Answers to Worksheet Lesson 36, Section 3.1 of textbook

1)

    a)   vertex $V(0,-1)$

    b)   opens upward

    c)   axis of symmetry: $x = 0$

    d) y-intercept: -1

    e) x-intercepts: $1, -1$

    f)   minimum value is -1 when $x = 0$

2)

    a)   vertex $V(-3,-12)$

    b)   opens upward

    c)   axis of symmetry: $x = -3$

    d) y-intercept: -3

    e) x-intercepts: $-3+2\sqrt{3}, -3-2\sqrt{3} \approx -0.46, -6.46$

    f)   minimum value of -12 when $x = -3$

3)

    a)   vertex $V\left(-\dfrac{3}{2},\dfrac{49}{2}\right)$

    b)   opens downward

    c)   axis of symmetry: $x = -\dfrac{3}{2}$

    d) y-intercept: 20

    e) x-intercepts: $-5, 2$

    f)   maximum value of $\dfrac{49}{2}$ when $x = -\dfrac{3}{2}$

4)

    a)   vertex: $V\left(2,-\dfrac{9}{2}\right)$

    b)   opens upward

    c)   axis of symmetry: $x = 2$

    d) y-intercept: $-\dfrac{5}{2}$

    e) x-intercepts: $-1, 5$

    f)   minimum value of $-\dfrac{9}{2}$ when $x = 2$

5) $f(x) = -\dfrac{1}{2}(x-2)^2 + 2$

6) $f(x) = -\dfrac{1}{12}(x-3)^2 + 5$

7) $f(x) = -\dfrac{1}{3}(x+2)^2 + 3$

8) $f(x) = \dfrac{3}{16}(x-4)^2 + 7$

9) $h = -2,\ k = 1,\ a = 1$
    Therefore: $f(x) = (x+2)^2 + 1$

10) $h = 3,\ k = 1,\ a = -1$
    Therefore: $f(x) = -(x-3)^2 + 1$

11) $a = -4,\ h = 2,\ k = 6$
    Therefore: $f(x) = -4(x-2)^2 + 6$

12) $a = 2,\ h = 1,\ k = -5$
    Therefore: $f(x) = 2(x-1)^2 - 5$

13) $a = \dfrac{1}{2},\ h = -2,\ k = -2$
    Therefore: $f(x) = \dfrac{1}{2}(x+2)^2 - 2$

14) axis: $x = 5$
    point symmetric to (3, 10) is (7,10)

15) axis: $x = 1$
    point symmetric to (−1,10) is (3,10)

16) axis: $x = -1$
    point symmetric to (5,−36) is (−7,−36)