Writing Equations of Parabolas

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

1) Vertex at origin, Focus: \( (0, -\frac{1}{32}) \)
2) Vertex at origin, Focus: \( (0, \frac{1}{8}) \)

3) Vertex at origin, Directrix: \( y = \frac{1}{4} \)
4) Vertex at origin, Directrix: \( y = -\frac{1}{8} \)

5) Vertex: \( (-5, 8) \), Focus: \( \left( -\frac{21}{4}, 8 \right) \)
6) Vertex: \( (-8, -9) \), Focus: \( \left( -\frac{31}{4}, -9 \right) \)

7) Vertex: \( (-6, -9) \), Directrix: \( x = -\frac{47}{8} \)
8) Vertex: \( (8, 9) \), Directrix: \( y = \frac{73}{8} \)

9) Vertex: \( (8, -1) \), y-intercept: \(-17\)
10) Vertex: \( (5, -1) \), y-intercept: \(-\frac{27}{2}\)

11) Opens left or right, Vertex: \( (7, 6) \), Passes through: \( (-11, 9) \)

12) Opens left or right, Vertex: \( (7, 0) \), Passes through: \( (6, -1) \)

13) Focus: \( \left( -\frac{63}{8}, -7 \right) \), Directrix: \( x = -\frac{65}{8} \)
14) Focus: \( \left( \frac{107}{12}, -7 \right) \), Directrix: \( x = \frac{109}{12} \)
15) Opens up or down, and passes through \((-6, -7), (-11, -2),\) and \((-8, 1)\)

16) Opens up or down, and passes through \((11, 15), (7, 7),\) and \((4, 22)\)

17)

18)

19) Vertex at origin, opens left, \(\frac{1}{8}\) units between the vertex and focus

20) Vertex at origin, opens right, \(\frac{1}{8}\) units between the vertex and focus

21) Vertex: \((10, 0)\), axis of symmetry: \(y = 0\), length of latus rectum = 1, \(a < 0\)

22) Vertex: \((4, 2)\), axis of symmetry: \(x = 4\), length of latus rectum = \(\frac{1}{3}\), \(a > 0\)

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

23) \(x^2 + 3x + y - 28 = 0\)

24) \(-y^2 + x - 20y - 103 = 0\)
Writing Equations of Parabolas

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

1) Vertex at origin, Focus: \(0, -\frac{1}{32}\)
   
   \[y = -8x^2\]

2) Vertex at origin, Focus: \(0, \frac{1}{8}\)
   
   \[y = 2x^2\]

3) Vertex at origin, Directrix: \(y = \frac{1}{4}\)
   
   \[y = -x^2\]

4) Vertex at origin, Directrix: \(y = -\frac{1}{8}\)
   
   \[y = 2x^2\]

5) Vertex: \((-5, 8)\), Focus: \((-\frac{21}{4}, 8)\)
   
   \[x = -(y - 8)^2 - 5\]

6) Vertex: \((-8, -9)\), Focus: \((-\frac{31}{4}, -9)\)
   
   \[x = (y + 9)^2 - 8\]

7) Vertex: \((-6, -9)\), Directrix: \(x = -\frac{47}{8}\)
   
   \[x = -2(y + 9)^2 - 6\]

8) Vertex: \((8, 9)\), Directrix: \(y = \frac{73}{8}\)
   
   \[y = -2(x - 8)^2 + 9\]

9) Vertex: \((8, -1)\), y-intercept: \(-17\)
   
   \[y = -\frac{1}{4}(x - 8)^2 - 1\]

10) Vertex: \((5, -1)\), y-intercept: \(-\frac{27}{2}\)
    
    \[y = -\frac{1}{2}(x - 5)^2 - 1\]

11) Opens left or right, Vertex: \((7, 6)\), Passes through: \((-11, 9)\)
    
    \[x = -2(y - 6)^2 + 7\]

12) Opens left or right, Vertex: \((7, 0)\), Passes through: \((6, -1)\)
    
    \[x = -y^2 + 7\]

13) Focus: \((-\frac{63}{8}, -7)\), Directrix: \(x = -\frac{65}{8}\)
    
    \[x = 2(y + 7)^2 - 8\]

14) Focus: \((\frac{107}{12}, -7)\), Directrix: \(x = \frac{109}{12}\)
    
    \[x = -3(y + 7)^2 + 9\]
15) Opens up or down, and passes through \((-6, -7), (-11, -2),\) and \((-8, 1)\)

\[ y = -(x + 9)^2 + 2 \]

16) Opens up or down, and passes through \((11, 15), (7, 7),\) and \((4, 22)\)

\[ y = (x - 8)^2 + 6 \]

17) \[ y = (x - 1)^2 \]

18) \[ x = (y + 1)^2 + 3 \]

19) Vertex at origin, opens left,

\[ \frac{1}{8} \] units between the vertex and focus

\[ x = -2y^2 \]

20) Vertex at origin, opens right,

\[ \frac{1}{8} \] units between the vertex and focus

\[ x = 2y^2 \]

21) Vertex: \((10, 0),\) axis of symmetry: \(y = 0,\)

length of latus rectum = \(1, a < 0\)

\[ x = y^2 + 10 \]

22) Vertex: \((4, 2),\) axis of symmetry: \(x = 4,\)

length of latus rectum = \(\frac{1}{3}, a > 0\)

\[ y = 3(x - 4)^2 + 2 \]

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

23) \[ x^2 + 3x + y - 28 = 0 \]

\[ y = -(x + 7)(x - 4) \]

24) \[ -y^2 + x - 20y - 103 = 0 \]

\[ x = y^2 + 20y + 103 \]