

# Algebra I

2<sup>nd</sup> Edition

## **Bench Mark Practice Solutions Guide**

**S***implified*  
*solutions*  
**For Math**

# Algebra I Bench Mark 44 Solutions Guide

## Graph.

**1.  $y = x^2 - 2x - 3$**

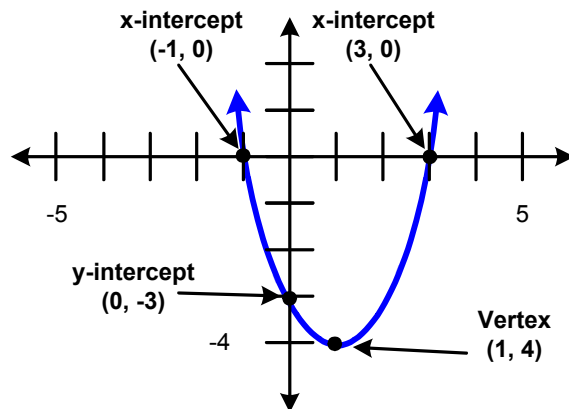
x-intercepts (let  $y = 0$  and solve for  $x$ )

$$\begin{aligned} x^2 - 2x - 3 &= 0 \\ (x - 3)(x + 1) &= 0 \\ x &= 3 \text{ and } -1 \end{aligned}$$

The x-intercepts are (3, 0) and (-1, 0).

y-intercept (let  $x = 0$  and solve for  $y$ )

$$\begin{aligned} y &= (0)^2 - 2(0) - 3 \\ y &= -3 \\ \text{y-intercept} &= (0, -3) \end{aligned}$$



vertex (The x-coordinate of the vertex is  $-\frac{b}{2a}$ .)

Substitute for  $x$  in the original equation and solve for  $y$ .

$$x = \frac{-b}{2a} = \frac{-(-2)}{2(1)} = \frac{2}{2} = 1$$

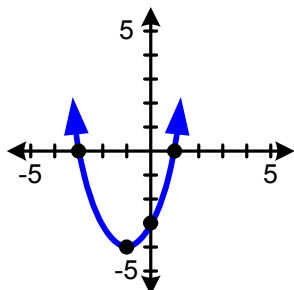
$$\begin{aligned} y &= (1)^2 - 2(1) - 3 = -4 \\ \text{so the vertex is} &= (1, -4) \end{aligned}$$

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

x-intercept:  $x^2 + 2x - 3 = 0$   
 $(x + 3)(x - 1) = 0$   
 $x = -3, 1$   
 $(-3, 0)(1, 0)$

y-intercept:  $y = (0)^2 + 2(0) - 3$   
 $y = -3$   
 $(0, -3)$

vertex:  $x = \frac{-b}{2a} = \frac{-2}{2(1)} = \frac{-2}{2} = -1$   
 $y = (-1)^2 + 2(-1) - 3$   
 $y = 1 - 2 - 3 = -4$   
 $V(-1, -4)$

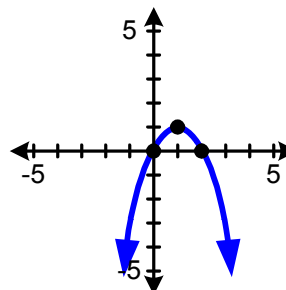


**3.  $y = 2x - x^2$**

x-intercept:  $2x - x^2 = 0$   
 $x(2 - x) = 0$   
 $x = 0, 2$   
 $(0, 0)(2, 0)$

y-intercept:  $y = 2(0) - (0)^2$   
 $y = 0$   
 $(0, 0)$

vertex:  $x = \frac{-b}{2a} = \frac{-2}{2(-1)} = \frac{-2}{-2} = 1$   
 $y = 2(1) - (1)^2$   
 $y = 2 - 1 = 1$   
 $V(1, 1)$



## Algebra I Bench Mark 44 Solutions Guide

4.  $y = x^2 - 8x + 15$

*x-intercept:*  $x^2 - 8x + 15 = 0$

$$(x - 3)(x - 5) = 0$$

$$x = 3, 5$$

$$(3, 0)(5, 0)$$

*y-intercept:*  $y = (0)^2 - 8(0) + 15$

$$y = 15$$

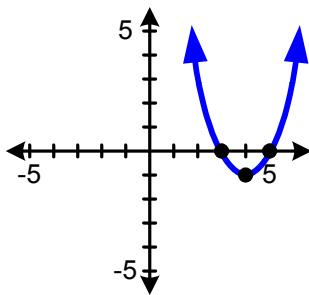
$$(0, 15)$$

*vertex:*  $x = \frac{-b}{2a} = \frac{-(-8)}{2(1)} = \frac{8}{2} = 4$

$$y = (4)^2 - 8(4) + 15$$

$$y = 16 - 32 + 15 = -1$$

$$V(4, -1)$$



5.  $y = x^2 - 8x + 12$

*x-intercept:*  $x^2 - 8x + 12 = 0$

$$(x - 6)(x - 2) = 0$$

$$x = 6, 2$$

$$(6, 0)(2, 0)$$

*y-intercept:*  $y = (0)^2 - 8(0) + 12$

$$y = 12$$

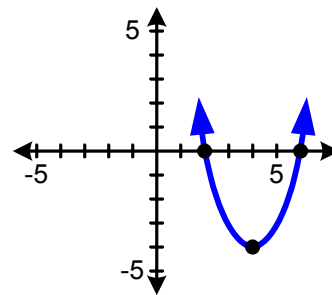
$$(0, 12)$$

*vertex:*  $x = \frac{-b}{2a} = \frac{-(-8)}{2(1)} = \frac{8}{2} = 4$

$$y = (4)^2 - 8(4) + 12$$

$$y = 16 - 32 + 12 = -4$$

$$V(4, -4)$$



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

*x-intercept:*  $x^2 + 4x - 5 = 0$

$$(x + 5)(x - 1) = 0$$

$$x = -5, 1$$

$$(-5, 0)(1, 0)$$

*y-intercept:*  $y = (0)^2 + 4(0) - 5$

$$y = -5$$

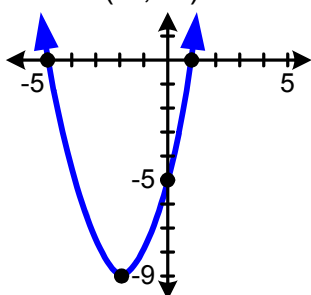
$$(0, -5)$$

*vertex:*  $x = \frac{-b}{2a} = \frac{-4}{2(1)} = \frac{-4}{2} = -2$

$$y = (-2)^2 + 4(-2) - 5$$

$$y = 4 - 8 - 5 = -9$$

$$V(-2, -9)$$



7.  $y = -x^2 - 10x - 24$

*x-intercept:*  $-x^2 - 10x - 24 = 0$

$$-(x + 6)(x + 4) = 0$$

$$x = -6, -4$$

$$(-6, 0)(-4, 0)$$

*y-intercept:*  $y = -(0)^2 - 10(0) - 24$

$$y = -24$$

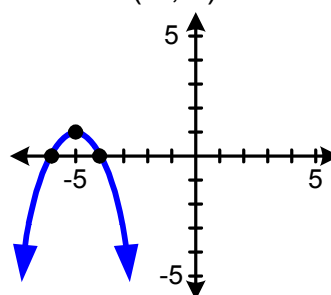
$$(0, -24)$$

*vertex:*  $x = \frac{-b}{2a} = \frac{-(-10)}{2(-1)} = \frac{10}{-2} = -5$

$$y = -(-5)^2 - 10(-5) - 24$$

$$y = -25 + 50 - 24 = 1$$

$$V(-5, 1)$$



## Algebra I Bench Mark 44 Solutions Guide

8.  $y = 4 - x^2$

*x-intercept:*  $4 - x^2 = 0$

$$(2 - x)(2 + x) = 0$$

$$x = 2, -2$$

$$(2, 0)(-2, 0)$$

*y-intercept:*  $y = 4 - (0)^2$

$$y = 4$$

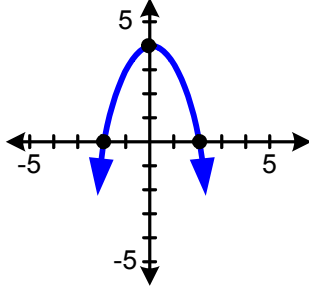
$$(0, 4)$$

*vertex:*  $x = \frac{-b}{2a} = \frac{-(0)}{2(1)} = 0$

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

$$y = 4 - 0 = 4$$

$$V(0, 4)$$



9.  $y = x^2 - 4$

*x-intercept:*  $x^2 - 4 = 0$

$$(x - 2)(x + 2) = 0$$

$$x = 2, -2$$

$$(2, 0)(-2, 0)$$

*y-intercept:*  $y = (0)^2 - 4$

$$y = -4$$

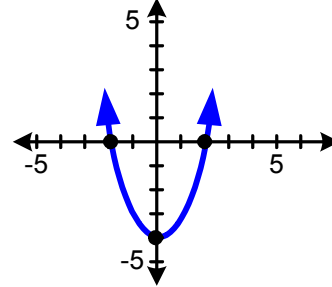
$$(0, -4)$$

*vertex:*  $x = \frac{-b}{2a} = \frac{-(0)}{2(1)} = 0$

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

$$y = 0 - 4 = -4$$

$$V(0, -4)$$



10.  $y = 4x^2 + 8x - 5$

*x-intercept:*  $4x^2 + 8x - 5 = 0$

$$(2x - 1)(2x + 5) = 0$$

$$x = \frac{1}{2}, \frac{-5}{2}$$

$$\left(\frac{1}{2}, 0\right)\left(\frac{-5}{2}, 0\right)$$

*y-intercept:*  $y = 4(0)^2 + 8(0) - 5$

$$y = -5$$

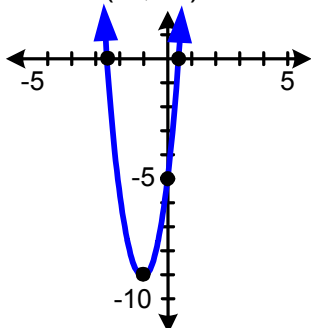
$$(0, -5)$$

*vertex:*  $x = \frac{-b}{2a} = \frac{-(8)}{2(4)} = \frac{-8}{8} = -1$

$$y = 4(-1)^2 + 8(-1) - 5$$

$$y = 4 - 8 - 5 = -9$$

$$V(-1, -9)$$



11.  $y = -4x^2 + 4x + 3$

*x-intercept:*  $-4x^2 + 4x + 3 = 0$

$$-(2x + 1)(2x - 3) = 0$$

$$x = \frac{-1}{2}, \frac{3}{2}$$

$$\left(\frac{-1}{2}, 0\right)\left(\frac{3}{2}, 0\right)$$

*y-intercept:*  $y = -4(0)^2 + 4(0) + 3$

$$y = 3$$

$$(0, 3)$$

*vertex:*  $x = \frac{-b}{2a} = \frac{-4}{2(-4)} = \frac{-4}{-8} = \frac{1}{2}$

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

$$y = -1 + 2 + 3 = 4$$

$$V\left(\frac{1}{2}, 4\right)$$

