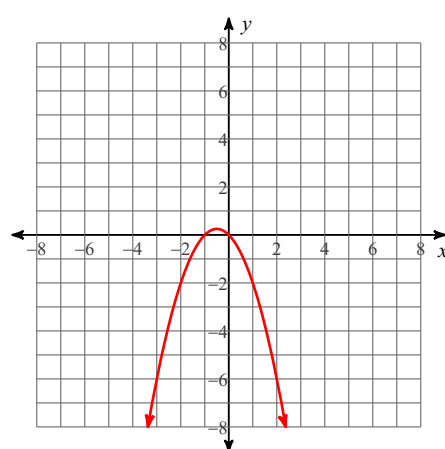
Identify the vertex and axis of symmetry of each. Then sketch the graph.

19)  $x^2 = -y + 4x$



Vertex:  $(2, 4)$   
Focus:  $(2, \frac{15}{4})$   
Directrix:  $y = \frac{17}{4}$

20)  $y = -x(x + 1)$



Vertex:  $(-\frac{1}{2}, \frac{1}{4})$   
Focus:  $(-\frac{1}{2}, 0)$   
Directrix:  $y = \frac{1}{2}$

Identify the vertex and axis of symmetry of each.

21)  $y = 3(x - 2)(x - 1)$  Vertex:  $(\frac{3}{2}, -\frac{3}{4})$

Axis of Sym.:  $x = \frac{3}{2}$

22)  $y = 12x^2 + 216x + 963$

Vertex:  $(-9, -9)$

Axis of Sym.:  $x = -9$

23)  $y = -(x - 5)(x - 4)$  Vertex:  $(\frac{9}{2}, \frac{1}{4})$

Axis of Sym.:  $x = \frac{9}{2}$

24)  $-20x - 2x^2 + 5y = 25$

Vertex:  $(-5, -5)$

Axis of Sym.:  $x = -5$