Graphing Quadratics

Vertex Form

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

|a|>1 -> stretch

0<|a|<1 -> compress

a<0 -flipped

Left if (x+h)

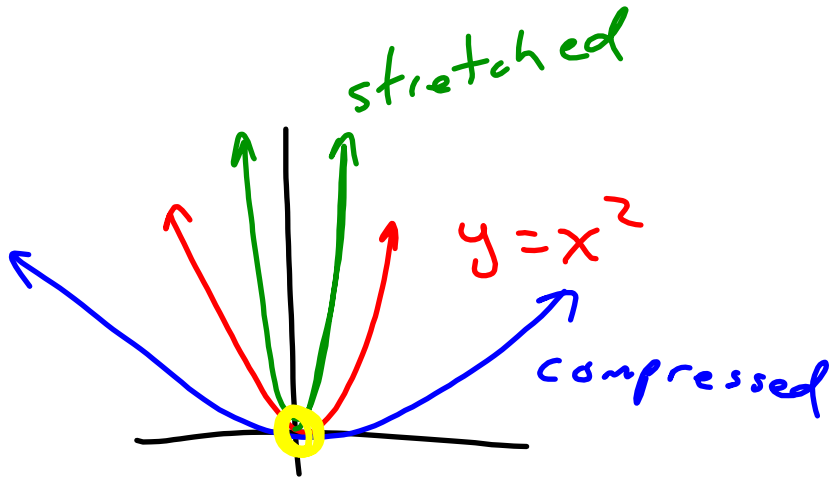
Right if (x-h)

up if +k

down if -k

Vertex = (h , k)

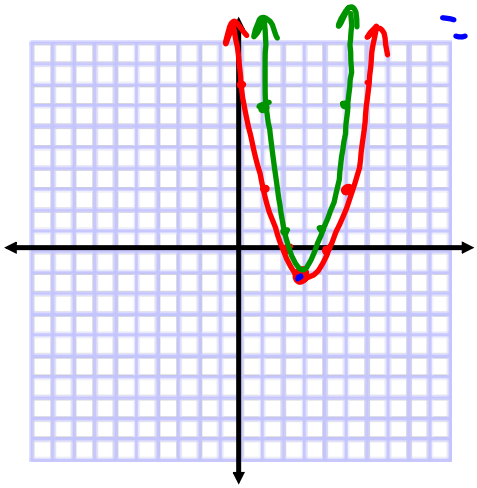
If a quadratic equation is in vertex form we can graph it by starting at the vertex and making a stretch or compression on $y = x^2$.


stretched
$y = x^2$
compressed

Graph the following parabolas

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

Vertex $= (3, -1)$



Steps

1. Place a point on the vertex

2. From that point, stretch or compress the parabola.

over up

x	y
-3	9
-2	4
-1	1
Vertex 0	0
1	1
2	4
3	9

x2

-3	18
-2	8
-1	2
0	0
1	2
2	8
3	18

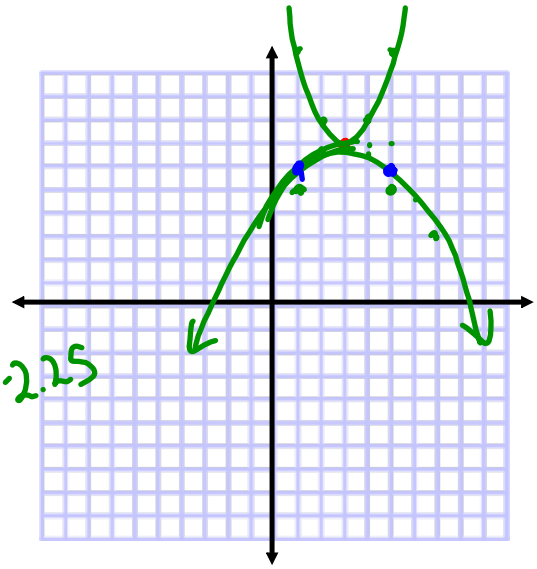
$y = -\frac{1}{4}(x - 3)^2 + 7$

Vertex = (3, 7)

over	up
4	16
3	9
2	4
1	1
0	0

$\times -\frac{1}{4}$

4	-4
3	$-\frac{9}{4} = -2.25$
2	-1



Graphing Quadratics

Factored Form

$$y = a(x - s)(x - t)$$

x-interecepts =

If a quadratic equation is in factored form we can graph it by placing points at the x-intercepts. Then finding the vertex.

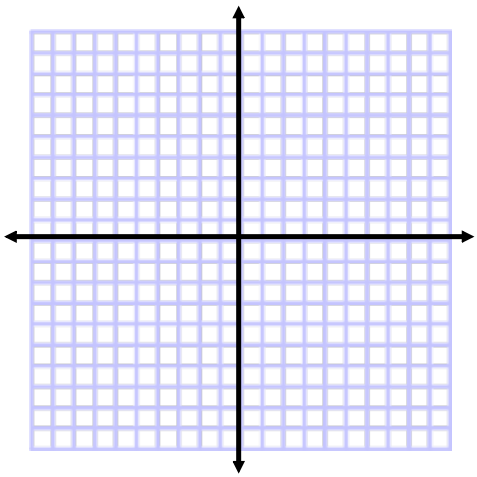
To find the vertex in factored form:

We know that parabolas are symmetrical. So the x coordinate of the vertex must be at the midpoint of the two x-intercepts.

If we substitute this value into the equation we will determine the y coordinate

Graph the following parabolas

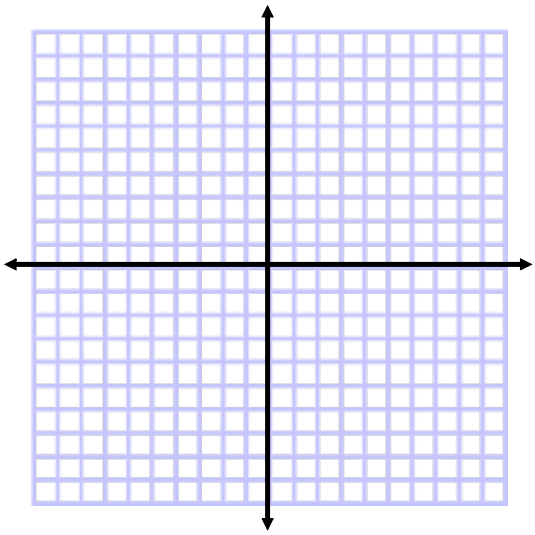
$y = (x - 1)(x + 5)$



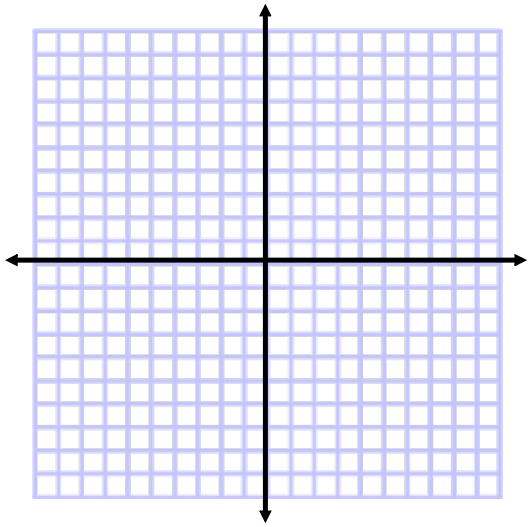
Steps

1. Place points at the x-intercepts
2. Determine the vertex
3. Connect the dots

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



$y = 0.1(x - 6)(x + 4)$



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