

Properties of Parabolas

Identify the vertex of each.

1) $y = x^2 + 16x + 64$

$x = \frac{-b}{2a} = \frac{-16}{2(1)} = -8$ Vertex = (-8, 0)

$y = (-8)^2 + 16(-8) + 64 = 0$

3) $y = -x^2 + 18x - 75$

$x = \frac{-18}{2(-1)} = 9$ Vertex = (9, 6)

$y = -(9)^2 + 18(9) - 75 = 6$

2) $y = 2x^2 - 4x - 2$

$x = \frac{4}{2(2)} = 1$ Vertex = (1, -4)

$y = -4$

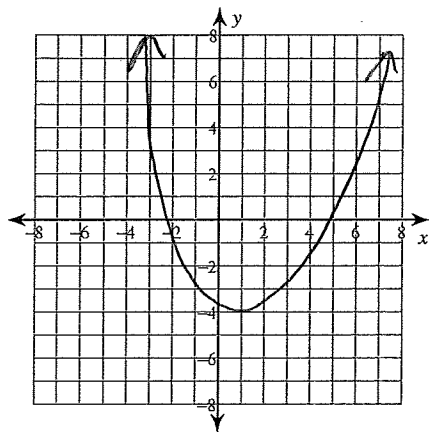
4) $y = -3x^2 + 12x - 10$

$x = \frac{-12}{(-3)2} = 2$ Vertex = (2, 2)

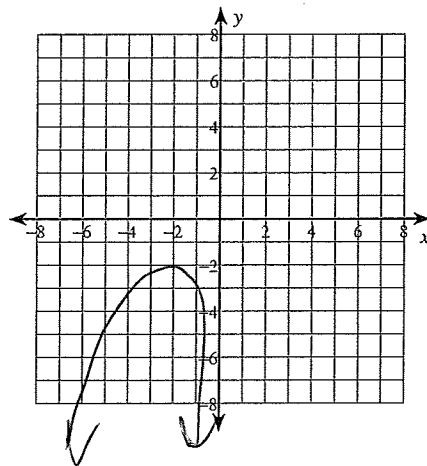
$y = 2$

Graph each equation.

5) $y = x^2 - 2x - 3$

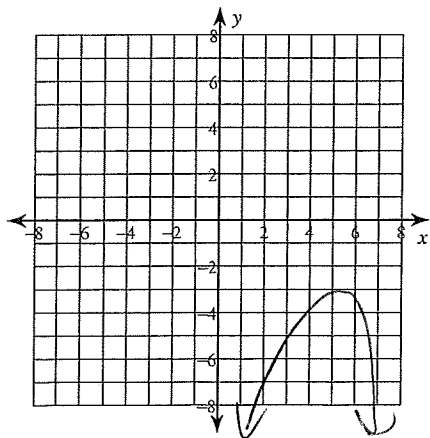


6) $y = -x^2 - 6x - 10$



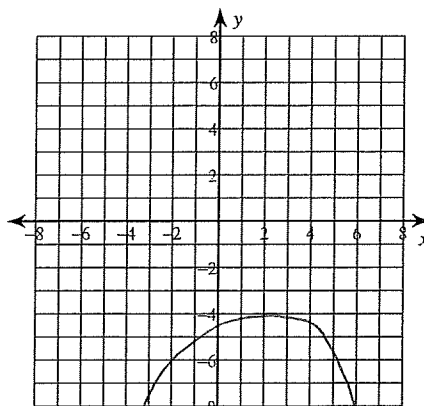
Identify the min/max value of each. Then sketch the graph.

7) $f(x) = -x^2 + 8x - 20$



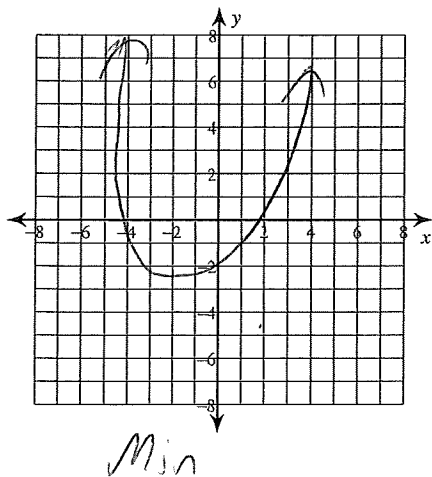
Max

8) $f(x) = -\frac{1}{3}x^2 + \frac{4}{3}x - \frac{16}{3}$

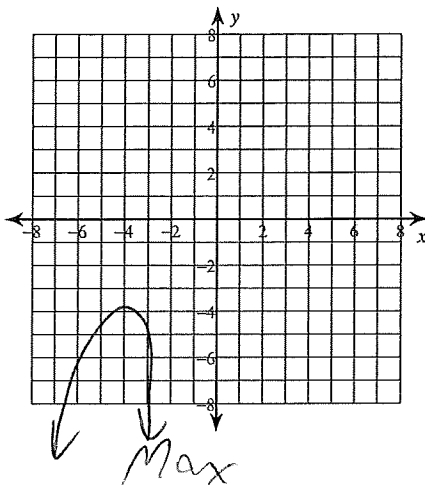


Max

9) $f(x) = x^2 + 2x - 1$



10) $f(x) = -x^2 - 10x - 30$



Identify the vertex, axis of symmetry, and min/max value of each.

11) $f(x) = 3x^2 - 54x + 241$

$x = \frac{54}{2(3)} = 9 \in \text{Aofs}$

$y = -2 \in \text{Min}$

vertex = (9, -2)

12) $f(x) = x^2 - 18x + 86$

$x = \frac{18}{2(1)} = 9 \in \text{Aofs}$

$y = 5 \in \text{Min}$

vertex = (9, 5)

13) $f(x) = -\frac{4}{5}x^2 + \frac{48}{5}x - \frac{114}{5}$

$x = \frac{-\frac{48}{5}}{2(-\frac{4}{5})} = 6 \in \text{Aofs}$

$y = 6 \in \text{Max}$

vertex = (6, 6)

14) $f(x) = -2x^2 - 20x - 46$

$x = \frac{20}{2(-2)} = \frac{20}{-4} = -5 \in \text{Aofs}$

$y = 4 \in \text{Max}$ vertex = (-5, 4)

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

$x = 0 \in \text{Aofs}$ vertex = (0, 7)

$y = 7 \in \text{Max}$

16) $f(x) = x^2 - 12x + 44$

$x = \frac{12}{2(1)} = 6 \in \text{Aofs}$

$y = 8 \in \text{Min}$

vertex = (6, 8)

17) $f(x) = \frac{1}{4}x^2 - x + 9$

$x = \frac{1}{2(\frac{1}{4})} = 2 \in \text{Aofs}$

$y = 8 \in \text{Min}$

vertex = (2, 8)

18) $f(x) = x^2 + 4x + 5$

$x = \frac{-4}{2(1)} = \frac{-4}{2} = -2 \in \text{Aofs}$

$y = (-2)^2 + 4(-2) + 5 = 1 \in \text{Min}$

vertex = (-2, 1)