

Lesson 11: Linear Inequalities in Two Variables

Do Now:

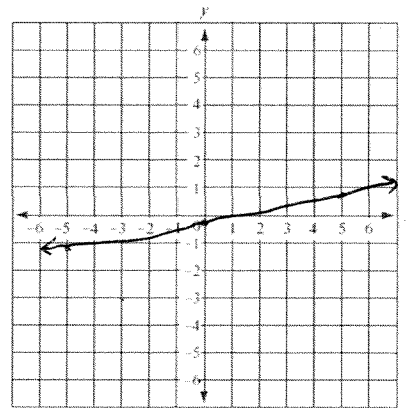
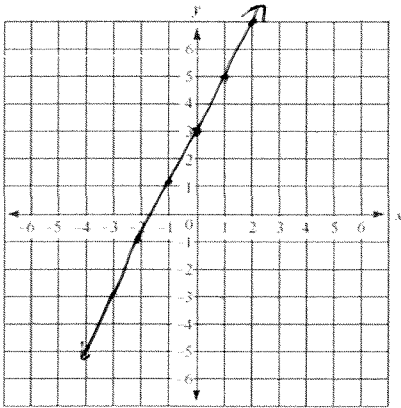
Graph the following functions:

$y = 2x + 3$

$5y = 2x - 1$

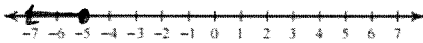
$y = \frac{2}{5}x - \frac{1}{5}$

$-2x + 5y = -1$

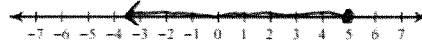


Draw a graph for each inequality.

1) $n \leq -5$



2) $n \leq 5$



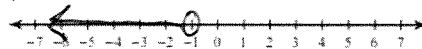
3) $4x + 13 \leq 33$

$x \leq 5$

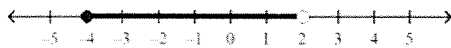


4) $-2x + 3 > 5$

$x < -1$

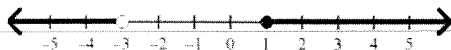


Write a compound inequality that the graph could represent.



- a. $-2 \leq x < 4$
- b. $-4 < x \leq 2$

- c. $x \geq -4$ or $x < 2$
- d. $-4 \leq x < 2$



- a. $d > -3$ or $d \leq 1$
- b. $d < -1$ or $d \geq 3$

- c. $d < -3$ or $d \geq 1$
- d. $-1 \leq d < 3$

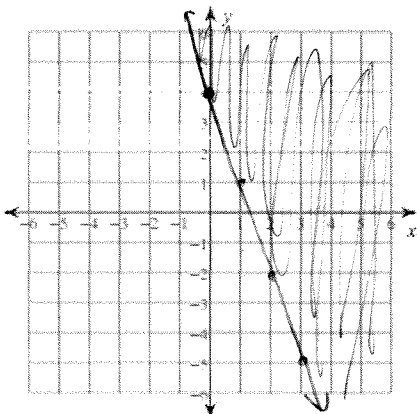
Inequalities are relations between expressions that are not equal. They use the signs:

1. $<$
2. $>$
3. \leq
4. \geq

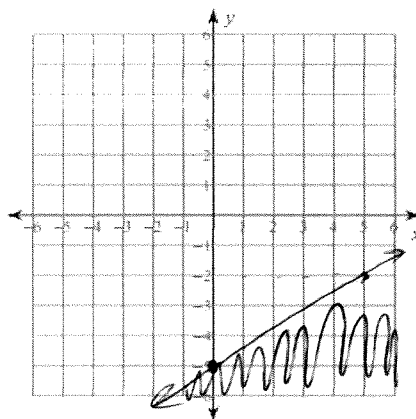
They are very useful! For example, I can mathematically model a situation in which I want to buy no more than \$100 worth of groceries and gas combined in one week using inequalities.

Sketch the graph of each linear inequality.

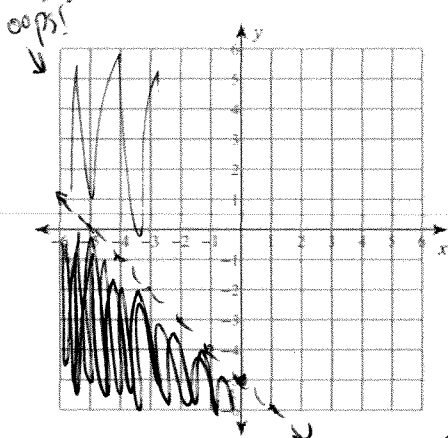
1) $y \geq -3x + 4$



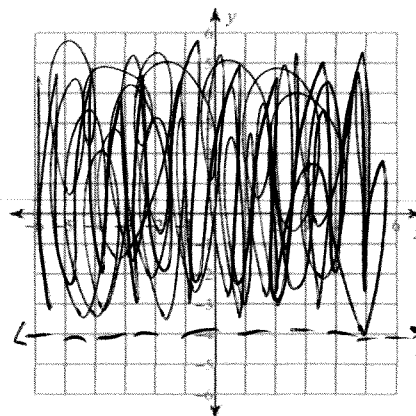
2) $y \leq \frac{3}{5}x - 5$



3) $y > -x - 5$

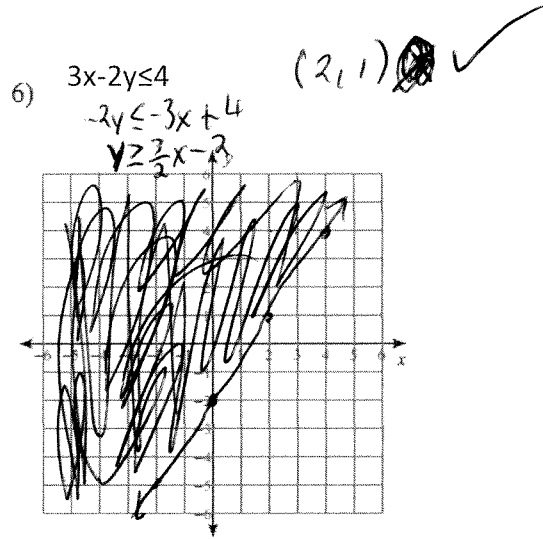
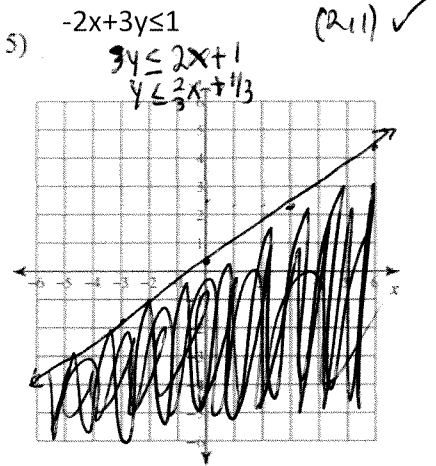


4) $y > -4$



The solution to an inequality is a half-plane. The boundary is a line (linear).

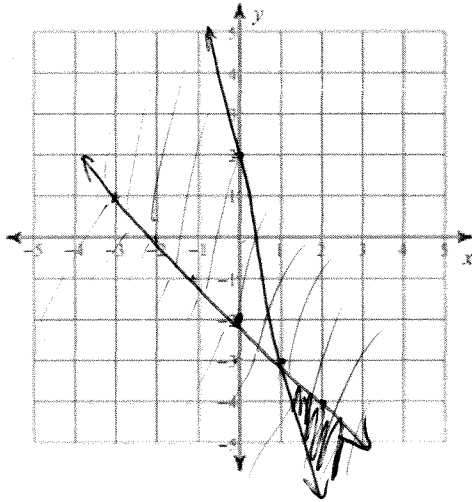
For which of these inequalities is (2, 1) in the solution set?



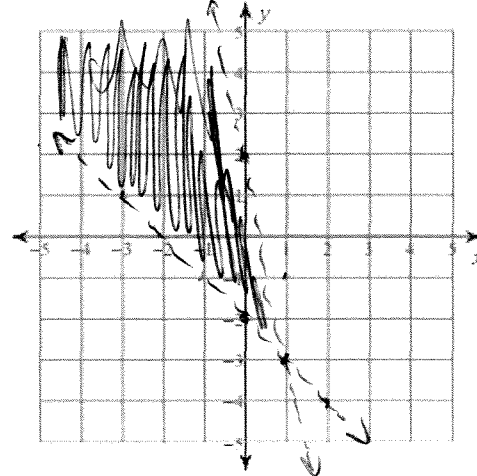
	Inequality in Standard Form	Inequality in Slope-Intercept Form	Quick Information
	$-2x+y \geq 0$	$y \geq 2x$	Slope: 2 y-int: 0 Boundary: $y=2x$
	$\frac{2}{3}x+y > 1$ $2x+3y > 3$	$y > -\frac{2}{3}x+1$	Slope: $-\frac{2}{3}$ y-int: 1 Boundary: $y = -\frac{2}{3}x+1$
	$3x+y \leq 4$	$y \leq -3x+4$	Slope: -3 y-int: 4 Boundary: $y = -3x+4$

Sketch the solution to each system of inequalities.

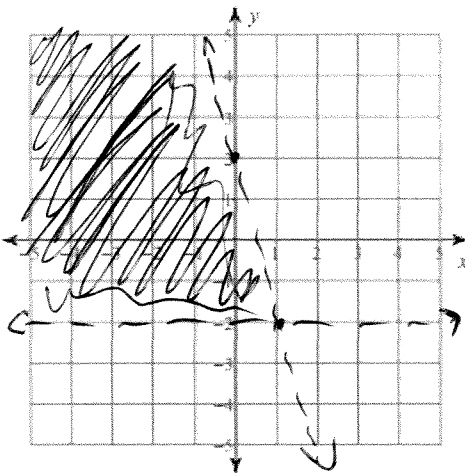
1) $y \leq -x - 2$
 $y \geq -5x + 2$



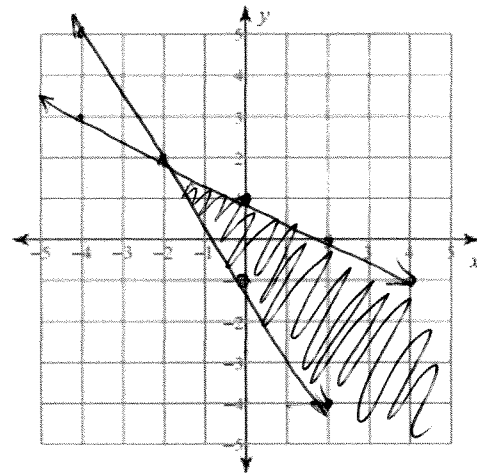
2) $y > -x - 2$
 $y < -5x + 2$



7) $4x + y < 2$ $y < -4x + 2$
 $y > -2$ $y > -2$



8) $3x + 2y \geq -2$ $y \geq -\frac{3}{2}x - 1$
 $x + 2y \leq 2$ $y \leq -\frac{1}{2}x + 1$



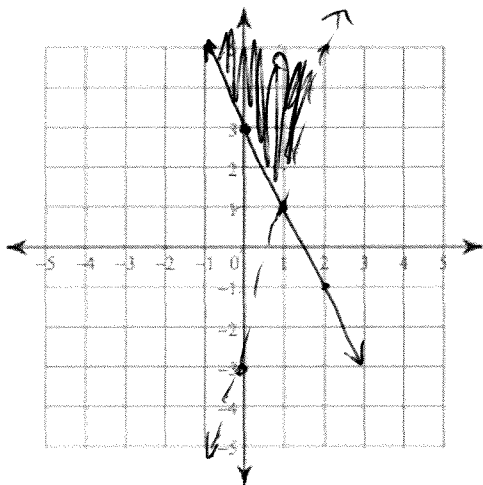
For 7 and 8, state three coordinates that are solutions to the system:

7:

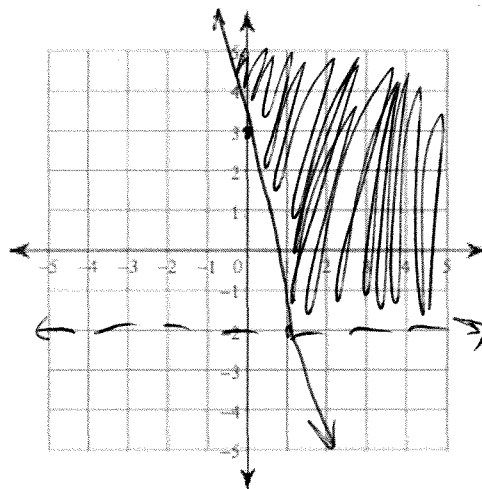
8:

Sketch the solution to each system of inequalities.

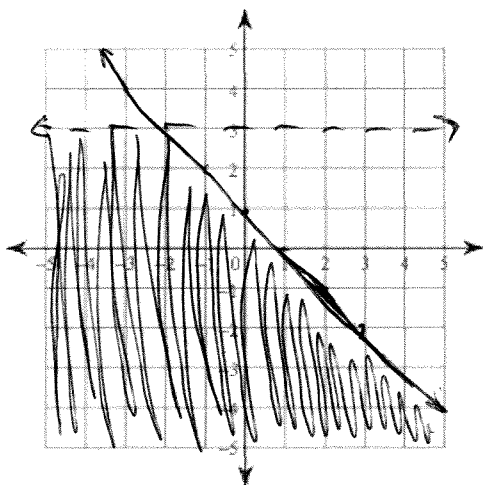
1) $y > 4x - 3$
 $y \geq -2x + 3$



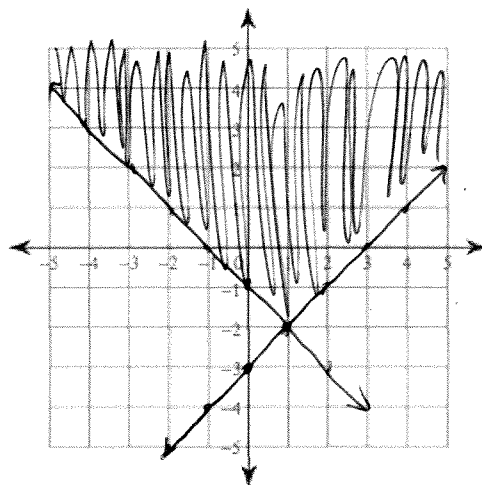
2) $y \geq -5x + 3$
 $y > -2$



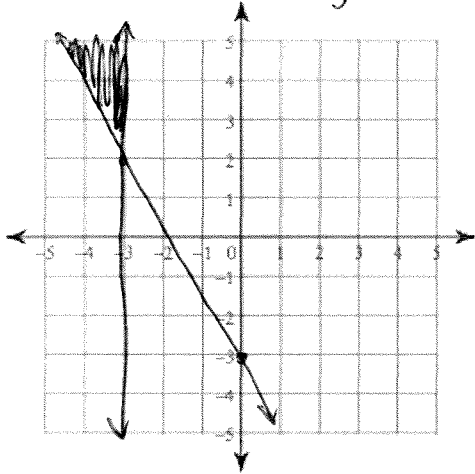
3) $y < 3$
 $y \leq -x + 1$



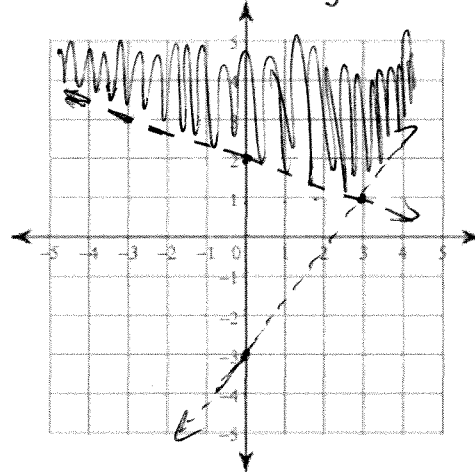
4) $y \geq x - 3$
 $y \geq -x - 1$



5) $x \leq -3$
 $5x + 3y \geq -9$ $y \geq -\frac{5}{3}x - 3$



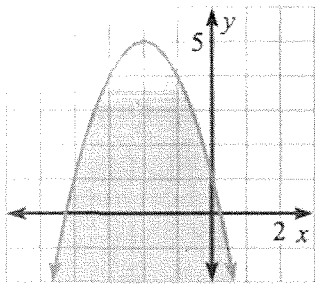
6) $4x - 3y < 9$ $y > \frac{4}{3}x - 3$
 $x + 3y > 6$ $y > -\frac{1}{3}x + 2$



MATCHING GRAPHS Match the inequality with its graph.

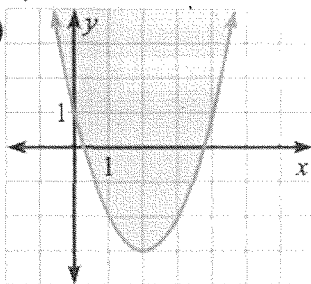
14. $y \geq x^2 - 4x + 1$

(A)
16



15. $y < x^2 - 4x + 1$

(B)
14



16. $y \leq -x^2 - 4x + 1$

(C)
15

