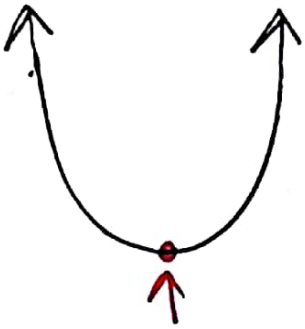
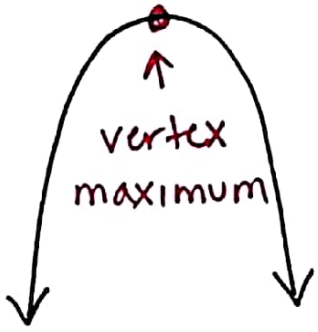
September 6

Vertex of a Parabola



a value is positive



a value is negative

Ex 1 Find vertex of: $y = x^2 + 4x + 8$

Step 1: Identify a, b, and c. a: 1 b: 4 c: 8

Step 2: Find x using formula $x = \frac{-b}{2a}$

$$x = \frac{-b}{2a}$$

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

$$x = -2$$

Step 3: Find y by plugging x value into original problem.

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

$$y = 4$$

Step 4: Write as a point.

$$\boxed{(-2, 4)}$$ minimum

Ex2 Find vertex of: $y = -3x^2 - 18x + 4$

a: -3 b: -18 c: 4

$$x = \frac{-b}{2a}$$

$$x = \frac{-(-18)}{2(-3)}$$

$$x = -3$$

$$y = -3(-3)^2 - 18(-3) + 4$$

$$y = 31$$

$\boxed{(-3, 31)}$ maximum