

Objective: Graph a quadratic function using transformations

Concept

The Quadratic Function

vertex form

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

vertex : (h, k)

The Quadratic Function

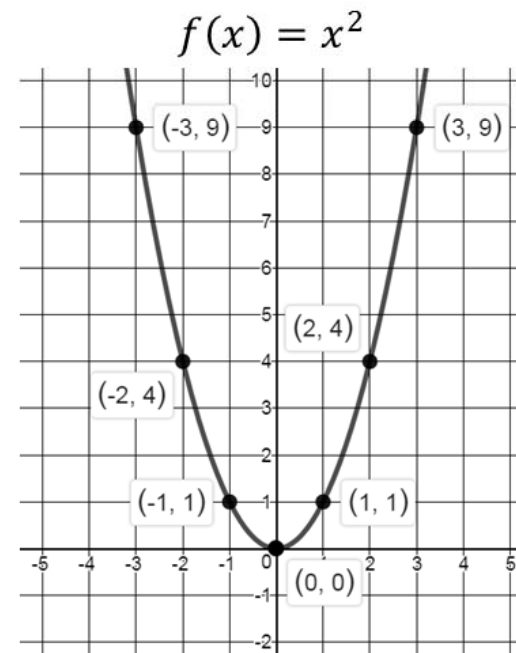
standard form

$$f(x) = ax^2 + bx + c$$

$$\text{vertex} = (h, k) = \left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right) \right)$$

One Procedure for Graphing a Parabola from Vertex Form Using Transformations

1. Determine the translations and graph the new vertex.
2. Draw a dashed horizontal line through the new vertex.
3. Perform any reflection, stretch, and/or compression on the other key points in the parent function using the line in step 2 as the reference line.
4. Draw in a smooth curve. Erase the dashed line in step 2.



Objective: Graph a quadratic function using transformations

Identify each quadratic function as being in Vertex Form or Standard Form. If in Vertex Form, identify the values of a , h , and k . If in Standard Form, identify the values of a , b , and c .

$$g(x) = -2(x + 7)^2 - 5$$

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

Vertex Form

$$a = -2, h = -7, k = -5$$

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Identify each quadratic function as being in Vertex Form or Standard Form. If in Vertex Form, identify the values of a , h , and k . If in Standard Form, identify the values of a , b , and c .

$$g(x) = -(x - 3)^2$$

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

Vertex Form

$$a = -1, h = 3, k = 0$$

Objective: Graph a quadratic function using transformations

Identify each quadratic function as being in Vertex Form or Standard Form. If in Vertex Form, identify the values of a , h , and k . If in Standard Form, identify the values of a , b , and c .

$$g(x) = x^2 + 6x - 10$$

$$g(x) = ax^2 + bx + c$$

Standard Form

$$a = 1, b = 6, c = -10$$

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Identify each quadratic function as being in Vertex Form or Standard Form. If in Vertex Form, identify the values of a , h , and k . If in Standard Form, identify the values of a , b , and c .

$$g(x) = -\frac{1}{2}x^2 - 2x$$

$$g(x) = ax^2 + bx + c$$

Standard Form

$$a = -\frac{1}{2}, b = -2, c = 0$$

Objective: Graph a quadratic function using transformations

Identify each quadratic function as being in Vertex Form or Standard Form. If in Vertex Form, identify the values of a , h , and k . If in Standard Form, identify the values of a , b , and c .

$$g(x) = 2x^2 - 8$$

$$g(x) = 2x^2 - 8$$
$$g(x) = a(x-h)^2 + k$$

Vertex Form
 $a = 2, h = 0, k = -8$

$$g(x) = 2x^2 - 8$$
$$g(x) = ax^2 + bx + c$$

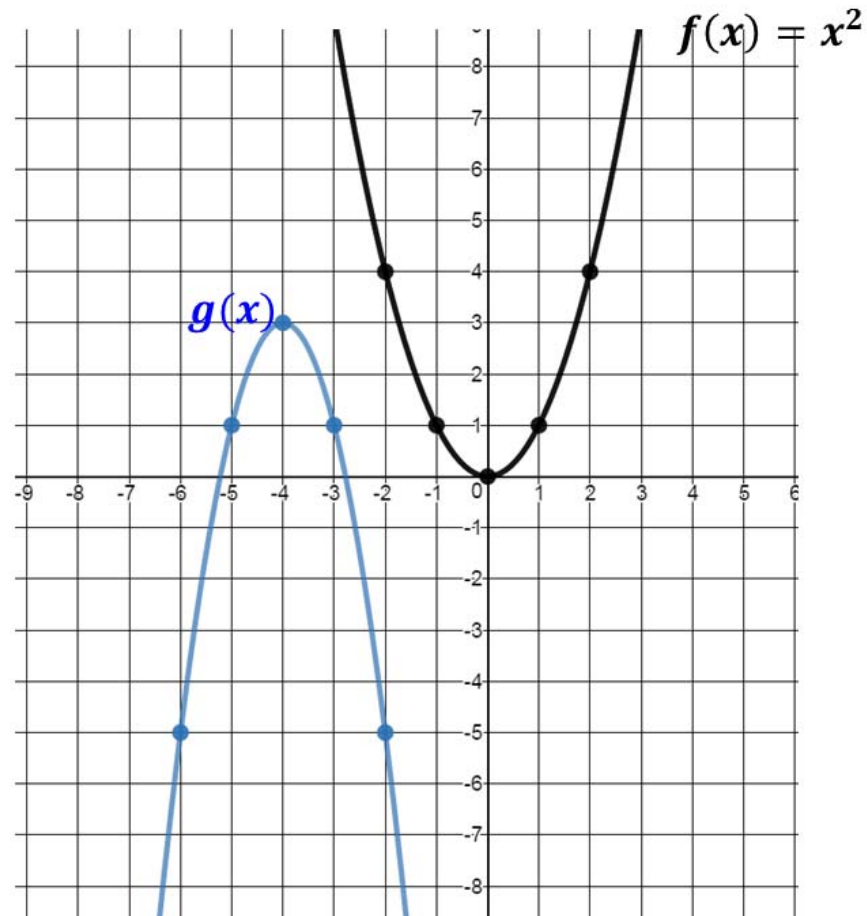
Standard Form
 $a = 2, b = 0, c = -8$

Objective: Graph a quadratic function using transformations

Practice) A) Graph each quadratic function using transformations. B) State the vertex and whether it's a maximum or minimum. C) State the zeros or the interval in which a zero is located.

$$g(x) = -2(x + 4)^2 + 3$$

- B) Vertex $(-4, 3)$; maximum
 C) The zeros are in the intervals $[-6, -5]$ and $[-3, -2]$



Objective: Graph Quadratic Functions From Standard Form Using Transformations

Practice) A) Graph each quadratic function using transformations. B) State the vertex and whether it's a maximum or minimum. C) State the zeros or the interval in which a zero is located.

$$b(x) = -x^2 + 6x - 8$$

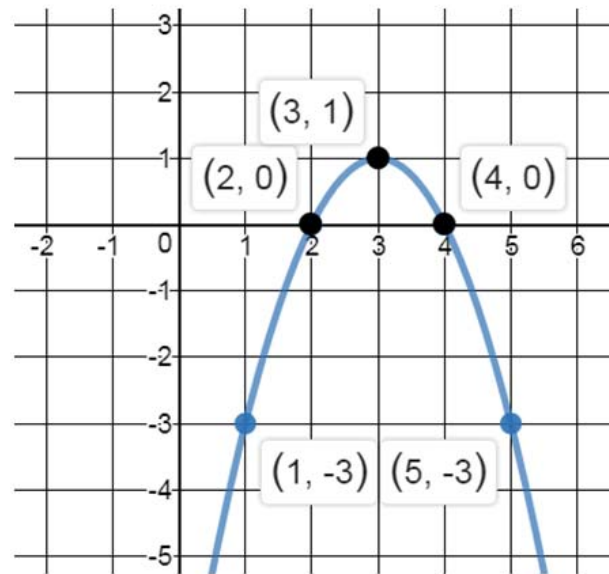
$$1. x = \frac{-b}{2a} = \frac{-1(6)}{2(-1)} = \frac{-6}{-2} = 3$$

$$y = -1(3)^2 + 6(3) - 8$$
$$= -9 + 18 - 8$$

$$y = 1$$

B) vertex (3,1), maximum

C) zeros $x = 2$ and $x = 4$.



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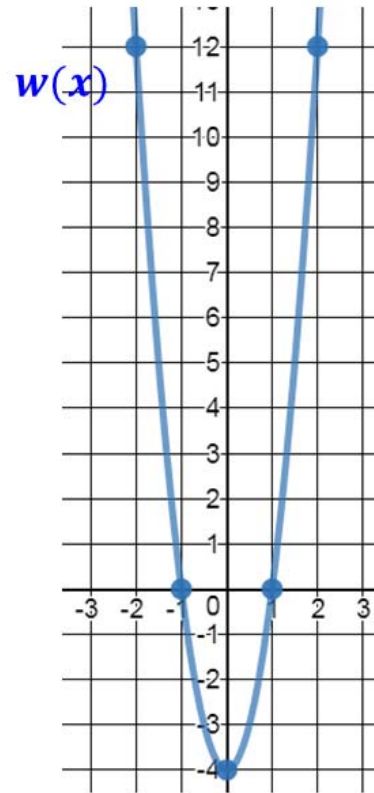
Practice) A) Graph each quadratic function using transformations. B) State the vertex and whether it's a maximum or minimum. C) State the zeros or the interval in which a zero is located.

$$w(x) = 4x^2 - 4$$

B) Vertex

$(0, -4)$; minimum

C) The zeros are $x = -1$
and $x = 1$.



Objective: Graph Quadratic Functions From Standard Form Using Transformations

Practice) A) Graph each quadratic function using transformations. B) State the vertex and whether it's a maximum or minimum. C) State the zeros or the interval in which a zero is located.

$$q(x) = \frac{1}{2}x^2 - 2x - 1$$

$$1. x = \frac{-1b}{2a} = \frac{-1(-2)}{2\left(\frac{1}{2}\right)} = 2$$

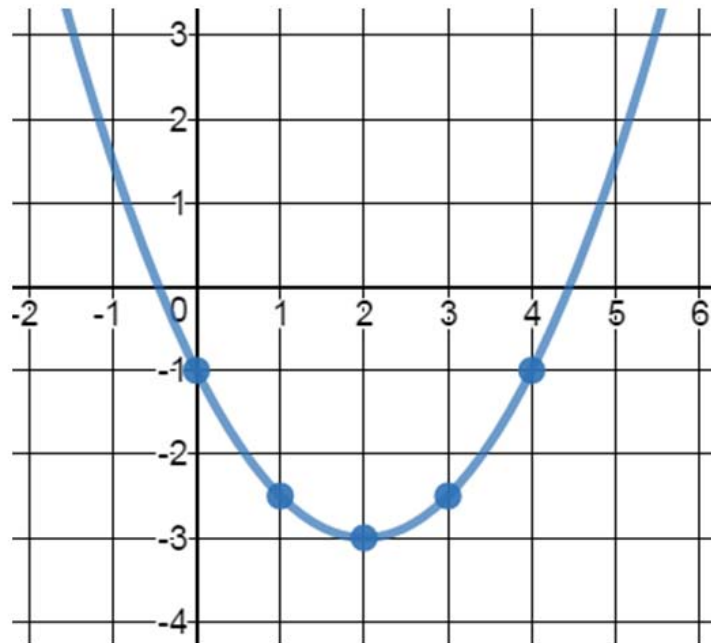
$$y = \frac{1}{2}(2)^2 - 2(2) - 1$$

$$= 2 - 4 - 1$$

$$y = -3$$

B) vertex $(2, -3)$, minimum

C) The zeros are in the intervals $[-1, 0]$ and $[4, 5]$.



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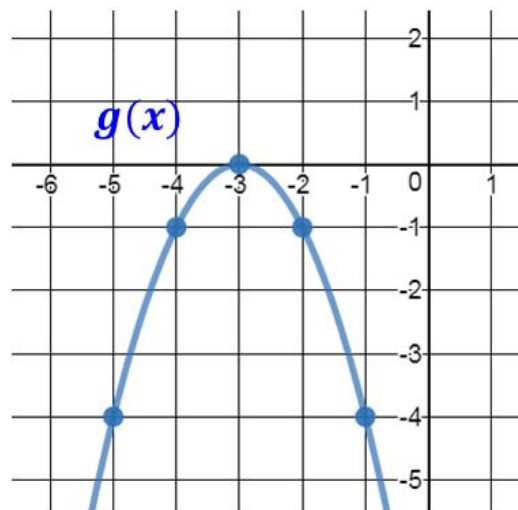
Practice) A) Graph each quadratic function using transformations. B) State the vertex and whether it's a maximum or minimum. C) State the zeros or the interval in which a zero is located.

$$g(x) = -(x + 3)^2$$

B) Vertex

$(-3, 0)$; maximum

C) The zeros is $x = -3$.



Objective: Graph Quadratic Functions From Standard Form Using Transformations

Practice) A) Graph each quadratic function using transformations. B) State the vertex and whether it's a maximum or minimum. C) State the zeros or the interval in which a zero is located.

$$n(x) = 2x^2 - 8x + 7$$

$$1. x = \frac{-b}{2a} = \frac{-1(-8)}{2(2)} = \frac{8}{4} = 2$$

$$y = 2(2)^2 - 8(2) + 7$$

$$= 8 - 16 + 7$$

$$y = -1$$

B) vertex $(2, -1)$, minimum

C) The zeros are in the intervals $[1, 2]$ and $[2, 3]$.

