

# 4.9 Graph Quadratic Inequalities

**EXAMPLE 1** Graph a quadratic inequality

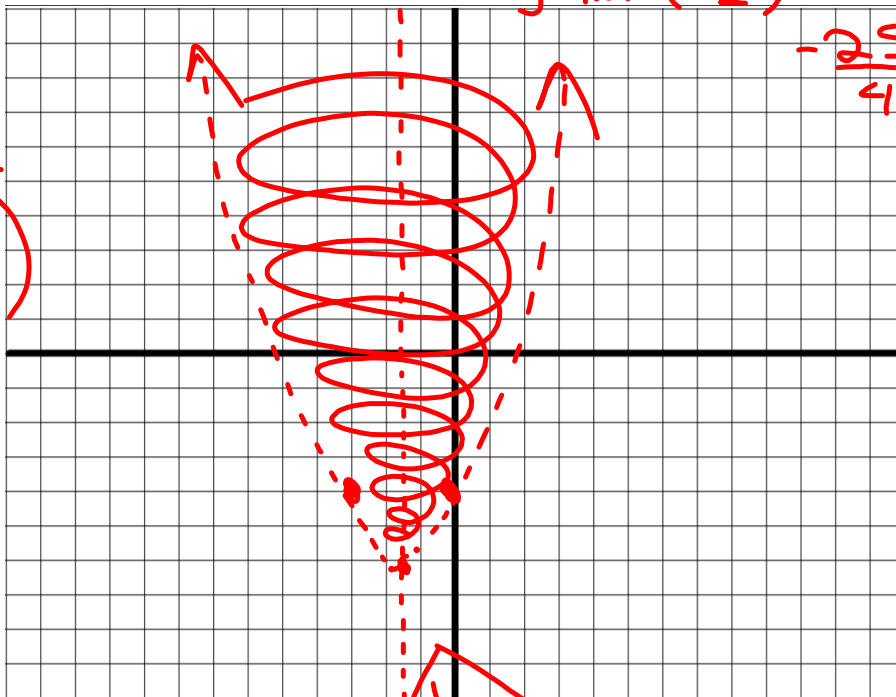
$$\frac{-b}{2a} = \frac{-(-3)}{2(1)} = \frac{3}{2}$$

Graph  $y > x^2 + 3x - 4$

$$y\text{-int } \left(-\frac{3}{2}\right)^2 + 3\left(-\frac{3}{2}\right) - 4$$

$$-\frac{25}{4} \text{ or } -6.25$$

vertex  
 $\left(\frac{3}{2}, -\frac{25}{4}\right)$

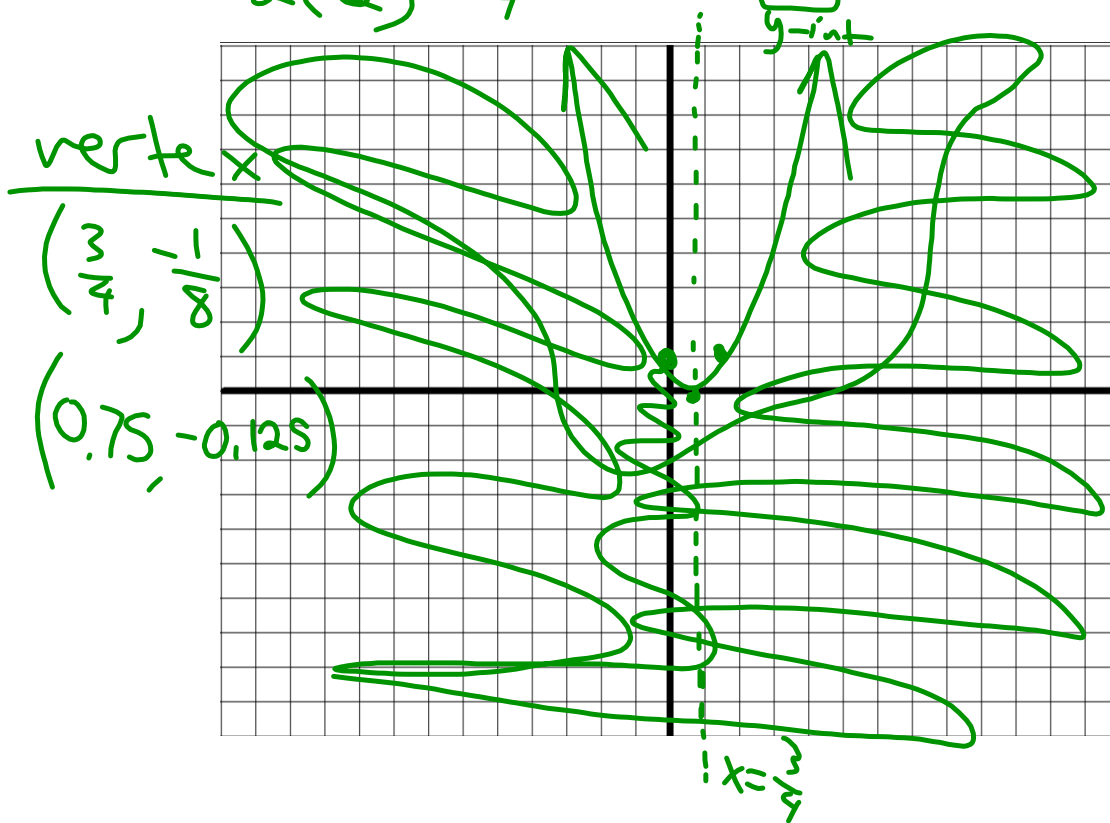


$x = -3$   
 $\frac{2}{1}$

**EXAMPLE 1** Graph a quadratic inequality

Graph the inequality.

$$\frac{-b}{2a} = \frac{-(-3)}{2(2)} = \frac{3}{4} \quad y \leq 2x^2 - 3x + 1$$



**EXAMPLE 1** Graph a quadratic inequality

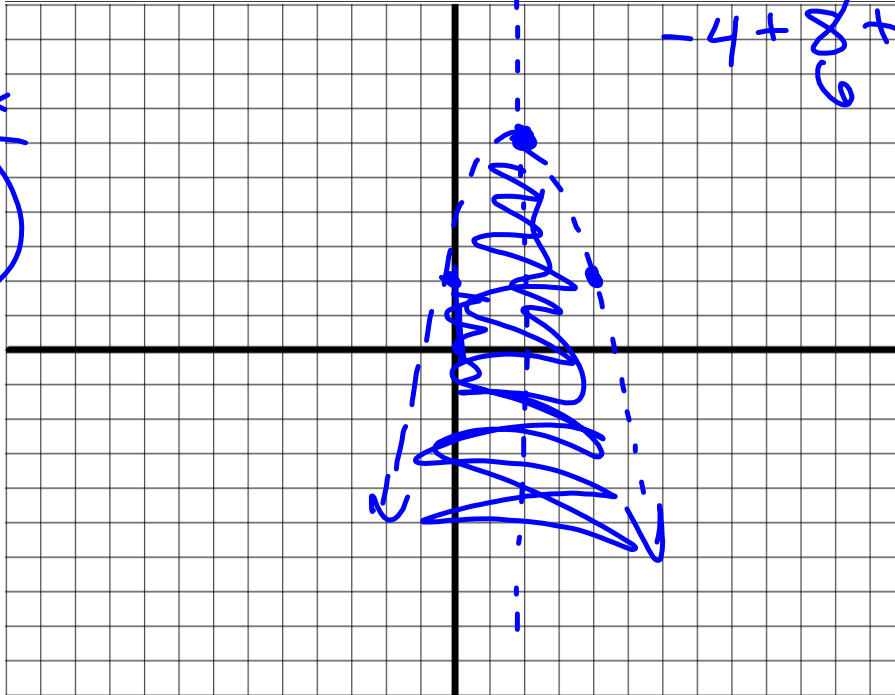
Graph the inequality.

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

$$y < -x^2 + 4x + 2$$

$$\begin{aligned} &-(2)^2 + 4(2) + 2 \\ &-4 + 8 + 2 \\ &6 \end{aligned}$$

vertex  
 $(2, 6)$



**EXAMPLE 3** Graph a system of quadratic inequalities

Graph the system of quadratic inequalities.

$$\frac{-b}{2a} = \frac{-(0)}{2(-1)} = 0 \rightarrow \begin{cases} y \leq -x^2 + 4 \\ y > x^2 - 2x - 3 \end{cases} \quad \frac{-b}{2a} = \frac{-(-2)}{2(1)} = \frac{2}{2} = 1$$

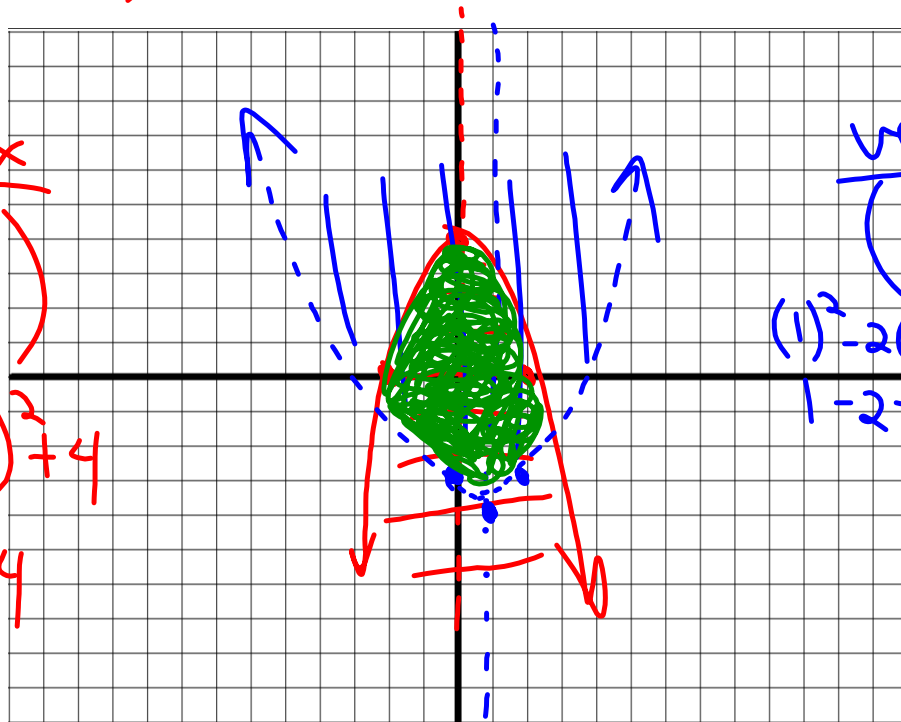
vertex

$$(0, 4)$$

$$-(2)^2 + 4$$

$$-4 + 4$$

$$0$$



vertex

$$(1, -4)$$

$$(1)^2 - 2(1) - 3$$

$$1 - 2 - 3 = -4$$

**GRAPHING SYSTEMS** Graph the system of inequalities.

$\frac{-b}{2a} = \frac{-0}{2(2)} = 0$ 
 20.  $y \geq 2x^2 + 0x + 0$   
 $\rightarrow y < -x^2 + 1$

$\frac{-0}{2(-1)} = 0$

vertex  
 $(0, 0)$

$\frac{2(1)^2}{2}$

vertex  
 $(0, 1)$

$\frac{-(-1)^2 + 1}{-1 + 1}$

