Standard to Vertex Form

Convert to vertex form: $y = 2x^2 + 4x - 9$

Identify the axis of symmetry:

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

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

$$x = \frac{-4}{4} = -1$$

$$f(1) = 2(-1)^2 + 4(-1) - 9$$

$$f(1) = 2 - 4 - 9$$

$$f(1) = -11$$

Vertex: (-1, -11)

$y = 2(x + 1)^2 - 11$ Axis of Symmetry: x = -1

Convert to vertex form: $y = \frac{-3}{2}x^2 - 9x + 2$

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

$$x = \frac{-(-9)}{2(-3/2)}$$

$$x = \frac{9}{-3} = -3$$

$$f(-3) = \frac{-3}{2}(-3)^2 - 9(-3) + 2$$

$$f(-3) = -13.5 + 27 + 2$$

$$f(-3) = 15.5$$

Vertex: (-3, 15.5)

$$y = -3(x + 3)^2 + 15.5$$

A golf ball is hit from an elevated location such that its height, in feet, is modeled by:

$$h(x) = \frac{-2}{525}x^2 + \frac{4}{3}x + 22$$

Determine the maximum height of the ball.

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

$$x = \frac{-(4/3)}{2(-2/525)}$$

$$x = 175$$

$$h(175) = \frac{-2}{525}(175)^2 + \frac{4}{3}(175) + 22$$

$$h(175) = \frac{416}{3} = 138.\overline{6}$$

The maximum height of the ball is $138.\overline{6}$ feet.

The axis of symmetry for $y = ax^2 + 5x - 10$ is $x = -9$. What is the value of a?

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

$$-9 = \frac{-(5)}{2(a)}$$

$$-9 = \frac{-5}{2a}$$

$$-18a = -5$$

$$a = \frac{5}{18}$$