

Finding the Vertex

Name: Hirsch

1. $y = 3(x - 6)^2 - 3$

Direction: UP
 Vertex: (6, -3)
 AOS: X = 6

2. $y = x^2 + 6x + 9$

Direction: UP
 Vertex: (-3, 0)
 AOS: X = -3

$$x = \frac{\text{opp } b}{2a} = \frac{-6}{2(1)} = \textcircled{-3}$$

$$y = (-3)^2 + 6(-3) + 9 = \textcircled{0}$$

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

Direction: UP
 Vertex: (-1, -16)
 AOS: X = -1

x-int: (3, 0) and (-5, 0)

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

$$y = (-1 - 3)(-1 + 5) = \textcircled{-16}$$

4. $y = 2x^2 + 16x - 5$

Direction: UP
 Vertex: (-4, -37)
 AOS: X = -4

$$x = \frac{\text{opp } b}{2a} = \frac{-16}{2(2)} = \textcircled{-4}$$

$$y = 2(-4)^2 + 16(-4) - 5 = \textcircled{-37}$$

5. $y = -(x + 1)(x + 9)$

Direction: down
 Vertex: (-5, 16)
 AOS: X = -5

x-int (-1, 0) and (-9, 0)

$$x = \frac{-1 + (-9)}{2} = \textcircled{-5}$$

$$y = -(-5 + 1)(-5 + 9) = \textcircled{16}$$

6. $y = -2(x + 8)^2 + 4$

Direction: down
 Vertex: (-8, 4)
 AOS: X = -8

7. $y = (2x - 5)(2x - 7)$

Direction: UP
 Vertex: (3, -1)
 AOS: X = 3

$$\begin{array}{l} 2x - 5 = 0 \quad 2x - 7 = 0 \\ 2x = 5 \quad 2x = 7 \\ x = 2.5 \quad x = 3.5 \end{array}$$

$$x = \frac{2.5 + 3.5}{2} = \textcircled{3}$$

$$y = (2(3) - 5)(2(3) - 7) = \textcircled{-1}$$

8. $y = (x + 8)^2$

Direction: UP
 Vertex: (-8, 0)
 AOS: X = -8

9. $y = -3x^2 - 12x + 7$

Direction: down
 Vertex: (-2, 19)
 AOS: X = -2

$$x = \frac{\text{opp } b}{2a} = \frac{12}{2(-3)} = \textcircled{-2}$$

$$y = -3(-2)^2 - 12(-2) + 7 = \textcircled{19}$$