The Great Quadratic - Graphing Quadratic Equations

The graph of a quadratic equation is called a parabola.

A parabola has a maximum or minimum point called a vertex.

There are three forms of a quadratic equation:

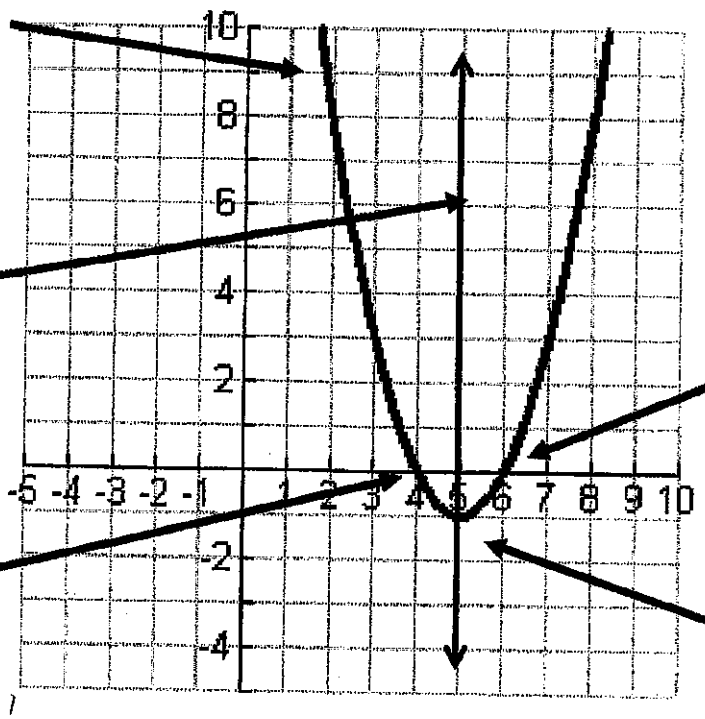
I. Intercept Form $y = a(x-p)(x-q)$

II. Vertex Form $y = a(x-h)^2 + k$

III. Standard Form $y = ax^2 + bx + c$

The equation $x = \frac{-b}{2a}$ gives the equation of the axis of symmetry

This is a vertical line.



parabola

axis of sym. (AOS)

X-int

X-intercept

root, zeroes, solutions

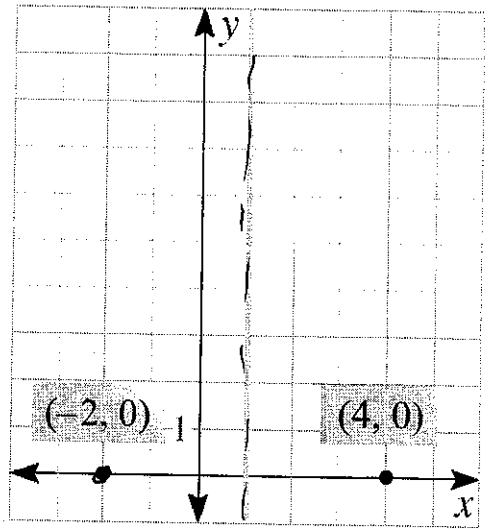
vertex

EXAMPLE **Graphing a Quadratic Function in Intercept Form**

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

p q

The x-intercepts occur at $(-2, 0)$ and $(4, 0)$



The axis of symmetry lies half-way between these points, at $x = 1$.

$$\frac{p+q}{2} = \frac{-2+4}{2} = \frac{2}{2} = 1$$

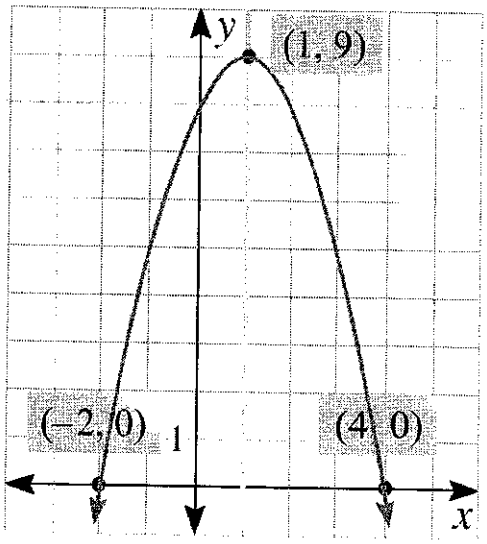
EXAMPLE **Graphing a Quadratic Function in Intercept Form**

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

So, the x-coordinate of the vertex is $x = 1$ and the y-coordinate of the vertex is:

$$y = -(1+2)(1-4) = 9$$

plug in



Name: Date: Period:

Practice Worksheet: Graphing Quadratic Functions in Intercept Form $f(x)=a(x-p)(x-q)$

For #1-6, label the x-intercepts, axis of symmetry, vertex, y-int., and at least one more point on the graph.

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

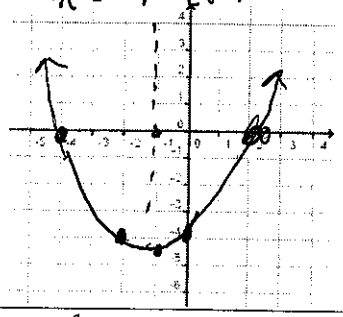
x-intercepts: (-4 , 0) (2 , 0)

Axis of Symmetry is x= $\frac{-4+2}{2}=-1$

Vertex: (-1 , $-\frac{9}{2}$) $\frac{1}{2}(-1+4)(-1-2)$ $\frac{1}{2}(3)(-3)$

y-intercept: (0, -4) $\frac{1}{2}(0+4)(0-2)$

$\frac{1}{2}(-2+4)(-2-2)=\frac{1}{2}(2)(-4)=-4$



2] $y=-\frac{1}{2}x(x-8)$

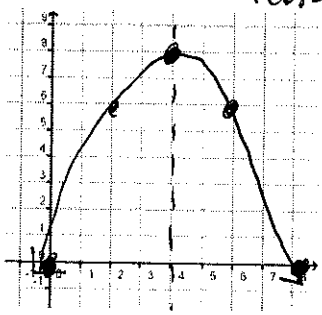
x-intercepts: (0 , 0) (8 , 0)

Axis of Symmetry is x= $\frac{0+8}{2}=4$

Vertex: (4 , 8) $-\frac{1}{2}(4)(4-8)$

y-intercept: (0, 0) $-\frac{1}{2}(0)(0-8)=0$

$-\frac{1}{2}(8)(8-8)=$ $f(2)=6$ $f(6)=6$



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

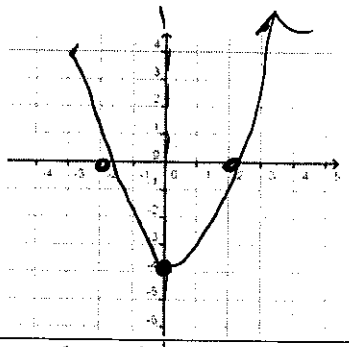
x-intercepts: (-2 , 0) (2 , 0)

Axis of Symmetry is x= $\frac{-2+2}{2}=\frac{0}{2}=0$

Vertex: (0 , -4) $y=(0+2)(0-2)=-4$

y-intercept: (0, -4)

(3, 5) (-3, 5)



4] $y=-\frac{1}{3}(x+1)(x-5)$

x-intercepts: (-1 , 0) (5 , 0)

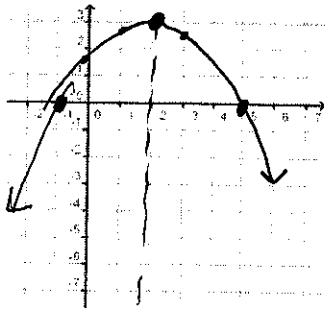
Axis of Symmetry is x= 2 $\frac{-1+5}{2}=$

Vertex: (2 , 3)

$-\frac{1}{3}(2+1)(2-5)=$

y-intercept: (0, 5)

$-\frac{1}{3}(0+1)(0-5)=-\frac{1}{3}(1)(-5)$



5] $y=4(x+2)(x+1)$

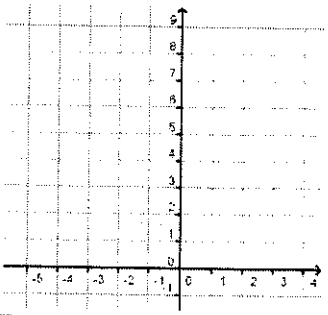
x-intercepts: (-2 , 0) (-1 , 0)

Axis of Symmetry is x= $\frac{-3}{2}$ $\frac{-2+-1}{2}=\frac{-3}{2}$

Vertex: (,)

$4(-\frac{3}{2}+2)(-\frac{3}{2}+1)=$ solve from here

y-intercept: (0,)



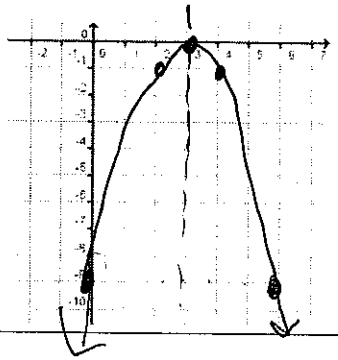
6] $y=-(x-3)(x-3)$

x-intercepts: (3 , 0) (3 , 0)

Axis of Symmetry is x= 3

Vertex: (3 , 0) $-(3-3)(3-3)$

y-intercept: (0, -9) $-(0-3)(0-3)$ $-(4-3)(4-3)$



$f(3)=-\frac{1}{3}(3+1)(3-5)=\frac{8}{3}$