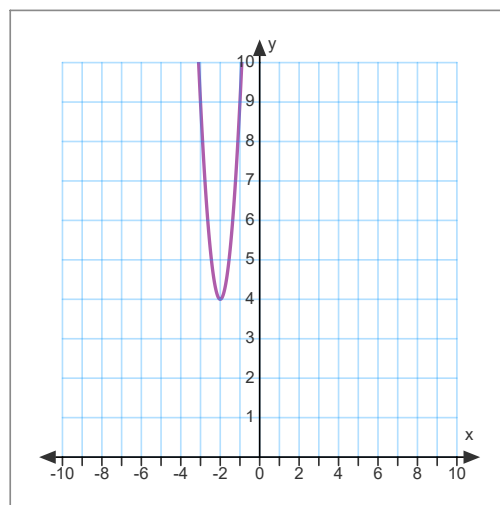
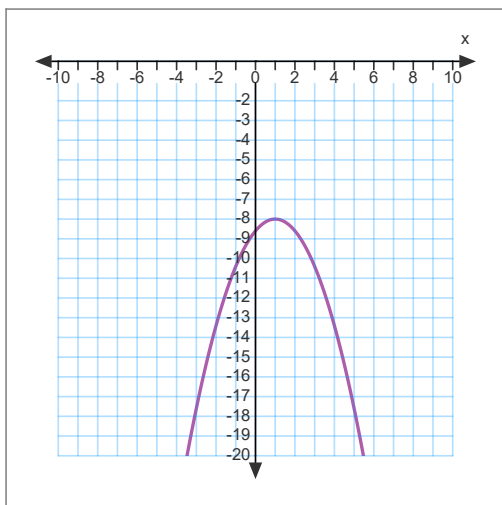


Example: Using the parameters, describe the graph of each quadratic function.

a) $f(x) = -\frac{3}{5}(x-1)^2 - 8$

b) $f(x) = 5(x+2)^2 + 4$

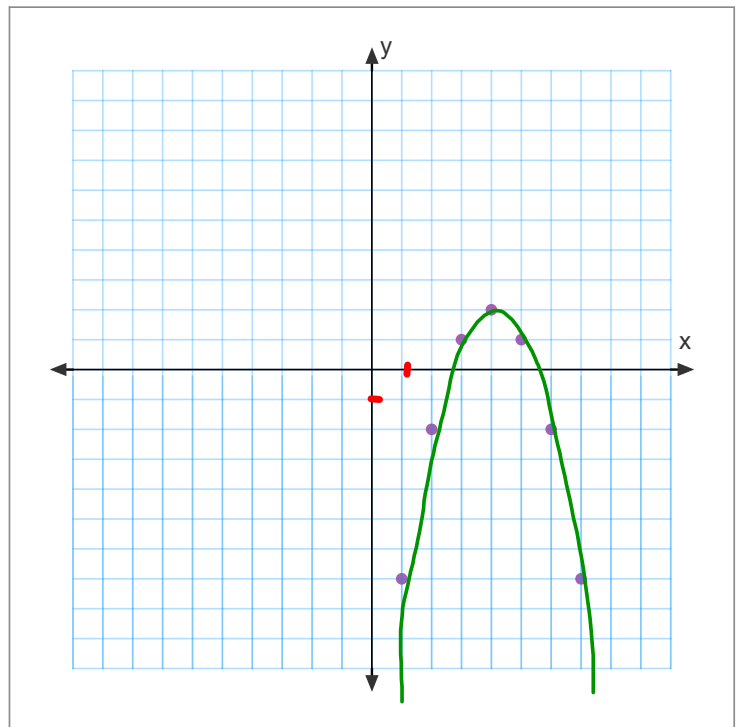


Graphing a Second-Degree Function

Example: $y = -(x-4)^2 + 2$ $h=4$ $k=2$

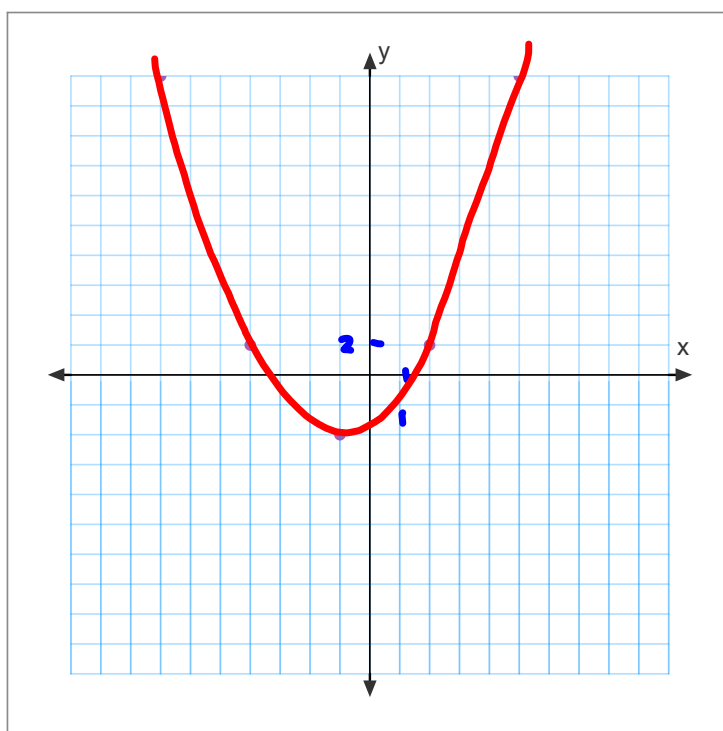
vertex

x	y
1	-7
2	-4
3	-1
4	2
5	1
6	-2



Example: Graph the function $f(x) = \frac{2}{3}(x+1)^2 - 4$.

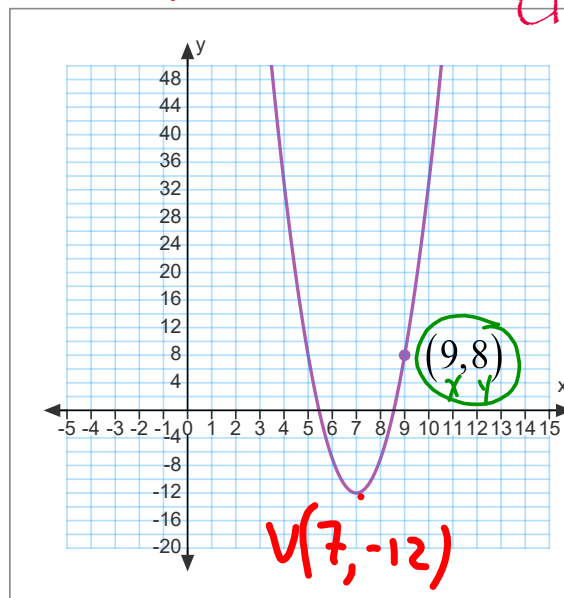
x	y
-10	50
-7	20
-4	2
-1	-4
2	2
5	20
8	50



Finding the Rule of a Second-degree Function

- Given the vertex and a point
 (h, k)

Example:



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

① Determine vertex
 $v(7, -12) \Rightarrow (h, k)$
 $\Rightarrow f(x) = a(x-7)^2 - 12$

② Replace x & y with
 values from the point
 - solve for a

$$8 = a(9-7)^2 - 12$$

$$8 = a(2)^2 - 12$$

$$8 = 4a - 12$$

$$5 = a \quad 20 = 4a$$

$$f(x) = 5(x-7)^2 - 12$$

Example: What is the equation of the second-degree function whose vertex is $(11, 24)$ and passes through the point $(6, 42)$?

(Handwritten annotations: blue wavy lines under $(11, 24)$ and $(6, 42)$; red 'x' and 'y' under the coordinates; green arrow pointing to $h=11$ and $k=24$)

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

$$f(x) = a(x-11)^2 + 24$$

$$42 = a(6-11)^2 + 24$$

$$42 = a(-5)^2 + 24$$

$$42 = 25a + 24$$

$$18 = 25a \quad \longrightarrow \quad a = \frac{18}{25} = 0.72$$

$$f(x) = \frac{18}{25}(x-11)^2 + 24 \quad \text{or} \quad f(x) = 0.72(x-11)^2 + 24$$

Example: What is the equation of the second-degree function whose vertex is $V(-10, -2)$ and whose y-intercept is -12?



The given point is $P(0, -12)$.

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

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

$$-12 = a(0+10)^2 - 2$$

$$-12 = a(10)^2 - 2$$

$$-12 = 100a - 2$$

$$-10 = 100a$$

$$\frac{-10}{100} = \frac{1}{10} = -0.1 = a$$

$$f(x) = -\frac{1}{10}(x+10)^2 - 2$$