

Name: _____

Show all work clearly and in order. Please box your answers. 10 minutes.

1. For the quadratic function

$$y = x^2 - x - \frac{3}{4}$$

- (a) Find the axis of symmetry

$$x = \frac{-b}{2a} = \frac{+1}{2(1)} = \frac{1}{2} \quad \text{so}$$

$$x = \frac{1}{2}$$

- (b) Find the coordinates of the vertex

$$x\text{-coordinate: } x = \frac{1}{2}$$

$$y\text{-coordinate: } y = \left(\frac{1}{2}\right)^2 - \frac{1}{2} - \frac{3}{4} = \frac{1}{4} - \frac{2}{4} - \frac{3}{4} = -1$$

$$\left(\frac{1}{2}, -1\right)$$

- (c) Find the x-intercept(s)

$$x^2 - x - \frac{3}{4} = 0$$

Sol 1:

$$x = \frac{1 \pm \sqrt{(-1)^2 - 4(-\frac{3}{4})}}{2(1)} = \frac{1 \pm \sqrt{1+3}}{2} = \frac{1 \pm \sqrt{4}}{2} = \frac{1 \pm 2}{2} \rightarrow$$

$$x = -\frac{1}{2} \text{ and } x = \frac{3}{2}$$

Sol 2:

$$(x + \frac{1}{2})(x - \frac{3}{2}) = 0 \rightarrow x = -\frac{1}{2} \text{ and } x = \frac{3}{2} \quad \text{or}$$

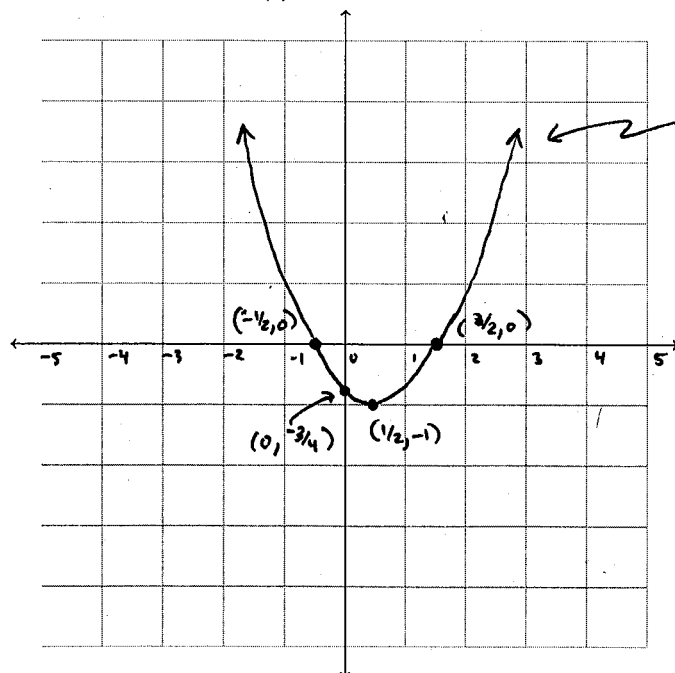
$$\left(-\frac{1}{2}, 0\right) \text{ and } \left(\frac{3}{2}, 0\right)$$

- (d) Find the y intercept

$$y(0) = 0^2 - 0 - \frac{3}{4} = -\frac{3}{4}$$

$$\text{or } (0, -\frac{3}{4})$$

- (e) Using the previous parts sketch the graph of the quadratic function. You must label the vertex and any x-coordinate(s).

opens up since $a = 1 > 0$.