Chapter 9 – Linear and Quadratic Inequalities

9.1 – Linear Inequalities in Two Variables

Inequality - < or >

Solution Region (solution set) – All the points in this region would satisfy the inequality

Steps:

1. Graph the linear equation (use a dotted line if it is < or > and a solid line if it is also = to)
2. Pick a tester point on your Cartesian plane and sub this into your inequality
3. If the test point checks out to be true you shade on this side of your line, if it is false you shad on the other side of your line.

Examples:

1. Graph 4x + 2y ≥ 10.

Determine if the point (1,3) is a part of the solution.

1. Graph 5x – 20y < 0

1. Your turn page 469

9.2 – Quadratic Inequalities in One Variable

Method 1 –

1. Graph the function
2. Find where the graph (on the x axis) goes below the line < or above the line >.

Method 2 – Roots and test points

1. Solve the equation by finding the roots (setting y = 0)
2. Put the roots on a number line (you should have 2 section or 3 sections)
3. State the different intervals and pick a point from each interval.
4. Sub this point into your equation and this will tell you if it checks out to be true or not.

Method 3 – Sign Analysis

1. Find the roots (setting y = 0 and factor, or use the quadratic formula)
2. Put the roots on a number line and find the different intervals (2 or 3 intervals)
3. Set up in a chart:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Interval 1 | Interval 2 | Interval 3 |
| (FACTOR) |  |  |  |
| (FACTOR) |  |  |  |
| (FACTOR)(FACTOR) |  |  |  |

1. Pick test points from each interval and plug it in to each factor to see if it gives a positive or a negative answer.
2. Multiply the + and – together to get your final row.

Examples:

1. Solve x2 – 10x + 16 ≤ 0
2. Solve –x2 + 3x + 10 < 0 using 2 different methods.
3. Solve x2 – 4x > 10
4. Your turn page 483

9.3 – Quadratic Inequalities in Two Variables

These steps are the same as 9.1 steps but you will be graphing a parabola. First change the graph into vertex graphing form then find the vertex, x-int, and y-int.

Examples:

1. Graph y > (x-4)2 – 2

Determine if the point (2,1) is a solution of the inequality

1. Graph y ≤ -x2 + 2x + 4
2. Your turn page 494