

$$y = x^2$$

$$y = ax^2 + bx + c$$

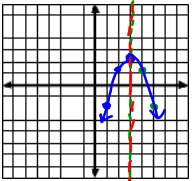
Standard Form

$y - k = \pm a(x - h)^2$ or $x - h = \pm a(y - k)^2$
 + opens up vertex (h,k) + opens right vertex (h,k)
 - opens down - opens left

Accurately graph the parabola. State the vertex, domain, range, axis of symmetry, "a" value, and direction.

1. $y = -(x-3)^2 + 2$ 5 points

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



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

a) the vertex (3, 2) b) the axis of symmetry $x = 3$

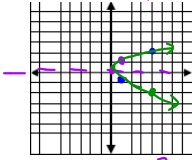
c) Domain all real #s \mathbb{R} d) Range $y \leq 2$

e) "a" value $a = 1$ f) direction of opening opens down

$y = -(2-3)^2 + 2$
 $= -(-1)^2 + 2$
 $= -1 + 2 = 1$
 $y = -(1-3)^2 + 2 = -2$

2. $x = y^2$

$x - 0 = (y - 0)^2$



x	y
0	0
1	1
1	-1
4	2
4	-2

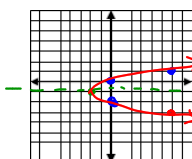
a) the vertex (0, 0) b) the axis of symmetry $y = 0$

c) Domain $x \geq 0$ d) Range \mathbb{R}

e) "a" value $a = 1$ f) direction of opening right

$x = y^2$
 $y = 1$
 $x = 1^2 = 1$
 $x = 2^2 = 4$

3. $x + 2 = 2(y + 1)^2$



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

a) the vertex (-2, -1) b) the axis of symmetry $y = -1$

c) Domain $x \geq -2$ d) Range \mathbb{R}

e) "a" value $a = 2$ f) direction of opening right

$x = 2(y + 1)^2 - 2$
 $x = 2(0 + 1)^2 - 2 = 0$
 $x = 2(1 + 1)^2 - 2 = 6$

Not everything is in standard form, so you must complete the square to put it into standard form.

4. $x^2 - 6x - y + 5 = 0$

$$x^2 - 6x + 9 = y - 5 + 9$$

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

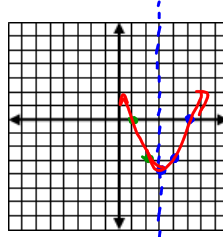
$$y + 4 = (x-3)^2$$

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

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

$$y = (5-3)^2 - 4 = 0$$

x	y
3	-4
4	-3
2	-3
5	0



a) the vertex (3, -4)

b) the axis of symmetry

$$x = 3$$

c) Domain \mathbb{R}

d) Range

$$y \geq -4$$

e) "a" value

$$a = 1$$

f) direction of opening

up

Complete the Square

5. $y^2 - 8y + x + 10 = 0$

$$y^2 - 8y + 16 = -x - 10 + 16$$

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

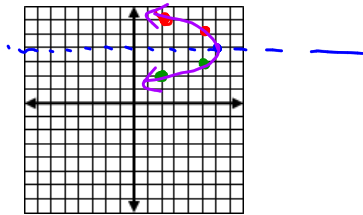
$$-x + 6 = (y-4)^2$$

$$x - 6 = -(y-4)^2$$

Need
x
not
-x

standard form
 $x = -(y-4)^2 + 6$
 $x = -(5-4)^2 + 6 = 5$
 $x = -(6-4)^2 + 6 = 2$

x	y
6	4
5	5
5	3
2	6
2	2



a) the vertex (6, 4)

b) the axis of symmetry

$$y = 4$$

c) Domain $x \leq 6$

d) Range

$$\mathbb{R}$$

e) "a" value

$$a = 1$$

f) direction of opening

left

6. $2x^2 - 8x - y + 10 = 0$

$+y - 10 + y - 10$

$2x^2 - 8x = y - 10$

$2(x^2 - 4x + 4) = y - 10 + 2(4)$

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

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

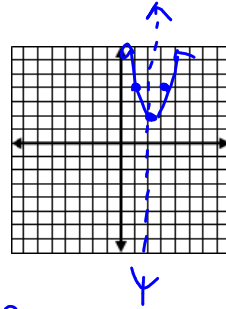
standard form

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

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

$y = 2(4-2)^2 + 2 = 10$

x	y
2	2
3	4
4	10
2	4
0	10



a) the vertex (2, 2)

b) the axis of symmetry

$x = 2$

c) Domain \mathbb{R}

d) Range

$y \geq 2$

e) "a" value

$a = 2$

f) direction of opening

up