Inequalities

Finite Math

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Graphing Linear Inequalities in Two Variables

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2. *Choose a test point anywhere in the plane, as long as it is not on the line.*
3. *Plug the point from step (2) into the inequality. Is the inequality true? Shade in the side of the line with that point. If the inequality is false, shade in the other side.*

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Example

Graph the inequality

$$6x - 3y \geq 12$$

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$$4x + 8y < 32$$

Now You Try It!

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Graph the inequality

$$2y \leq 10$$

Example

Graph the inequality

$$2x - 5y > 10$$

Solving Systems of Linear Inequalities Graphically

Definition (Solution Region/Feasible Region)

Given a system of inequalities, the solution region or feasible region consists of all points (x, y) *which simultaneously satisfy all of the inequalities in the system.*

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Example

Solve the following system of linear inequalities graphically:

$$\begin{array}{rcrcl} 3x & + & y & \leq & 21 \\ x & - & 2y & \leq & 0 \end{array}$$

Now You Try It!

Example

Solve the following system of linear inequalities graphically:

$$\begin{array}{rcrcl} 3x & + & y & \geq & 6 \\ x & - & 5y & \leq & 5 \end{array}$$

Corner Points

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Example

Solve the following system of linear inequalities graphically and find the corner points:

$$\begin{array}{rcrcl} x & + & y & \leq & 10 \\ 5x & + & 3y & \geq & 15 \\ -2x & + & 3y & \leq & 15 \\ 2x & - & 5y & \leq & 6 \end{array}$$

Now You Try It!

Example

Solve the following system of linear inequalities graphically and find the corner points:

$$\begin{array}{rcrcl} 5x & + & y & \geq & 20 \\ x & + & y & \geq & 12 \\ x & + & 3y & \geq & 18 \\ & & x & \geq & 0 \\ & & y & \geq & 0 \end{array}$$

Bounded and Unbounded Regions

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A solution region of a system of linear inequalities is bounded if it can be enclosed within a circle. If it cannot be enclosed within a circle, it is unbounded.

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Question

Which of the regions in examples 1-4 are bounded? Which are unbounded?