

Name _____ Date _____ Period _____

Graphing Quadratics Review

I know specific terminology such as: the forms of quadratics, X-Intercepts & Y-Intercepts & Vertex, Maxima/Minima, and limitations on domain, range

1. Identify the form of each quadratic and if it has a maximum or minimum.

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

vertex, minimum

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

standard, minimum

b) $f(x) = (x - 3)(x + 2)$

factored, minimum

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

vertex, minimum

c) $g(x) = 2(x - 3)(x - 7)$

factored, minimum

f) $f(x) = -3x^2 + 4x - 6$

standard, maximum

2. Label and list all the key features of the quadratic

Vertex: $(-1, 8)$

Axis of symmetry: $x = -1$

X-intercepts: $(-3, 0)$ $(1, 0)$

Y-intercept: $(0, 6)$

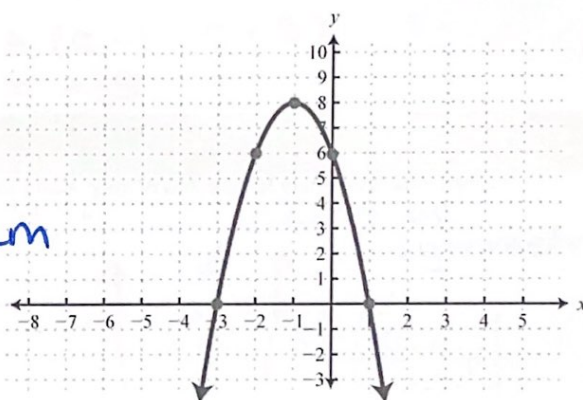
Does the graph have a max or min? maximum

Domain: All real numbers

Range: $y \leq 8$

Maximum or minimum _____

Maximum or minimum (point): $(-1, 8)$



I can find the y-intercept and x-intercept(s), find the vertex of a quadratic equation in any form, and determine if the vertex is a maxima or minima based on the equation.

3. Find the axis of symmetry, the vertex, the y-intercept, and how the graph opens

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

Axis of symmetry: $x = -2$

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

Vertex: $(-2, -1)$

y-intercept: $(0, 3)$

$x = -2$

Opens up or down: up

$$\begin{aligned} f(-2) &= (-2)^2 + 4(-2) + 3 \\ &= 4 - 8 + 3 \\ &= -4 + 3 = -1 \end{aligned}$$

4. Find the axis of symmetry, the vertex, the y-intercept, and how the graph opens

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

Axis of symmetry: $x = -2$

Vertex: $(-2, -5)$

y-intercept: $(0, 3)$

Opens up or down: up

Maximum or minimum minimum

$$(-2, -5)$$

$$\begin{aligned} f(0) &= 2(0+2)^2 - 5 \\ &= 2(2)^2 - 5 \\ &= 2(4) - 5 \\ &= 8 - 5 = 3 \end{aligned}$$

5. Find the x-intercepts, the axis of symmetry, the vertex, the y-intercept, and how the graph opens

$$f(x) = (x-3)(x+5)$$

x-intercepts: $(3, 0)$ $(-5, 0)$ $x = \frac{3+(-5)}{2} = \frac{-2}{2} = -1$

Axis of symmetry: $x = -1$

Vertex: $(-1, -16)$

y-intercept: $(0, -15)$

Opens up or down: up

Maximum or minimum minimum

$$\begin{aligned} f(-1) &= (-1-3)(-1+5) \\ &= (-4)(4) \\ &= (-16) \end{aligned}$$

$$\begin{aligned} f(0) &= (0-3)(0+5) \\ &= -15 \end{aligned}$$

I can graph a quadratic function and label key features.

6. Graph the quadratic and label the key features (x-intercepts, y-intercept, axis of symmetry, and vertex)

$$f(x) = 2x^2 + 4x - 6$$

- a. Axis of symmetry

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

- b. Vertex

$$\begin{aligned} f(-1) &= 2(-1)^2 + 4(-1) - 6 \\ &= 2(1) - 4 - 6 \\ &= 2 - 4 - 6 = -8 \quad (-1, -8) \end{aligned}$$

- c. Y-intercept

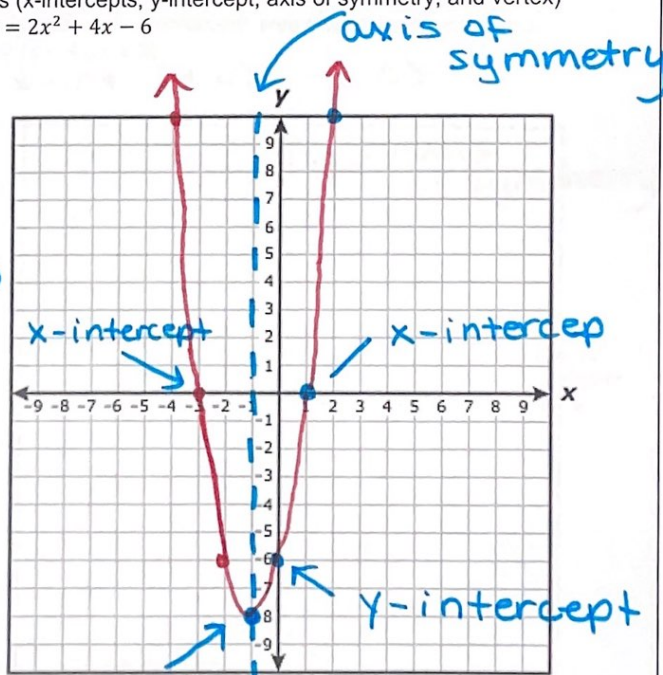
$(0, -6)$

- d. Calculate two more points.

$$\begin{aligned} 1. \quad f(1) &= 2(1)^2 + 4(1) - 6 \\ &= 2 + 4 - 6 \\ &= 0 \end{aligned}$$

$(1, 0)$

$$\begin{aligned} 2. \quad f(2) &= 2(2)^2 + 4(2) - 6 \\ &= 2(4) + 8 - 6 \\ &= 8 + 8 - 6 \\ &= 10 \quad (2, 10) \end{aligned}$$



D: All real numbers

R: $y \geq -8$

7. Graph the quadratic and label the key features (x-intercepts, y-intercept, axis of symmetry, and vertex)

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

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

e. Axis of symmetry

$$x = 1$$

f. Vertex (h, k) in vertex form
 $(1, 2)$

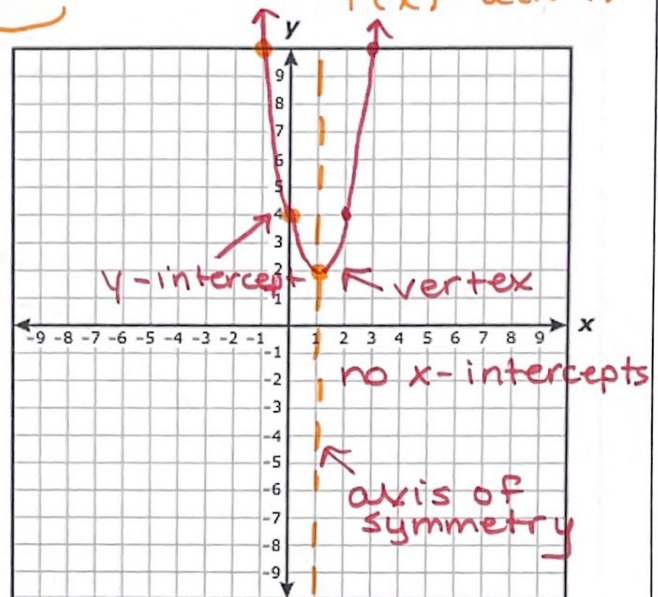
g. Y-intercept

$$\begin{aligned} f(0) &= 2(0 - 1)^2 + 2 \\ &= 2(1) + 2 \\ &= 2 + 2 = 4 \quad (0, 4) \end{aligned}$$

h. Calculate two more points.

$$\begin{aligned} 3. \quad f(-1) &= 2(-1 - 1)^2 + 2 \\ &= 2(-2)^2 + 2 \\ &= 2(4) + 2 \\ &= 10 \quad (-1, 10) \end{aligned}$$

$$\begin{aligned} 4. \quad f(-2) &= 2(-2 - 1)^2 + 2 \\ &= 2(-3)^2 + 2 \\ &= 2(9) + 2 = 20 \quad (-2, 20) \text{ off graph} \end{aligned}$$



D: All real numbers
R: $y \geq 2$

8. Graph the quadratic and label the key features (x-intercepts, y-intercept, axis of symmetry, and vertex)

$$f(x) = (x - 4)(x + 2)$$

$$\text{x-int. } (4, 0) \quad (-2, 0)$$

i. Axis of symmetry

$$x = \frac{4 + (-2)}{2} = \frac{2}{2} = 1$$

j. Vertex

$$\begin{aligned} f(1) &= (1 - 4)(1 + 2) \\ &= (-3)(3) \quad (1, -9) \\ &= -9 \end{aligned}$$

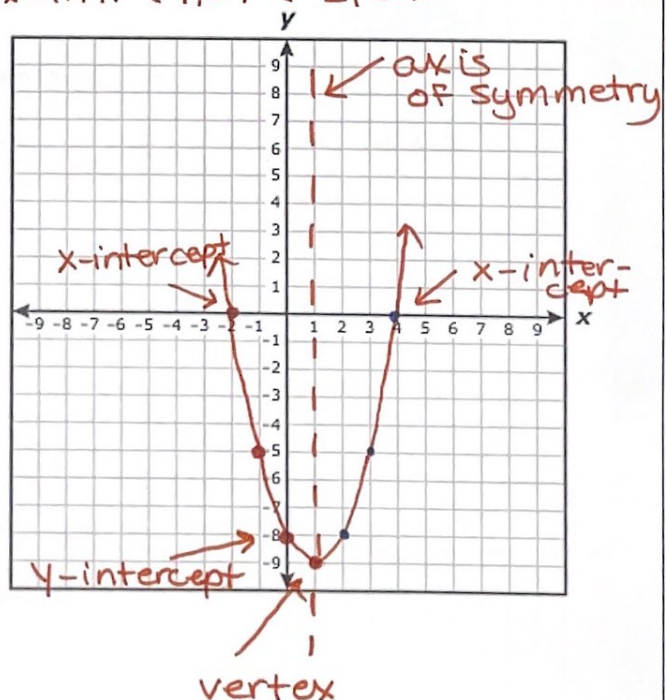
k. Y-intercept

$$\begin{aligned} f(0) &= (0 - 4)(0 + 2) \\ &= (-4)(2) \\ &= (-8) \quad (0, -8) \end{aligned}$$

l. Calculate two more points.

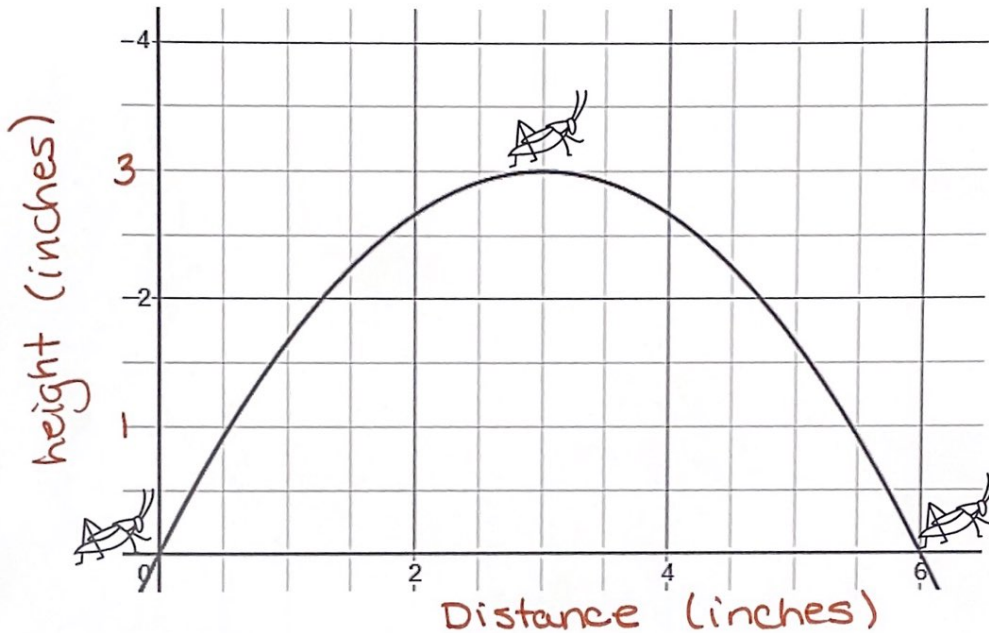
$$\begin{aligned} 5. \quad f(-1) &= (-1 - 4)(-1 + 2) \\ &= (-5)(1) \\ &= -5 \quad (-1, -5) \end{aligned}$$

$$\begin{aligned} 6. \quad f(-2) &= (-2 - 4)(-2 + 2) \\ &= (-6)(0) \\ &= 0 \end{aligned}$$



I can, given an equation or graph of a real-world quadratic, identify what the x-intercepts and vertex mean in that situation

A grasshopper jumps across the ground. X is the horizontal distance in inches and y is the vertical distance in inches. Its movement is shown by the graph below.



a) Identify the x-intercepts and the vertex. Label on the graph.

x-intercept $(0,0)$ $(6,0)$

b) What do the x-intercepts represent in this situation? Include units.

It represents where the grasshopper jumps off the ground and then where it lands.

c) What does the vertex represent in this situation? Include units.

This is the distance out from take off and maximum height. \rightarrow 3 inches from take off and 3 inches high.

d) What is the Domain and Range for this situation.

D: $0 \leq x \leq 6$

R: $0 \leq y \leq 3$

The grasshopper does not start or stop below ground.