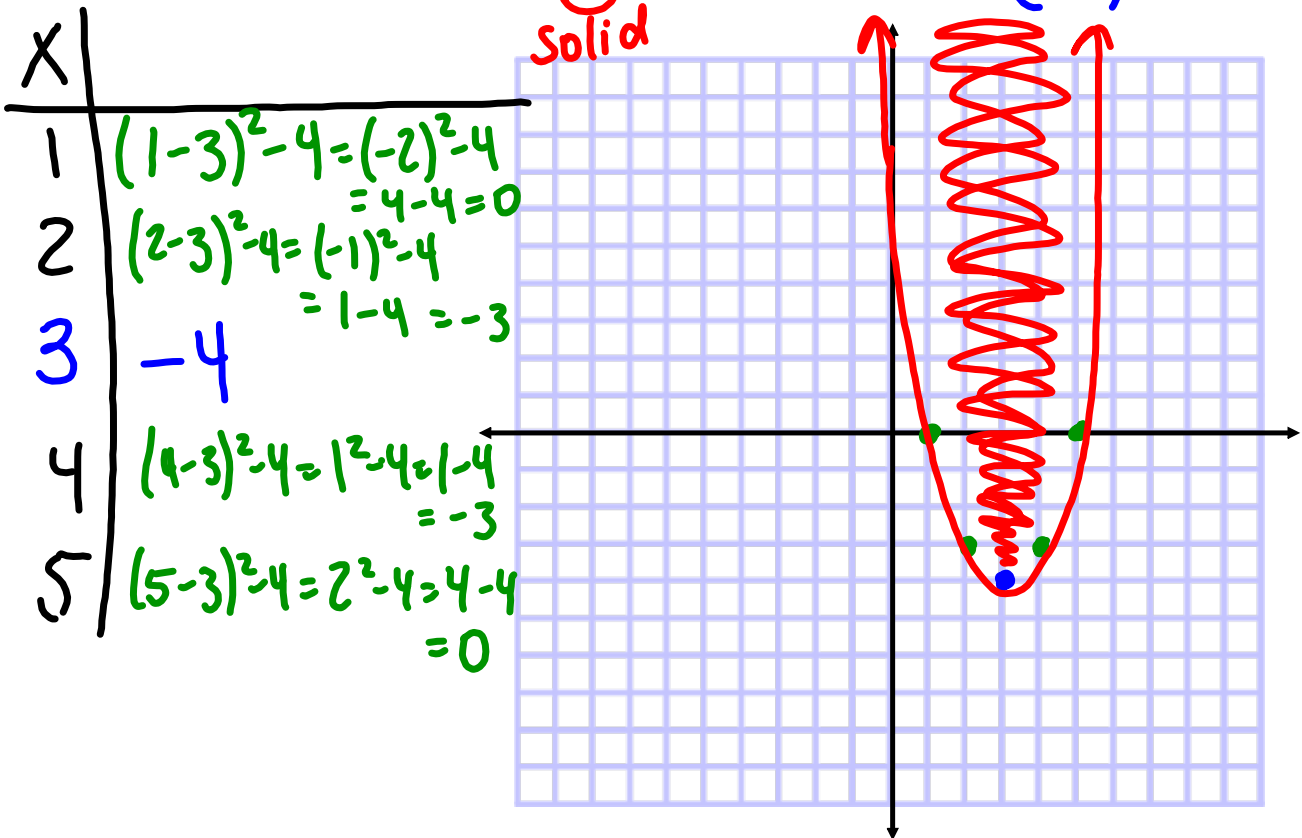


5.8 GRAPHING & SOLVING QUADRATIC INEQUALITIES

Example 1

Vertex form

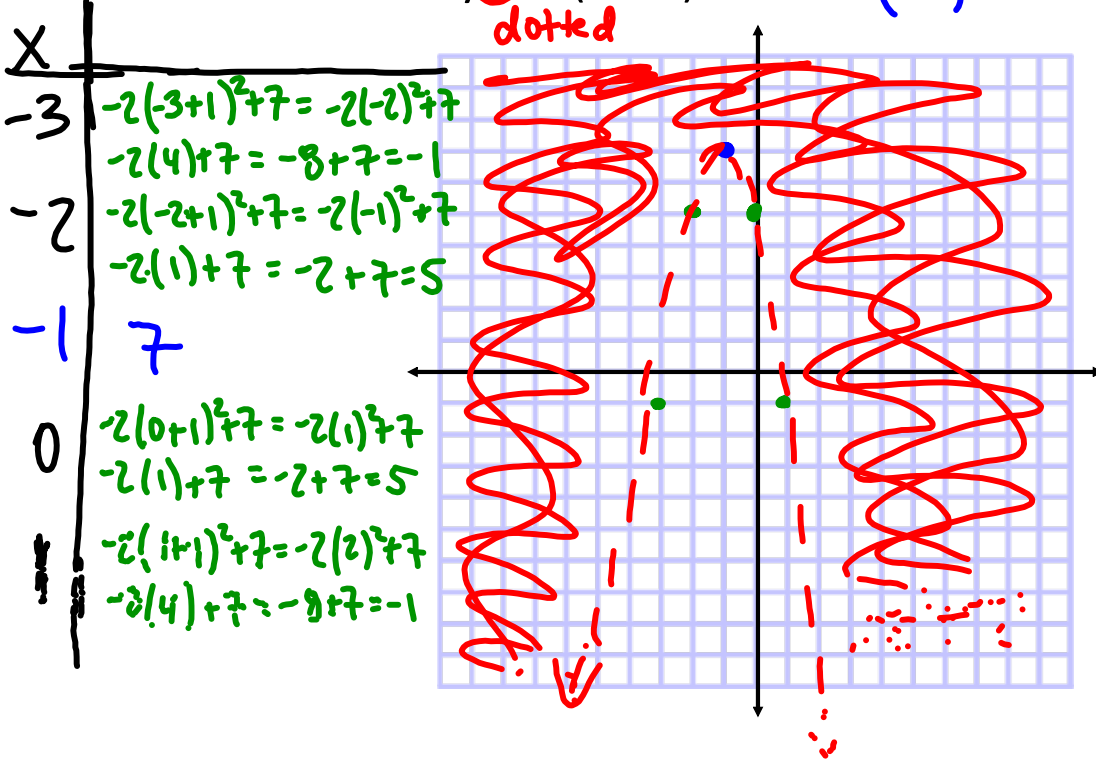
Graph the solution to $y \geq (x - 3)^2 - 4$.vertex: $(3, -4)$ 

Example 2

Vertex form

vertex:
(-1, 7)

Graph the solution to $y > -2(x + 1)^2 + 7$.



Example 3 Standard form

Graph the solution to $y < 2x^2 - 4x + 1$.

axis of symmetry

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

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

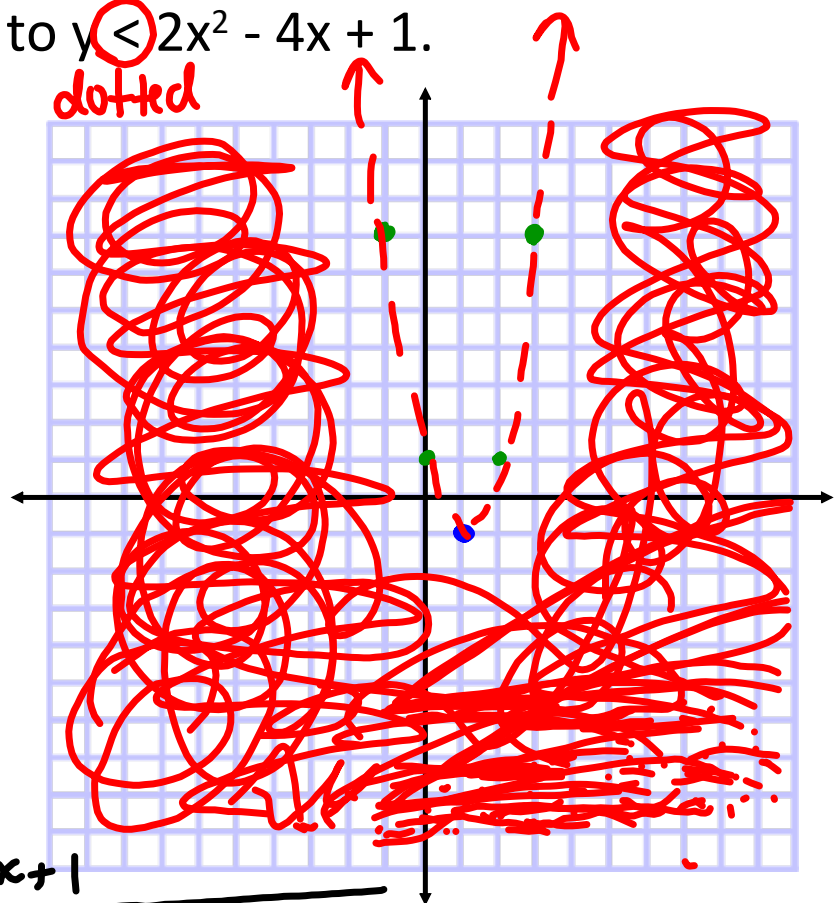
$$y = 2x^2 - 4x + 1$$

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

$$= 2(1) - 4 + 1$$

$$= 2 - 4 + 1 = -1$$

Vertex: $(1, -1)$



x	$2x^2 - 4x + 1$
-1	$2(-1)^2 - 4(-1) + 1 = 2(1) + 4 + 1 = 2 + 4 + 1 = 7$
0	$2(0)^2 - 4(0) + 1 = 1$
1	-1
2	$2(2)^2 - 4(2) + 1 = 2(4) - 8 + 1 = 8 - 8 + 1 = 1$
3	$2(3)^2 - 4(3) + 1 = 2(9) - 12 + 1 = 18 - 12 + 1 = 7$

Example 4 Standard form

Graph the solution to $y \leq -x^2 + 6x$.

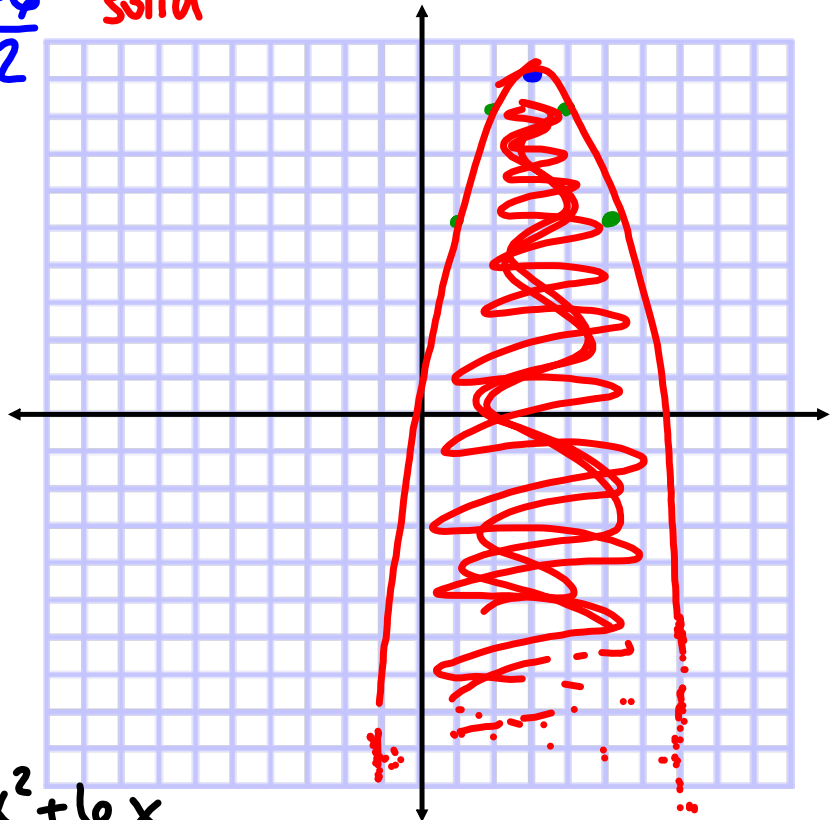
$$x = \frac{-b}{2a} = \frac{-6}{2(-1)} = \frac{-6}{-2}$$

solid

$$x = 3$$

$$\begin{aligned} y &= -x^2 + 6x \\ &= -(3)^2 + 6(3) \\ &= -9 + 18 = 9 \end{aligned}$$

$$\text{Vertex: } (3, 9)$$



x	$-x^2 + 6x$
1	$-(1)^2 + 6(1) = -1 + 6 = 5$
2	$-(2)^2 + 6(2) = -4 + 12 = 8$
3	9
4	$-(4)^2 + 6(4) = -16 + 24 = 8$
5	$-(5)^2 + 6(5) = -25 + 30 = 5$

When **SOLVING** a quadratic inequality, you must solve as if set equal to zero and then do a **number line test** to find the solutions.

Example 5

Solve the inequality $x^2 - 2x - 15 \geq 0$ and graph the solution on a number line.

Example 6

Solve the inequality $2x^2 - 5x - 3 < 0$ and graph the solution on a number line.

Example 7

Solve the inequality $-x^2 + 2x + 35 \geq 0$ and graph the solution on a number line.

Example 8

Solve the inequality $3x^2 - x > 4x + 2$ and graph the solution on a number line.