Section:	**1 – 9 Graph and Solve Quadratic Inequalities**
Essential Question	How do you graph and solve quadratic inequalities in One or Two variables?

Key Concept:

Graphing a Quadratic Inequality in TWO Variables

$y < ax^2 + bx + c$	$y > ax^2 + bx + c$	$y \leq ax^2 + bx + c$	$y \geq ax^2 + bx + c$

1. Graph the parabola.

   Rules for dotted vs. solid line:

- DOTTED: Use when $>$ or $<$.
- SOLID: Use when $\geq$ or $\leq$.

2. Pick a point that is NOT on the line of the parabola to determine where to shade.

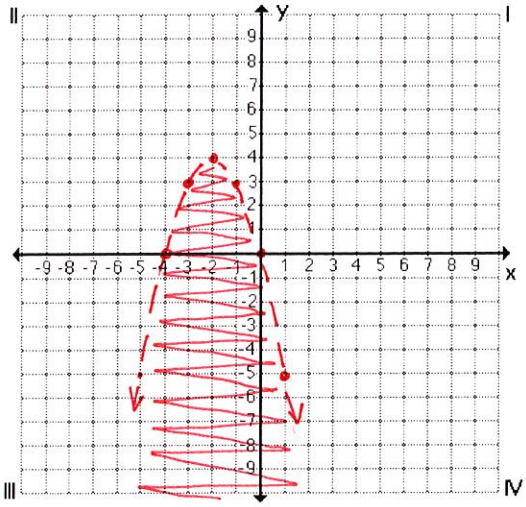
   (Easiest point is (0,0)

3. If the test point makes the equation TRUE, shade the region with the test point.

   If the test point makes the equation FALSE, do not shade the region with the test point.

Show:

Ex 1: Graph $y \leq -x^2 - 4x$ ↗ dotted line



plug into y=

x	y
-2	4
-1	3
0	0
1	-5
2	-12

↓

x	y
-3	3
-4	0

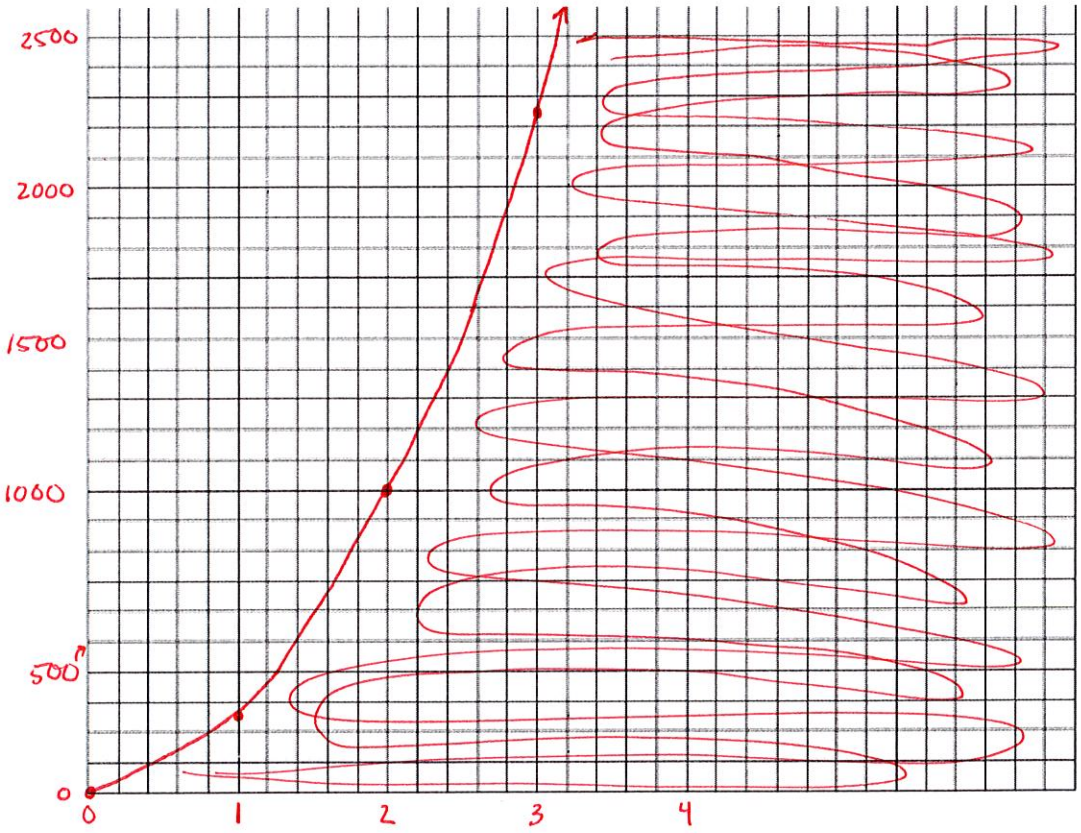
Test a point:

(0,5) $5 < -(0)^2 - 4(0)$

$5 < 0$? ✗ Not True

(don't shade)

Ex 2: A computer desk with a solid glass top can safely support a weight W (in pounds) provided $W \leq 250x^2$, where x is the thickness of the desktop (in inches). Graph the inequality. ↳ solid line



x	W
0	0
1	250
2	1000
3	2250
4	

Test a point:

(0,500)

$500 \leq 250(0)^2$

$500 \leq 0$?

✗ Not True

Ex 3: Graph the system of inequalities.

$y > x^2 - 3$

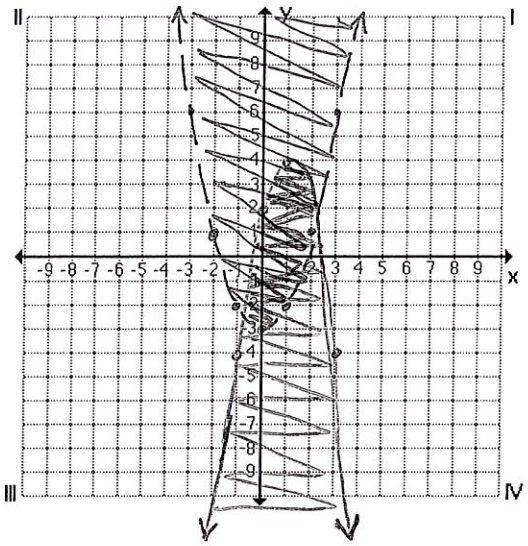
$y \leq -2x^2 + 4x + 2$

$y > x^2 - 3$

x	y
-2	1
-1	-2
0	-3
1	-2
2	1

$y \leq -2x^2 + 4x + 2$

x	y
-2	-14
-1	-4
0	2
1	4
2	2



Key Concept:

Graphing a Quadratic Inequality in **One** Variable

$ax^2 + bx + c < 0$	$ax^2 + bx + c > 0$	$ax^2 + bx + c \leq 0$	$ax^2 + bx + c \geq 0$

1. Solve the quadratic equation.

2. Plot the solutions on a number line.

   RULES for open circle vs. closed circle:

   - OPEN CIRCLE:

     $<$ or $>$

   - CLOSED CIRCLE

     $\leq$ or $\geq$

3. Choose a test point from each region on the number line. (Do not pick one of the points already plotted).

4. If the test point makes the equation TRUE, shade the region with the test point.

   If the test point makes the equation FALSE, do not shade the region with the test point.

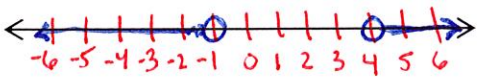
Ex 4: Solve $3x^2 - 9x - 12 < 0$ algebraically

$3(x^2 - 3x - 4) = 0$

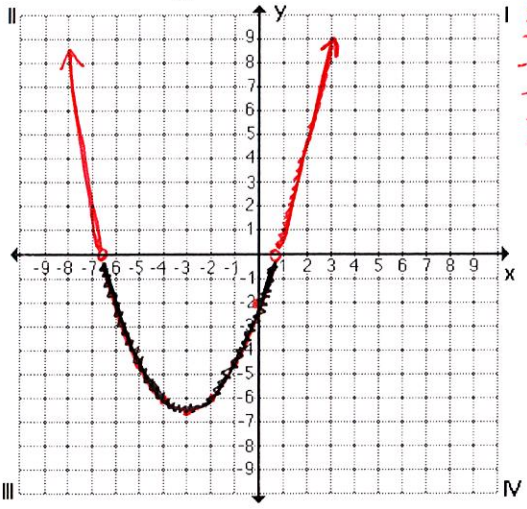
$3(x-4)(x+1) = 0$

$x = 4 \quad x = -1$

Test points

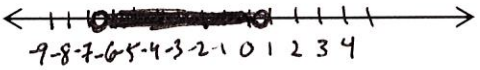


Ex 5: Solve $\frac{1}{2}x^2 + 3x - 2 < 0$ by graphing



x	y
-5	-4.5
-4	-6
-3	-4.5
-2	-6
-1	-4.5

x-intercepts = $-6.6, 0.6$



Ex 6: Solve $x^2 + 2x \leq 8$ by using a table.

$x^2 + 2x - 8 \leq 0$

x	y
-5	7
-4	0
-3	-5
-2	-8
-1	-9
0	-8
1	-5
2	0

x-intercepts