More on Quadratic Functions

Graphs and Vertex Form

Use technology to make a table of values and graph the function *F* defined by

$$F(x) = 3x^2 - 6x - 10$$

Use technology to find the following if $K(x) = -\frac{1}{3}x^2 - 1.2x + 5.4$

a) The vertex is _____
b) The y-intercept is _____
c) The x-intercepts are _____
d) The domain of K is _____
e) The range of K is _____
f) Calculate K(-4). _____
g) Solve K(x)=2. The solution set is _____
h) Solve K(x)>2. The solution set is _____
i) Solve K(x)≤2. The solution set is_____

An object was launched from the top of a hill with an initial velocity of 160 ft/sec. The height of the object, h(t) (in feet) can be modeled by

$$h(t) = -16t^2 + 160t + 384$$

where *t* represents the number of seconds after the launch. Assume the object landed on the ground at sea level. Use technology to graph this function and answer the following.

a) What was the maximum height of the object? When did this occur?

a) What was the initial height of the object?

b) When did the object reach the ground?

Use technology to graph each of the following functions.

$$f(x) = -x^2 + 10x - 21$$

$$g(x) = -(x-3)(x-7)$$

$$h(x) = -(x-5)^2 + 4$$

What do you notice about these graphs?

What can we immediately determine from the function *f*?

What can we immediately determine from the function *g*?

What can we immediately determine from the function *h*?

Forms of Quadratic Functions

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

Factored form: $f(x) = a(x-m)(x-n)$ *with intercepts* (m,0) and (n,0)

Vertex form: $f(x) = a(x-h)^2 + k$ *with vertex* (h,k)

Given the following functions:

$$f(x) = -x^2 + 10x - 21$$

$$g(x) = -(x-3)(x-7)$$

$$h(x) = -(x-5)^2 + 4$$

Algebraically show that:

a) *h(x) = f(x)*

b) h(x)=g(x).

How do each of the following functions compare to $f(x)=x^2$?

$g(x)=(x-6)^2-4$ is shifted _____and _____

$h(x)=(x+2)^2+5$ is shifted _____and _____

Determine the vertex of the following functions.

$f(x) = -(x-3)^2 + 11$

Vertex: _____

$g(x) = \frac{1}{3}(x+2)^2 - 7$

Vertex: _____

Write the vertex form for the quadratic function whose vertex and leading coefficient *a*, are given.

a) $a = 2, (-4,7)$

b) $a = -2, (3, -5)$

Determine the domain and range of the following functions.

$f(x) = -(x-3)^2 + 11$

Domain: _____

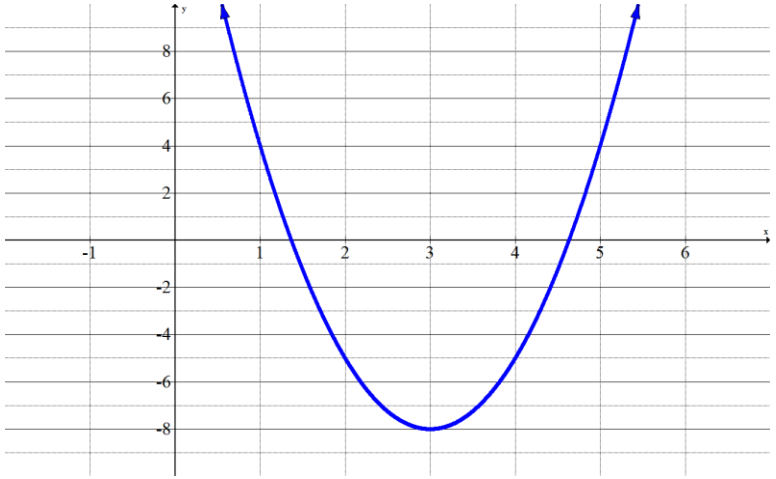
Range:_____

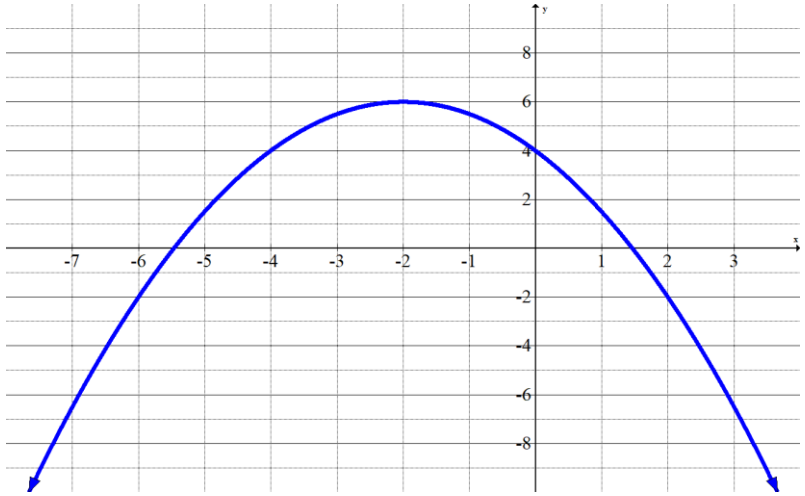
$g(x) = \frac{1}{3}(x+2)^2 - 7$

Domain: _____

Range:_____

Use the graph of the quadratic function to determine a possible formula in vertex form. You will need to identify the vertex and one more point on the graph to find the leading coefficient, *a*.





Vertex:_____

Value of *a*:_____

Formula:_____

Vertex:_____

Value of *a*:_____

Formula:_____

The formula for the quadratic function F is $F(x) = -4(x+1)(x-8)$

a) The vertical intercept (y-intercept) is _____.

b) The horizontal intercept/s is/are _____.