Lesson 7.3: Linear Inequalities in Two Variables

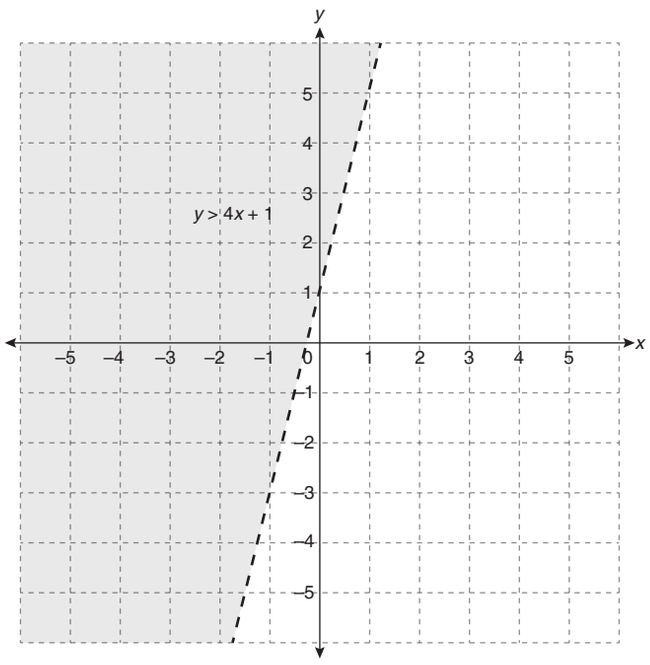
Practice Solutions – III

1. Isolate y in the inequality $13x - \frac{4}{5}y \geq 48$.

$$13x - \frac{4}{5}y \geq 48$$
$$-\frac{4}{5}y \geq 48 - 13x$$
$$y \leq -\frac{5}{4}(48 - 13x)$$
$$y \leq -60 + \frac{65}{4}x$$

2. Graph the following inequalities.

a. $y > 4x + 1$



Graph the boundary $y = 4x + 1$. The inequality is strict, so use a dashed line.

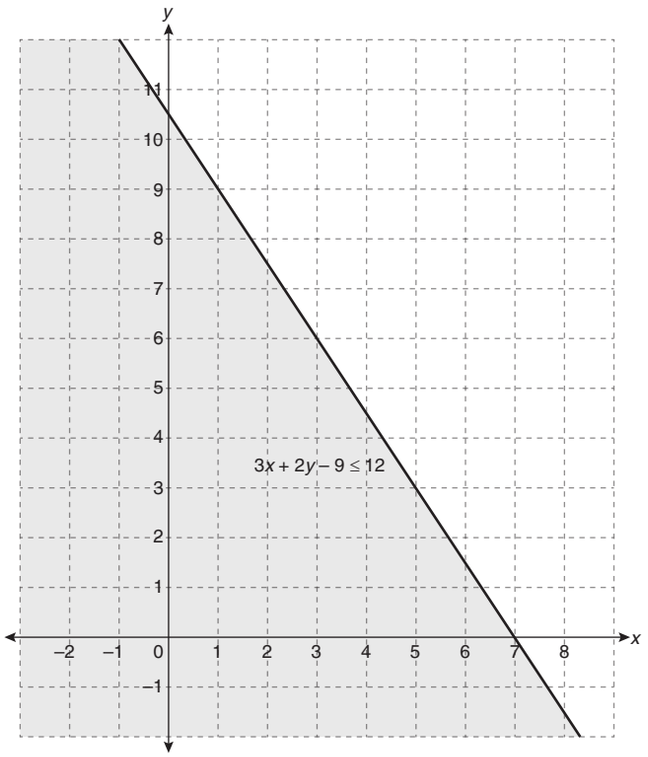
Use a test point to determine on which side of the boundary lies the solution region.

The point (0, 0) is shown.

Left Side	Right Side
y	$4x + 1$
0	$4(0) + 1$
	1
LS < RS	

The test point does not satisfy the inequality, so the half-plane containing (0, 0) is not the solution region.

b. $3x + 2y - 9 \leq 12$



$3x + 2y - 9 = 12$

$3x + 2y = 21$

Graph the boundary $3x + 2y = 21$. The inequality is not strict, so use a solid line.

Use a test point to determine on which side of the boundary lies the solution region.

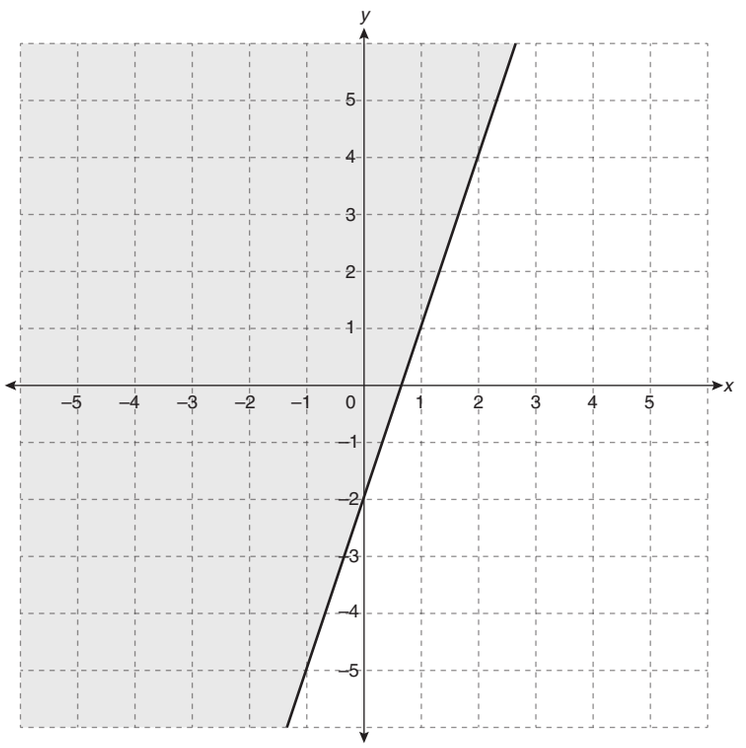
The point (0, 0) is shown.

Left Side	Right Side
$3x + 2y - 9$ $3(0) + 2(0) - 9$ -9	12
LS $\leq$ RS	

The test point satisfies the inequality, so the half-plane containing (0, 0) is the solution region.

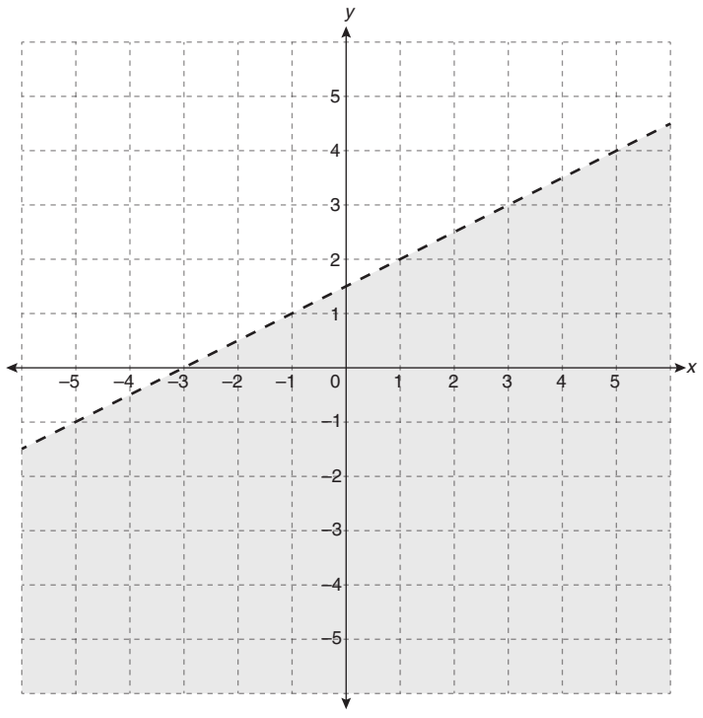
3. State an inequality represented by each graph.

a.



The boundary is defined by $y = 3x - 2$. The inequality is not strict and the y-values are always above the boundary, so an inequality is $y \geq 3x - 2$.

b.



The boundary is defined by $y = \frac{1}{2}x + \frac{3}{2}$. The inequality is strict and the y-values are always below the boundary, so an inequality is $y < \frac{1}{2}x + \frac{3}{2}$.

4. Explain why choosing a test point on the boundary of an inequality is not useful for determining where the solution region lies.

A test point on the boundary will always satisfy a non-strict inequality and will never satisfy a strict inequality. Neither case provides any information on where the solution region lies.

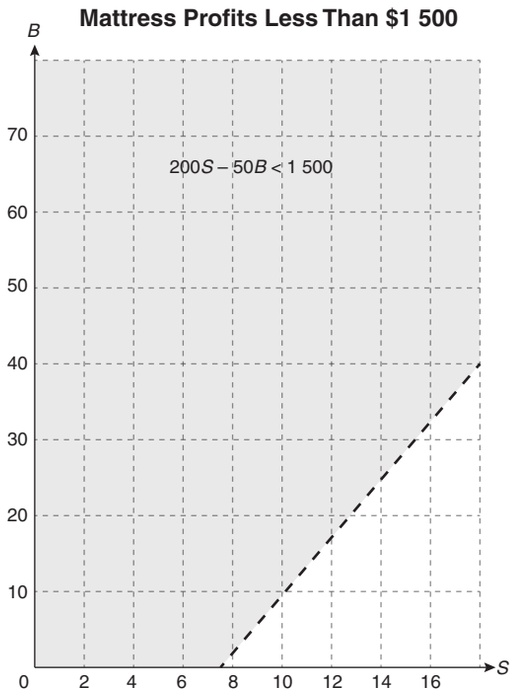
5. A used furniture store buys old mattresses for \$50 and sells them for \$200.

   a. Write an inequality representing all the possible combinations of mattress purchases and sales that will result in a profit of less than \$1 500.

   Let B be the number of mattresses bought and let S be the number of mattresses sold.

   $200S - 50B < 1\ 500$

b. Graph the inequality.



c. Describe an aspect of the used furniture business that an inequality cannot account for.

Descriptions will vary, but may include limited stock space, limited buyers, limited sellers, buying may need to occur before selling, etc.

Please complete *Lesson 7.3 Explore Your Understanding Assignment* located in *Workbook 7A* before proceeding to *Lesson 7.4*.