Worksheet Lesson Section 3.1

Find the following for each quadratic equation.

      (a)   vertex
      (b)   direction of opening
      (c)   equation for axis of symmetry
      (d)   y-intercept
      (e)   x-intercepts, if possible
      (f)   maximum or minimum value and where it occurs

1) $y = x^2 - 1$

2) $y = x^2 + 6x - 3$

3) $f(x) = -2x^2 - 6x + 20$

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

Find the equation for a quadratic function in standard form $(f(x) = a(x-h)^2 + k)$.

5)   Vertex at (2, 2), passing through point (0, 0)

6)   Vertex at (3, 5), passing through point (9, 2)

7)   Vertex at $(-2, 3)$, x-intercept of 1

8)   Vertex at (4, 7), y-intercept of 10

Convert each function to standard form $(f(x) = a(x-h)^2 + k)$

9) $f(x) = x^2 + 4x + 5$

10) $y = -x^2 + 6x - 8$

11) $f(x) = -4x^2 + 16x - 10$

12) $f(x) = 2x^2 - 4x - 3$

13) $y = \frac{1}{2}x^2 + 2x$

Find the equation for the axis of symmetry. Then determine another point that would correspond to the given point that has the same y coordinate.

14) $f(x) = 2(x-5)^2 + 2, \quad (3,10)$

15) $y = 3x^2 - 6x + 1, \quad (-1,10)$

16) $f(x) = -(x+1)^2, \quad (5,-36)$