Chapter 2
Quadratic Functions and Equations

Section 2.1
Vertex Form of a Quadratic Function

Vertex Form:

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

$a > 0$ opens up (minimum value)

$a < 0$ opens down (maximum value)

Vertex (h, k)

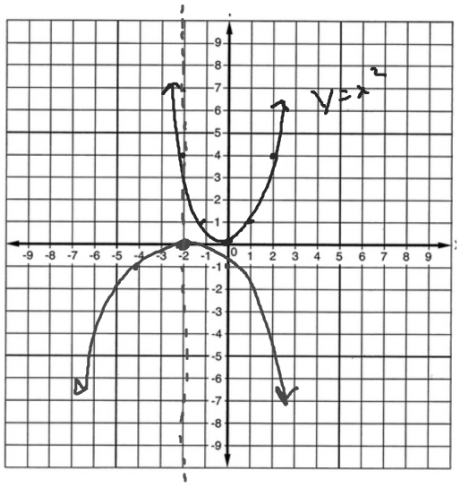
Describe the transformations of the parent function. Then graph the equation.

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

Reflect over x-axis

Left 2

Vertical compression by factor of $\frac{1}{2}$



a. Vertex $(-2, 0)$

b. Axis of Symmetry $x = -2$

c. (Maximum) or Minimum

d. Domain $(-\infty, \infty)$

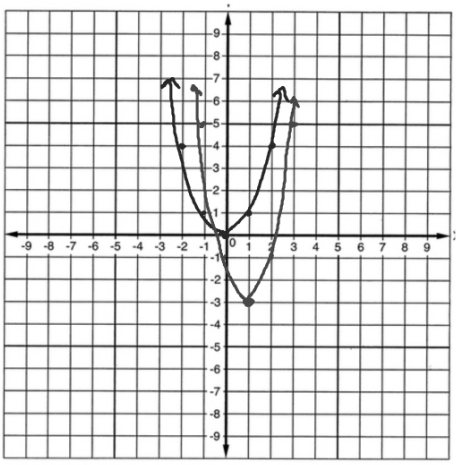
e. Range $(-\infty, 0]$

Describe the transformations of the parent function. Then graph the equation.

Vertical Stretch by Factor of 2

$y = 2(x-1)^2 - 3$ → Down 3

Right 1



a. Vertex (1, -3)

b. Axis of Symmetry $x = 1$

c. Maximum or Minimum

d. Domain $(-\infty, \infty)$

e. Range $[-3, \infty)$

Google Classroom

16, 20, 22, 24

What is the equation of a quadratic function with vertex (-2, 3) and a y-intercept -1

h k

(0, -1)
x y

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

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

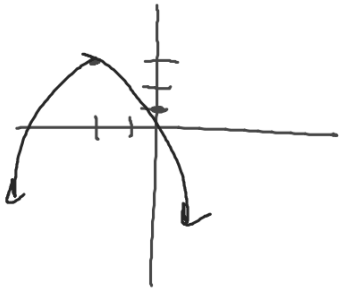
$-1 = a(0+2)^2 + 3$

$-1 = 4a + 3$

$-3 \quad -3$

$-4 = 4a$

$a = -1$



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

What is the equation of a quadratic function with vertex (-2, 3) and a passes through the point (-2, -1)

1, -4
h k

x y

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

$y = a(x-1)^2 - 4$

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

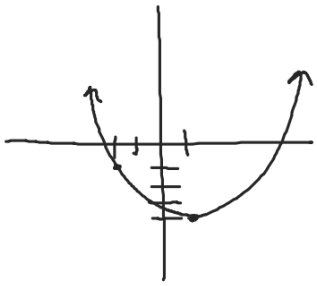
$-1 = a(-3)^2 - 4$

$-1 = 9a - 4$

$+4 \qquad +4$

$\frac{3}{9} = \frac{9a}{9}$

$a = \frac{1}{3}$



$y = \frac{1}{3}(x-1)^2 - 4$

26, 27, 28