

Objectives: Our goal is to learn how to graph a quadratic equation in any form.

Three different forms of a quadratic function: *x-intercepts*

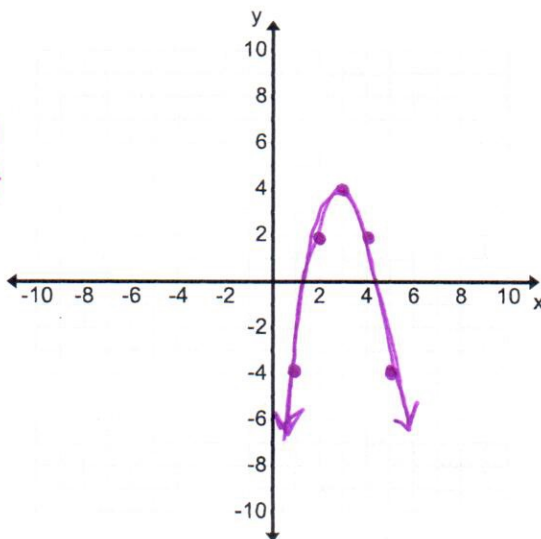
Vertex Form: <i>vertex (h, k)</i> $f(x) = a(x - h)^2 + k$ <i>complete the square</i>	Intercept Form: <i>(p, 0) (q, 0)</i> $f(x) = a(x - p)(x - q)$ <i>factor</i>	Standard Form: $f(x) = ax^2 + bx + c$
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Example 1: Graph the following quadratic function given in vertex form.

a(x-h)²+k
 $y = -2(x - 3)^2 + 4$

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

-2(1-3)²+4
-2(2-3)²+4



Identify Critical Information:

Vertex (Max/Min):

Max @ (3, 4)

Axis of Symmetry:

x = 3

Y-Int:

(0, -14)

X-Int:

(3+√2, 0)
(3-√2, 0)

Domain:

(-∞, ∞)

Range:

(-∞, 4]

Identify Critical Information:

Vertex (Max/Min):

Max @ (1, 9)

Axis of Symmetry:

x = 1

Y-Int:

(0, 8)

X-Int:

(-2, 0)(4, 0)

Domain:

(-∞, ∞)

Range:

(-∞, 9]

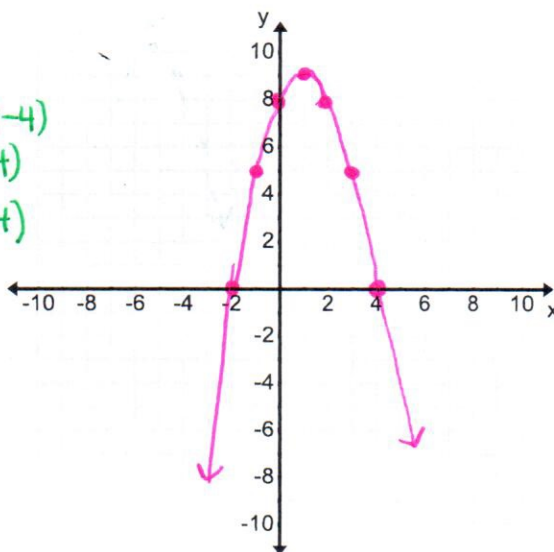
Example 2: Graph the following quadratic function given in intercept form.

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

y-int

x	y
-1	5
0	8
1	9
2	8
3	5

-(-1+2)(-1-4)
-(0+2)(0-4)
-(1+2)(1-4)



vertex
 $h = \frac{-2+4}{2} = 1$

Example 3: Graph the following quadratic function given in standard form.

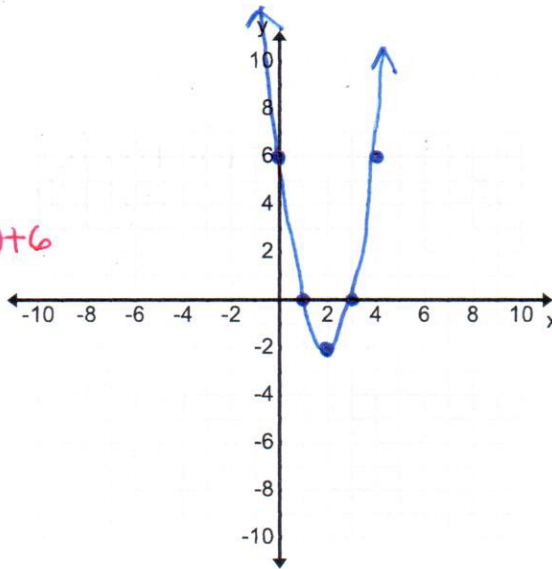
$$y = 2x^2 - 8x + 6$$

	x	y
y-int	0	6
x-int	1	0
x-int	2	-2
x-int	3	0
	4	6

$$2(2)^2 - 8(2) + 6$$

Vertex: (h, k)

$$h = \frac{-b}{2a} = \frac{+8}{2(2)} = 2$$



Identify Critical Information:

Vertex (Max/Min):

$$\text{MIN @ } (2, -2)$$

Axis of Symmetry:

$$x = 2$$

Y-Int: $(0, 6)$

X-Int:

$$(1, 0) \quad (3, 0)$$

Domain:

$$(-\infty, \infty)$$

Range:

$$[-2, \infty)$$

Identify Critical Information:

Vertex (Max/Min):

$$\text{MAX @ } (1, -2)$$

Axis of Symmetry:

$$x = 1$$

Y-Int:

$$(0, -3)$$

X-Int:

NONE

Domain:

$$(-\infty, \infty)$$

Range:

$$(-\infty, -2]$$

Example 4: Graph the following quadratic function given in standard form.

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

x	y
-1	-6
0	-3
1	-2
2	-3
3	-6

