

5.5 Graphing from Intercept Form

What information do you need in order to graph a quadratic function? Vertex & a-value

INTERCEPT FORM:

$$y = a(x-p)(x-q)$$

p & q are x -intercepts

* The x -intercepts of any graph are the solutions of the equation.

Let's practice graphing a parabola from intercept form:

How to find the Vertex in Intercept Form:

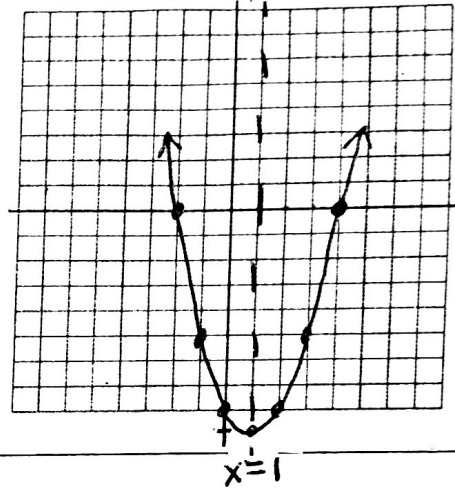
1) Find $\frac{1}{2}$ pbt x -intercepts ex: $(4,0), (-2,0)$
 • x -int are solutions; take opposite of what is in the factor

2) Find axis of symmetry ex: $x=1$
 • halfway between x -intercepts

3) Plug AoS into equation to get y -value of vertex
 ex: $x=1$ Vertex: $(1, -9)$
 $y = (1-4)(1+2) = (-3)(3) = -9$

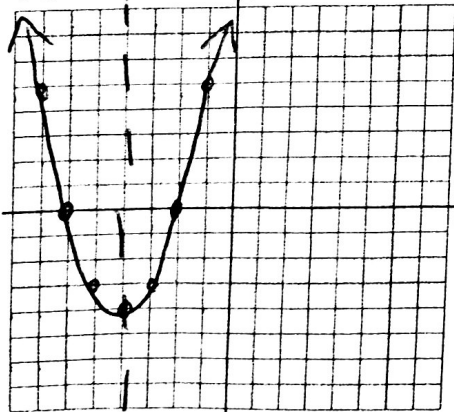
Graph $y = (x-4)(x+2)$

$x=4$ $x=-2$



Example 1: Graph the following quadratic equations

a) $y = (x+2)(x+6)$

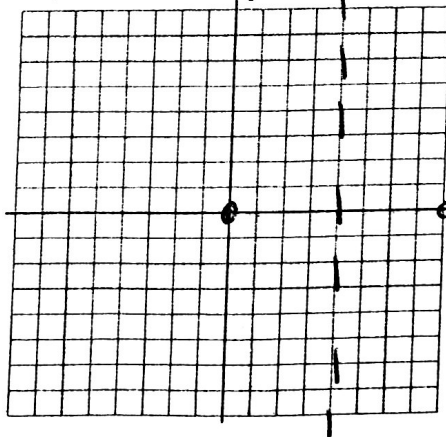


$x = -4$

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

Vertex $(-4, -4)$

b) $y = x(x-8)$

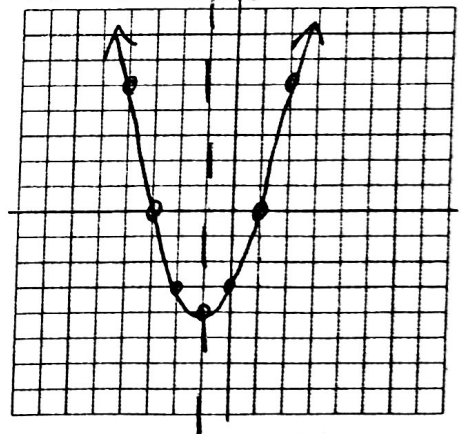


$x = 4$

$$y = 4(4-8) = -16$$

Vertex $(4, -16)$

c) $y = (x-1)(x+3)$



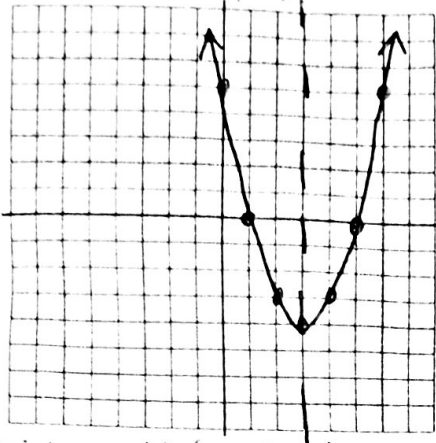
$x = -1$

$$y = (-1-1)(-1+3) = -4$$

Vertex $(-1, -4)$

Example 2: Graph the following quadratic equations

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



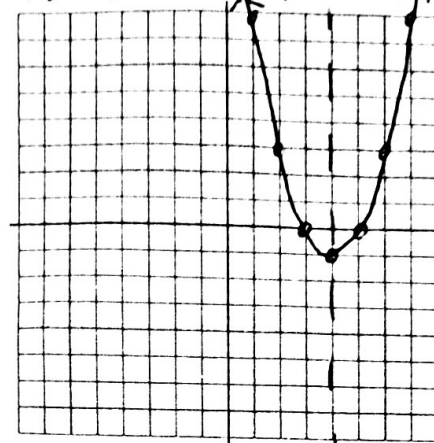
x-intercept(s): $(5, 0), (1, 0)$

y-intercept: $(0, 5)$

Axis of Symmetry: $x = 3$

Vertex: $(3, -4)$

b) $y = (x - 3)(x - 5)$



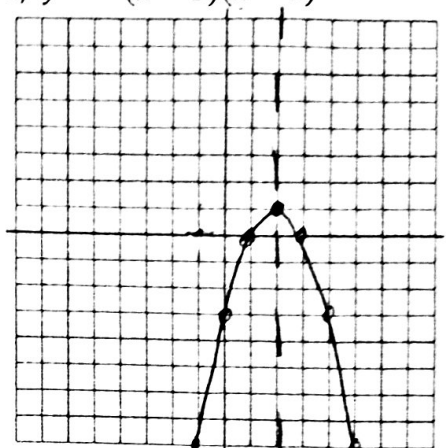
x-intercept(s): $(3, 0), (5, 0)$

y-intercept: $(0, 15)$

Axis of Symmetry: $x = 4$

Vertex: $(4, -1)$

c) $y = -(x - 3)(x - 1)$



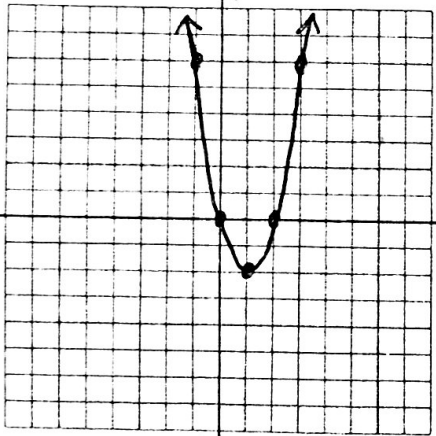
x-intercept(s): $(3, 0), (1, 0)$

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

Axis of Symmetry: $x = 2$

Vertex: $(2, 1)$

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



x-intercept(s): $(0, 0), (2, 0)$

y-intercept: $(0, 0)$

Axis of Symmetry: $x = 1$

Vertex: $(1, -2)$

Max/min value: -2

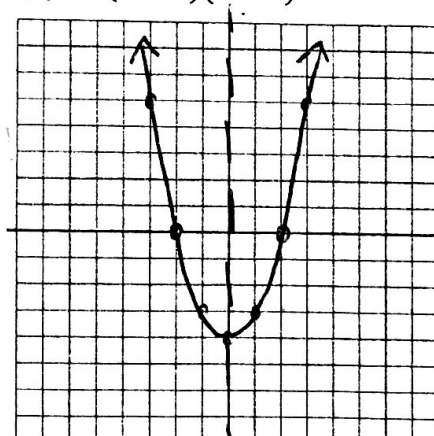
Domain: $(-\infty, \infty)$

Range: $[-2, \infty)$

Increasing: $(1, \infty)$

Decreasing: $(-\infty, 1)$

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



x-intercept(s): $(-2, 0), (2, 0)$

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

Axis of Symmetry: $x = 0$

Vertex: $(0, -4)$

Max/min value: -4

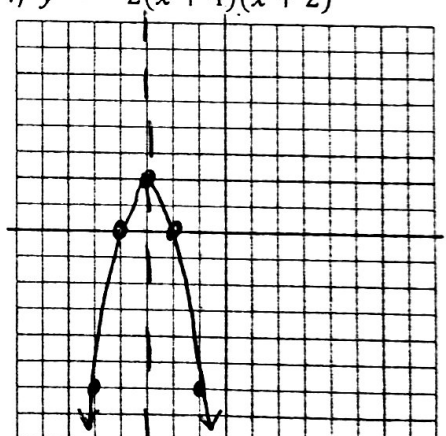
Domain: $(-\infty, \infty)$

Range: $[-4, \infty)$

Increasing: $(0, \infty)$

Decreasing: $(-\infty, 0)$

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



x-intercept(s): $(-4, 0), (-2, 0)$

* y-intercept: $(0, -16)$ $-2(0+4)(0+2) = -16$

Axis of Symmetry: $x = -3$

Vertex: $(-3, 2)$

Max/min value: 2

Domain: $(-\infty, \infty)$

Range: $(-\infty, 2]$

Increasing: $(-\infty, -3)$

Decreasing: $(-3, \infty)$

* If the y-int goes off graph, plug in 0 for x