Algebra III | Name ________________________________
Chapter 3 Note Packet

Section 3.1: Linear Inequalities and Absolute Value Inequalities
Essential Question:

Solve and graph the following inequalities.

1) $6x - 10 > 8$

2) $\frac{6x-3}{4} \le 8$

Graph the following inequalities.

3) $5 < m$

4) $1 \le x < 5.2$

Absolute Value Inequalities

$>$ $\ge$ Ex: $|x| > m$ is rewritten as: ______________**OR** ______________
great "OR" than

$<$ $\le$ Ex: $|x| < m$ is rewritten as: ______________**AND** ______________
less th"AND"
shade only the intersection

Graph the following absolute value inequalities:

5) $|x| < 3$

6) $|m| \ge 2$

Graph the following absolute value inequalities:

7) Solve and graph $|x - 2| < 3$

8) Solve and graph $|x - 4| = 7$

Section 3.1 Summary:

Section 3.2: Solving Polynomials of Degree 2 or higher
Essential Question:

> *If the inequality is linear you just need to isolate the x-variable, but if you have an x^2 or higher you* ***MUST FIND THE ZEROS!***

Example 1
Solve $x^2 + 6x - 16 > 0$

1st: Find zeros of the polynomial, set $P(x) = 0$

2nd: Test each interval

3rd: Write the solution as an inequality

Example 2

$(4 - 3x)(5 + x) \geq 0$

Example 3

$(x - 7)(x + 3)(x - 4) \geq 0$

Example 4

$x^2 - 4x + 4 < 0$

Example 5

$x^4 - 4x^2 \geq 0$

Example 6

$$\frac{(x-2)(x-7)^2}{x-4} \geq 0$$

1) Denominator $\neq 0$ (always open circle)

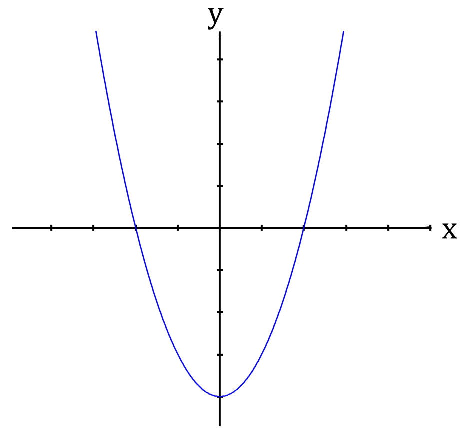
2) Find when numerator = 0

3) Plot ALL zeros for numerator and denominator

Example 7

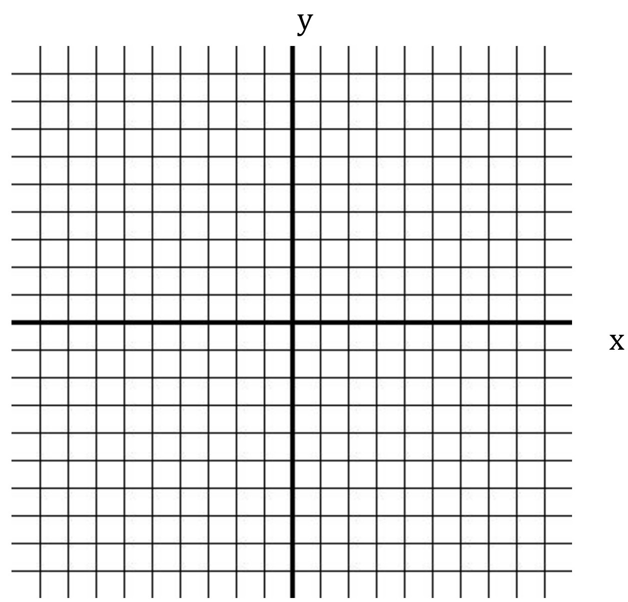
Use the graph to solve the inequality.

$x^2 - 4 \geq 0$



Example 8

$(x - 3)(x + 2)(x - 7) < 0$



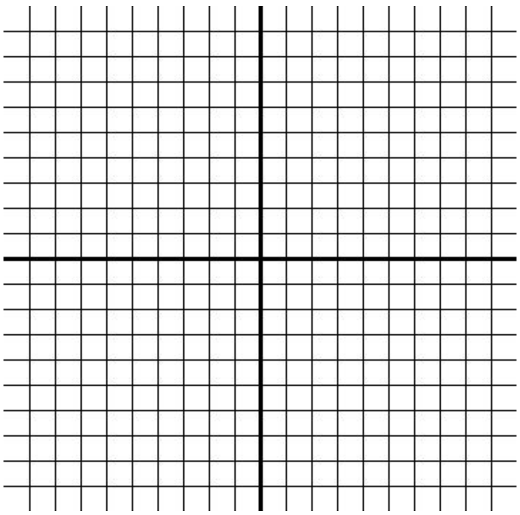
Section 3.2 Summary:

Section 3.3: INEQUALITIES IN TWO VARIABLES

Essential Question:

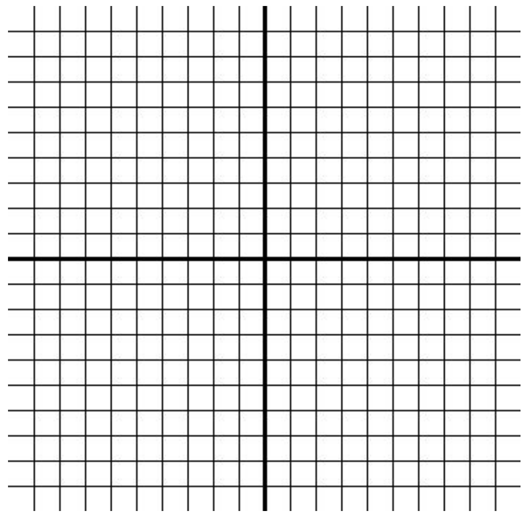
Linear Equation vs. Inequality

Example: $y = 3x + 2$



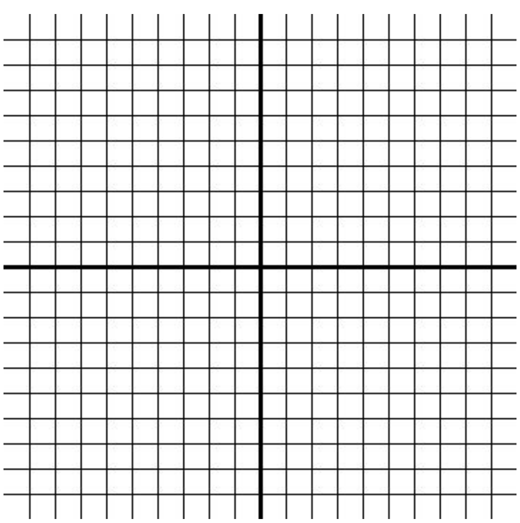
Quadratic Equation vs. Inequality

Example: $y = x^2 - 3$

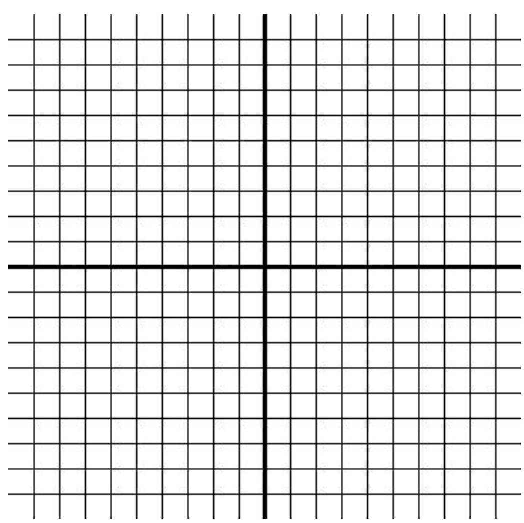


EXAMPLES: **Graph each of the following.**

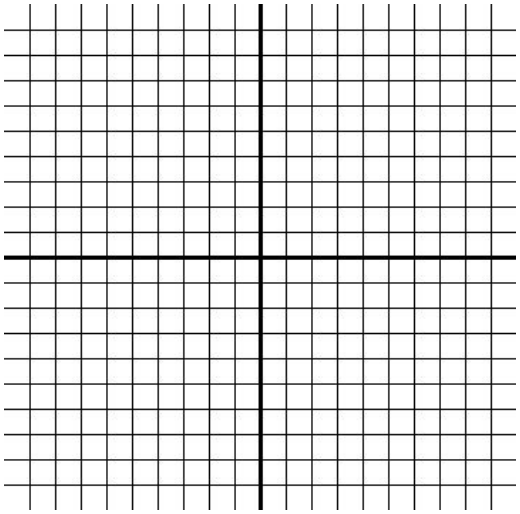
1) $y + 3x > 2$



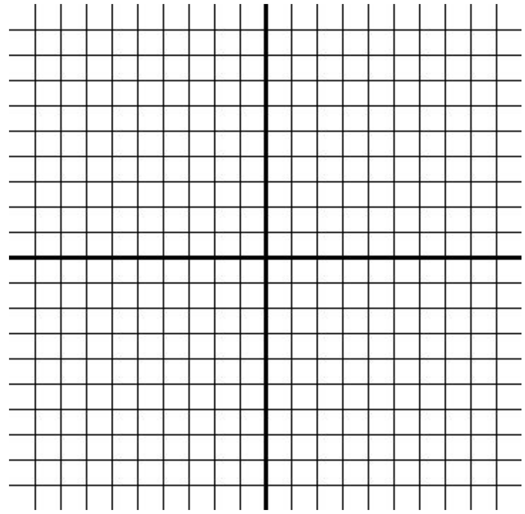
2) $y \leq x^2 + x - 6$



3) $-3 < x \le 2$

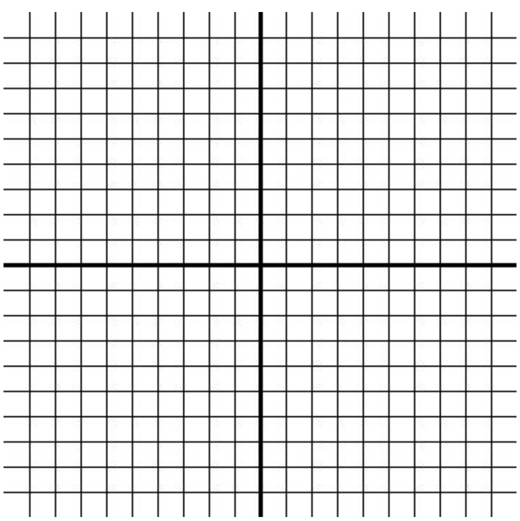


4) $|x + 1| > 5$



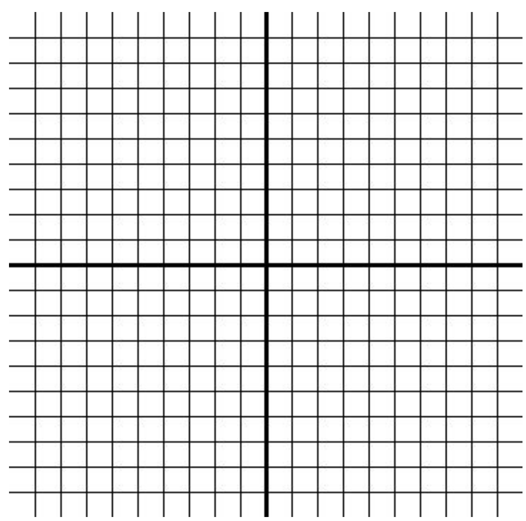
5) $y > 0$

$x - 2y \geq -6$



6) $y > x^2 - 4$

$3x + y < 4$



Section 3.3 Summary:

Section 3.4: Linear Programming
Essential Question:

* A process of optimizing a linear function to find its ________________ or ________________ value

* The process uses…
  1) An objective function
  2) Constraints (in the form of inequalities)
  3) Graph that is called the feasible region

Example 1

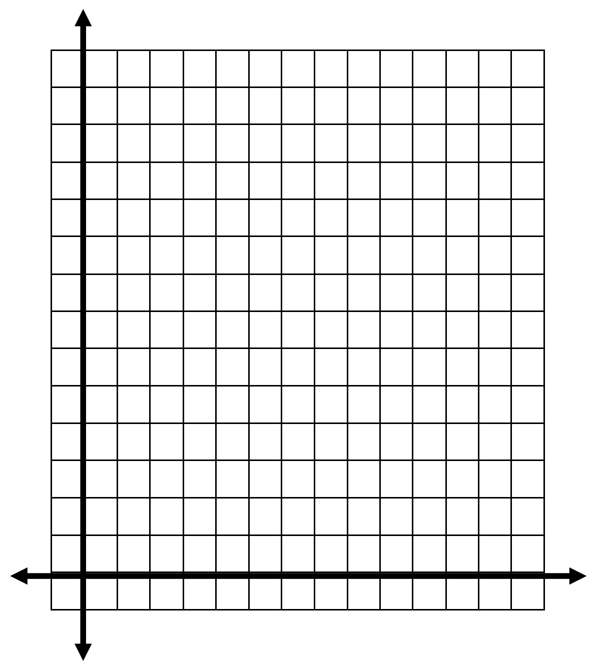
Find the minimum and maximum value of C = -x + 3y subject to the following constraints:

$x \geq 2$

$x \leq 5$

$y \geq 0$

$y \leq -2x + 12$



Vertices	**Value of function**
_______	_______________
_______	_______________
_______	_______________
_______	_______________

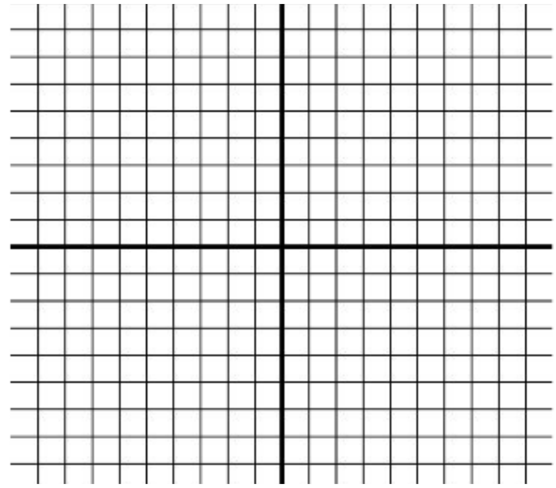
Minimum occurs @ _________

Maximum occurs @ _________

CORNER POINT PRINCIPLE

The maximum and minimum values occur at a __________________ of the feasible region.

Example 2
Find the min and max value of C = x + 5y subject to the following constraints.



$x \geq 0$

$5 \geq x + y$

$y - 2 \leq 2x$

Example 3
Write the constraints and objective function for the following linear programming problem.

The area of a parking lot is 600 square meters. A car requires 6 square meters and a bus requires 30 square meters. The attendant can only handle 60 vehicles. If a car is charged $2.50 and a bus $7.50, how many of each should be accepted to maximize income?

Step #1 Define the variables. Be SPECIFIC!!!

Step #2 Write the Objective function
- usually involves money
- contains information about maximizing or minimizing

Step #3 Write the constraints.
-These are the linear inequalities
- look for limitations!

Step #4 Graph the constraints.

Step #5 Determine vertices and find max or min

Vertices	**Value of function**	**Vertices**	**Value of function**
________	________________	________	________________
________	________________	________	________________

Section 3.4 Summary: