6-6 Graph Systems of Linear Inequalities

Name _____ Date _____

Solve by graphing: $\begin{cases} 3x + 2y \geq 8 \\ x - 3y > -6 \end{cases}$

Then name two ordered pairs that are solutions and two that are not.

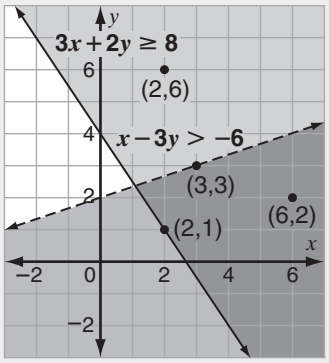
1 Graph the first inequality.

$3x + 2y \geq 8$

$y \geq -\frac{3}{2}x + 4$ ← Solve the inequality for y.

$m = -\frac{3}{2}$, $b = 4$

This region *includes* the boundary line $y = -\frac{3}{2}x + 4$ and all points *above* it.



2 Graph the second inequality.

$x - 3y > -6$

$y < \frac{1}{3}x + 2$ ← Solve the inequality for y.

$m = \frac{1}{3}$, $b = 2$

This region lies *below* the boundary line $y = \frac{1}{3}x + 2$.

3 The solution of the system of inequalities consists of coordinates of all ordered pairs in the area where the shaded regions *intersect.*

(2, 1) and (6, 2) are solutions.
(2, 6) and (3, 3) are not solutions.

On a separate sheet of paper, graph the system of inequalities. Tell if the given ordered pair is a solution of the system.

1. $\begin{cases} x + 2y > -3 \\ 3x + 4y < 12 \end{cases}$ $(1, 2)$

$x + 2y > -3$ | $3x + 4y < 12$

$1 + 2(2) \stackrel{?}{>} -3$ | $3(1) + 4(2) \stackrel{?}{<} 12$

$1 + 4 \stackrel{?}{>} -3$ | $3 + 8 \stackrel{?}{<} 12$

True: $5 > -3$ | True: $11 < 12$

yes

2. $\begin{cases} 4x - y < -6 \\ x + 3y > 8 \end{cases}$ $(-2, 5)$

3. $\begin{cases} 3x - 2y \geq -1 \\ 2x + y < 6 \end{cases}$ $(10.3, -3.8)$

4. $\begin{cases} 2x - 5y > 3 \\ 3x + 2y \leq 6 \end{cases}$ $(-4.9, 5.1)$

5. $\begin{cases} 3x - 8y \geq 7 \\ 6x + 16y \leq -6 \end{cases}$ $\left(\frac{2}{3}, -\frac{5}{8}\right)$

6. $\begin{cases} 4x - 12y \leq -13 \\ 8x + 6y \leq 0 \end{cases}$ $\left(-\frac{3}{4}, \frac{5}{6}\right)$

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On a separate sheet of paper, graph each system of inequalities. Describe the solution.

7. $\begin{cases} y \le x - 6 \\ y > x - 10 \end{cases}$

8. $\begin{cases} y < x + 4 \\ y \ge x - 4 \end{cases}$

9. $\begin{cases} 0.1x + 0.2y \ge 7 \\ 3.2x + 6.4y \ge -32 \end{cases}$

$y \le x - 6$
$m = 1$; $b = -6$
solid line
shaded below

$y > x - 10$
$m = 1$; $b = -10$
dashed line
shaded above

The solutions are all points on the solid upper line and between the parallel lines.

10. $\begin{cases} 5.2x + 3.6y \le -3 \\ 26x + 18y \le -2 \end{cases}$

11. $\begin{cases} \frac{5}{6} > 3y - \frac{1}{4} \\ \frac{5}{2} + y > \frac{11}{3} \end{cases}$

12. $\begin{cases} \frac{1}{4} > 5x + \frac{2}{3} \\ \frac{3}{2} + x > \frac{8}{5} \end{cases}$

Problem Solving

Graph each system on grid paper to show all possible solutions. Then name three ordered pairs that are solutions.

13. Online shopping An online media company sells customers songs for \$1 and TV shows for \$2.50. José wants to spend no more than \$15 but wants to buy at least 4 items (songs and/or shows).

14. Groceries Toothpaste costs \$3.50, and toothbrushes cost \$1.25. If Keisha has only \$12.50 and needs more than three toothbrushes or toothpastes, how many of each could she buy?

SPIRAL REVIEW

15. Graph: $\begin{cases} 2x + y = 9 \\ 2x + 2y = 8 \end{cases}$
Find and describe the solution.

16. Find the x- and y-intercepts of the equation.
$6x - 9y = 18$

17. Determine whether the sequence could be geometric, arithmetic, or neither. Use a pattern to write the next three terms.
500, 5, 0.05, 0.0005, …

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