Write the equation, in standard form, of the quadratic equation with vertex (2, 10) and passes through (0, 4).

h k x y

$y = a(x-h)^2 + k$

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

$4 = a(0-2)^2 + 10$

$4 = 4a + 10$

$-6 = 4a$

$a = \frac{-6}{4} = -\frac{3}{2}$

$y = -\frac{3}{2}(x-2)^2 + 10$

Standard Form

$y = ax^2 + bx + c$

$y = -\frac{3}{2}(x-2)^2 + 10$

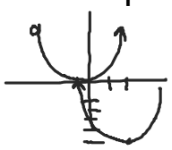
$y = -\frac{3}{2}(x-2)(x-2) + 10$

$y = -\frac{3}{2}(x^2 - 4x + 4) + 10$

$y = -\frac{3}{2}x^2 + 6x - 6 + 10$

$y = -\frac{3}{2}x^2 + 6x + 4$

Write the equaiton in standard form of a quadratic equation with a translation of right 2 and down 5. $y = x^2$



$(2, -5)$
$h \quad k$

$y = a(x-h)^2 + k$

$y = 1(x-2)^2 - 5$

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

$= x^2 - 4x + 4 - 5$

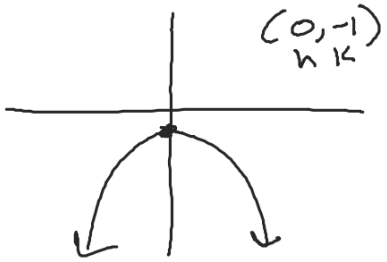
$= x^2 - 4x - 1$

Write the equaiton in standard form of a quadratic equation with a reflection over the x-axis and a translation down 1.

$y = a(x-h)^2 + k$

$y = -1(x-0)^2 - 1$

$= -x^2 - 1$

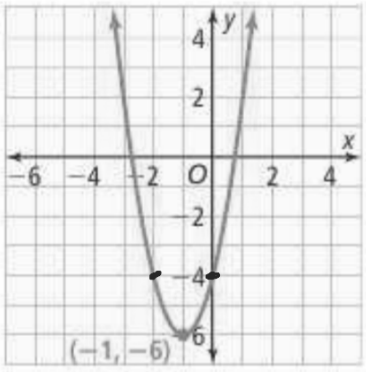


29, 30, 31

36, 37

Write the equation of the function represented by the parabola in vertex form and in the form $y = ax^2 + bx + c$. SEE EXAMPLE 4

29.



h k
Vertex $(-1, -6)$ Pt $(0, -4)$
x y

$y = a(x-h)^2 + k$

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

$-4 = a(0+1)^2 - 6$

$-4 = a - 6$

$a = 2$

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

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

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

$2x^2 + 4x + 2 - 6$

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

Write the equation $g(x)$ in vertex form of a quadratic function for the transformations giver the function $f(x) = x^2$. SEE EXAMPLE 5

30. Let $g(x)$ be the function whose graph is a translation 4 units left and 1 unit up of the graph of $f(x)$.

$V(-4,1)$ $\quad y = (x+4)^2 + 1$

31. Let $g(x)$ be the function whose graph is a reflection in the x-axis and translated 3 units right of the graph of $f(x)$.

$V(3,0)$ $\quad a = -1$ $\quad y = -(x-3)^2$

36. The graph of $gx = 3(x - 2)^2$ is a transformation of the graph of $fx = x^2$. Are the following transformations of f that map to g? Select *yes* or *no*.

	Yes	No
Translation left		✗
Translation right	✓	
Translation up		✗
Translation down		✗
Reflection over x-axis		✗
Vertical Compression		✗
Vertical Stretch	✓	

37. SAT/ACT Which of the following functions represents a parabola that has a vertex located at $(-3, 4)$ and that passes through the point $(-1, -4)$?

(A) $f(x) = x^2 - 5$

(B) $f(x) = -2(x + 3)^2 + 4$

(C) $f(x) = (x + 3)^2 + 4$

(D) $f(x) = 2(x + 1)^2 - 4$

(E) $f(x) = 2(x - 3)^2 - 32$

$y = a(x-h)^2 + k$

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

$-4 = a(-1+3)^2 + 4$

$-4 = 4a + 4$

$-4 \quad -4$

$-8 = 4a$

$a = -2$