

Algebra: Systems of Linear Inequalities

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DIRECTIONS

Describe the solution region for each system of linear inequalities.

1 Describe the solution region:

$$\left\{ \begin{array}{l} x+y \leq 5 \\ x-y \geq 1 \end{array} \right.$$

Answer: _____

2 Describe the solution region:

$$\left\{ \begin{array}{l} y \geq -x+4 \\ y < 3x \end{array} \right.$$

Answer: _____

3 Describe the solution region:

$$\left\{ \begin{array}{l} y > 2x-1 \\ y \leq x+3 \end{array} \right.$$

Answer: _____

4 Describe the solution region:

$$\left\{ \begin{array}{l} y < 4 \\ y \geq 2x-3 \end{array} \right.$$

Answer: _____

5 Describe the solution region:

$$\left\{ \begin{array}{l} x \geq 0 \\ y \geq 0 \end{array} \right.$$

Answer: _____

6 Describe the solution region:

$$\left\{ \begin{array}{l} y > x+1 \\ y < -x+5 \end{array} \right.$$

Answer: _____

7 Describe the solution region:

$$\left\{ \begin{array}{l} x+2y < 6 \\ 3x-y > 0 \end{array} \right.$$

Answer: _____

8 Describe the solution region:

$$\left\{ \begin{array}{l} 2x+y \leq 4 \\ y \geq x-2 \end{array} \right.$$

Answer: _____

9 Describe the solution region:

$$\left\{ \begin{array}{l} y > x \\ y < x+4 \end{array} \right.$$

Answer: _____

10 Describe the solution region:

$$\left\{ \begin{array}{l} y \leq 3x+2 \\ y \geq -2x+1 \end{array} \right.$$

Answer: _____

Answer Key & Solutions

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TEACHER NOTES Graph each boundary line, shade the correct half-plane, then identify the overlapping region.

1 Describe the solution region:

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Overlap: on/below $x + y = 5$ and on/below $x - y = -1$

$$\left\{ \begin{array}{l} x+y \leq 5 \\ x-y \geq -1 \end{array} \right. \text{right.}$$

2 Describe the solution region:

=

Overlap: on/above $y = -x + 4$ and below $y = 3x$

$$\left\{ \begin{array}{l} y \geq -x+4 \\ y < 3x \end{array} \right. \text{right.}$$

3 Describe the solution region:

=

Overlap region above $y = 2x - 1$ and on/below $y = x + 3$

$$\left\{ \begin{array}{l} y > 2x-1 \\ y \leq x+3 \end{array} \right. \text{right.}$$

4 Describe the solution region:

=

Overlap: below $y = 4$ and on/above $y = 2x - 3$

$$\left\{ \begin{array}{l} y < 4 \\ y \geq 2x-3 \end{array} \right. \text{right.}$$

5 Describe the solution region:

=

First quadrant (including axes)

$$\left\{ \begin{array}{l} x \geq 0 \\ y \geq 0 \end{array} \right. \text{right.}$$

6 Describe the solution region:

=

Overlap: above $y = x + 1$ and below $y = -x + 5$

$$\left\{ \begin{array}{l} y > x+1 \\ y < -x+5 \end{array} \right. \text{right.}$$

7 Describe the solution region:

=

Overlap: below $x + 2y = 6$ and above $3x - y = 0$

$$\left\{ \begin{array}{l} x+2y < 6 \\ 3x-y > 0 \end{array} \right. \text{right.}$$

8 Describe the solution region:

=

Overlap: on/below $2x + y = 4$ and on/above $y = x - 2$

$$\left\{ \begin{array}{l} 2x+y \leq 4 \\ y \geq x-2 \end{array} \right. \text{right.}$$

9 Describe the solution region:

=

Overlap: above $y = x$ and below $y = x + 4$

$$\left\{ \begin{array}{l} y > x \\ y < x+4 \end{array} \right. \text{right.}$$

10 Describe the solution region:

=

Overlap: on/below $y = 3x + 2$ and on/above $y = -2x + 1$

$$\left\{ \begin{array}{l} y \leq 3x+2 \\ y \geq -2x+1 \end{array} \right. \text{right.}$$