

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

Writing Equations of Quadratics

I. Given a Vertex and a point

a. Vertex: (2, 3), y-intercept: (0, 5)

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

$$5 = a(0-2)^2 + 3$$

$$5 = 4a + 3$$

$$-3 \quad -3$$

$$\rightarrow a = \frac{1}{2}$$

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

b. Vertex: (-2, -3), x-intercept (5, 0)

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

$$0 = a(5+2)^2 - 3$$

$$0 = 49a - 3$$

$$+3 \quad +3$$

$$3 = 49a$$

$$a = \frac{3}{49}$$

$$y = \frac{3}{49}(x+2)^2 - 3$$

II. Given a Vertex and "a" coefficient

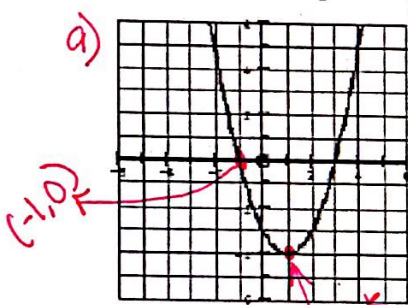
a. Vertex: (-4, 7), $a = -\frac{1}{2}$

$$y = -\frac{1}{2}(x+4)^2 + 7$$

b. Vertex: (5, -3), $a = 3$

$$y = 3(x-5)^2 - 3$$

III. From a Graph



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

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

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

$$0 = 4a - 4$$

$$+4 \quad +4$$

$$4 = 4a$$

$$a = 1$$

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



vertex: (3, -4)
pt: (1, 0)

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

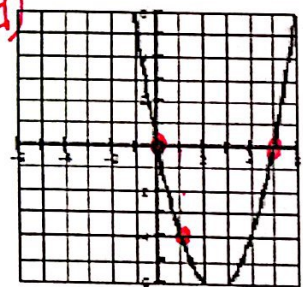
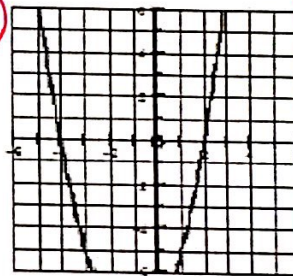
$$0 = a(1-3)^2 - 4$$

$$0 = 4a - 4$$

$$4 = 4a$$

$$a = 1$$

$$y = (x-3)^2 - 4$$



x	y
0	0
5	0
1	-4

$$y = x^2 - 5x$$

IV. Three Points

a. (-2, 101), (4, 5), (7, 11)

x	y
-2	101
4	5
7	11

$$y = 2x^2 - 20x + 53$$

↑ Quad Reg.

b. x-intercepts: (-3, 0), (5, 0)
y-intercept: (0, -30)