Function:
$$f(x) = 2x^2 - 4x - 1$$

Find the x- and y-intercepts of the graph, if any exist. (If an answer does not exist, enter DNE.)

x-intercept:
$$y = 0$$
$$2x^2 - 4x - 1 = 0$$
$$D = 16 - 4 \cdot 2 \cdot (-1) = 24$$
$$x_1 = \frac{4 + \sqrt{24}}{2 \cdot 2} = \frac{2 + \sqrt{6}}{2} \approx 2.225$$
$$x_2 = \frac{4 - \sqrt{24}}{2 \cdot 2} = \frac{2 - \sqrt{6}}{2} \approx -0.225$$

Thus,

$(x, y) = $ (-0.225, 0)
(smaller x-value)

$(x, y) = $ (2.225, 0)
(larger x-value)

y-intercept:
$x = 0$
$$y = f(0) = 2 \cdot 0^2 - 4 \cdot 0 - 1 = -1$$
$(x, y) = $ (0,-1)

Convert the function into standard form.

$$2x^2 - 4x - 1 = 2(x^2 - 2x) - 1 = 2(x^2 - 2x + 1) - 3 = 2(x - 1)^2 - 3$$

$$f(x) = 2(x - 1)^2 - 3$$

Identify the vertex and give an equation for the axis of symmetry.
vertex: $(x, y) = $ (1, -3)

axis of symmetry: $x = 1$