Graph the inequality.

1. $y \geq -1$
2. $4x - 5y < 3$
3. $7x - 4y \geq -9$
4. $-5x - 6y > 14$
5. $\frac{x}{5} - y \leq 2$
6. $y \geq 2$

Warm Up

- Use graph paper to graph
- Set each to $y = mx + b$ and then graph
- Check answers using graphing technology

Solve the inequality.

1. $2y + 8 \leq 16$
2. $10 - q \geq 14$
3. $4p \leq 16$
4. $10(2g + 3) \geq 10 \cdot 3g$
5. $7(x + 6) \leq 2(5x)$
6. $z + (-8) > 6$

Cumulative Warm Up

Set up into $y = mx + b$

find y-intercept (b)

find slope (m) always $\frac{y}{x}$

if not a fraction - make a fraction by putting the number over 1.

Essential Question

How can you graph a system of linear inequalities?

Essential Question

What you will learn:

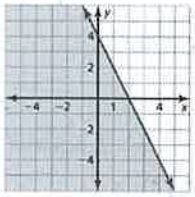
- Check solutions of linear inequalities
- Graph systems of linear inequalities
- Write systems of linear inequalities
- Use systems of linear inequalities to solve real-world problems.

Work with a partner. Match each linear inequality with its graph. Explain your reasoning.

$2x + y \leq 4$ Inequality 1

$2x - y \leq 0$ Inequality 2

A.



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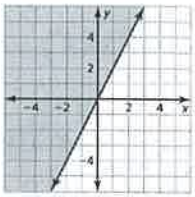


Exploration 1

Change each inequality to $y = mx + b$

- find y-intercept
- count slope
- check shaded region by using test point

Work with a partner. Consider the linear inequalities given in Exploration 1.

$2x + y \leq 4$ Inequality 1

$2x - y \leq 0$ Inequality 2

a. Use two different colors to graph the inequalities in the same coordinate plane. What is the result?

b. Describe each of the shaded regions of the graph. What does the unshaded region represent?

Exploration 2

* Graphing technology can be used to show the overlapping region.

Tell whether each ordered pair is a solution of the system of linear inequalities.

$y < 2x$ Inequality 1

$y \geq x + 1$ Inequality 2

a. (3, 5)

b. (−2, 0)

Example 1

- substitute the values from the coordinate (x, y) and verify that both inequalities are true.

Tell whether the ordered pair is a solution of the system of linear inequalities.

1. $(-1, 5)$; $y < 5$, $y > x - 4$

2. $(1, 4)$; $y \geq 3x + 1$, $y > x - 1$

Monitoring Progress 1-2

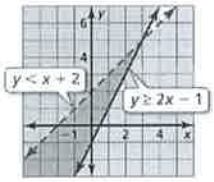
Student practice

Core Concept

Graphing a System of Linear Inequalities

Step 1 Graph each inequality in the same coordinate plane.

Step 2 Find the intersection of the half-planes that are solutions of the inequalities. This intersection is the graph of the system.



Core Concept

Graph the system of linear inequalities.

$y \leq 3$ Inequality 1

$y > x + 2$ Inequality 2

Example 2

Student practice

Graph the system of linear inequalities.

$2x + y < -1$ Inequality 1

$2x + y > 3$ Inequality 2

Example 3

Graph the system of linear inequalities.

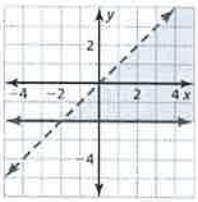
3. $y \geq -x + 4$
$x + y \leq 0$

4. $y > 2x - 3$
$y \geq \frac{1}{2}x + 1$

5. $-2x + y < 4$
$2x + y > 4$

Monitoring Progress 3-5

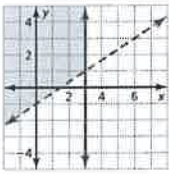
Write a system of linear inequalities represented by the graph.



Example 4

find y intercept, count slope, determine shaded region by using a test point, pick >, < or ≥, ≤

Write a system of linear inequalities represented by the graph.

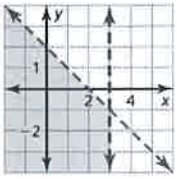


Example 5

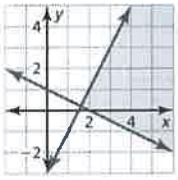
Student practice

Write a system of linear inequalities represented by the graph.

6.



7.



Monitoring Progress 6-7

You have at most 8 hours to spend at the mall and at the beach. You want to spend at least 2 hours at the mall and more than 4 hours at the beach. Write and graph a system that represents the situation. How much time can you spend at each location?

$x + y \leq 8$

$x \geq 2$

$y > 4$

Example 6

Use graphing paper to graph each inequality and find the overlapping shaded region

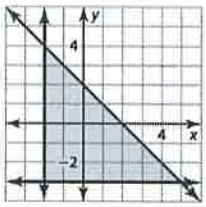
8. Name another solution of Example 6.

9. WHAT IF? You want to spend at least 3 hours at the mall. How does this change the system? Is (2.5, 5) still a solution? Explain.

Monitoring Progress 8-9

- Name an ordered pair that is a solution of the system of linear inequalities.

- Name an ordered pair that is not a solution of the system of linear inequalities.



Closure

- find a coordinate pair in the shaded region

- find a coordinate pair out side of the the shaded region