

Writing & Graphing Linear Inequalities

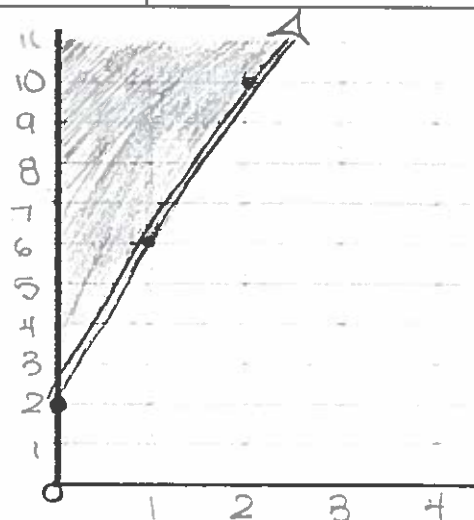
Review Inequality Symbols & Words:

	Greater than:	Greater than or equal to:	Less than:	Less than or equal to:
Symbol	$>$	\geq	$<$	\leq
Words	above exceeding	no less than Minimum at least	below shorter than smaller than	maximum at most

(1) A server earns a wage of \$4 per hour plus \$2 for coming in for the shift. However, the server always earns some money in tips, so that wage is a minimum for what the server can earn in one shift. Write a linear inequality for the amount the server can earn y in a shift of x hours. Graph the inequality.

$m=4$ $y \geq 4x + 2$
 $b=2$
 start @ 2 on the y-axis

after 1 hour she earns at least \$6 but could also earn more.



(2) Graph the linear inequality.

$$3x - 2y > 10$$

$$\begin{array}{r} 3x - 2y > 10 \\ -3x \quad -3x \\ \hline -2y > -3x + 10 \\ \hline -2 \quad -2 \\ \hline y < \frac{3}{2}x - 5 \end{array}$$

Steps for Graphing Linear Inequalities

(1) Solve for y
 ** Reverse symbol if you multiply/divide by a negative!

(2) Start at the y-intercept (b).

(3) Write slope as rise/run to plot points.

(4) Connect points with dotted line
 line if $<$ or $>$.

Connect points with solid
 line if \leq or \geq .

(5) Shade above line if $>$, \geq .

Shade below line if $<$, \leq .

~~not a solution~~

Test the point (0, 0) to be sure you shaded correctly.

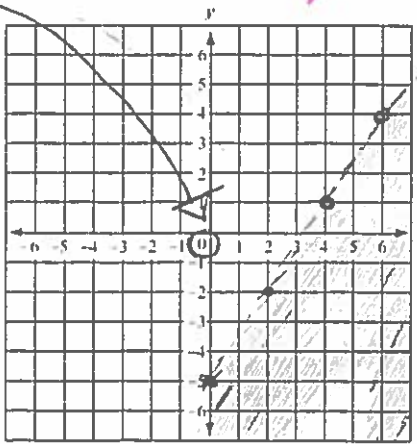
$$y < \frac{3}{2}x - 5$$

$$(0) < \frac{3}{2}(0) - 5$$

$$0 < 0 - 5$$

$$0 < -5$$

False!



(3) For each inequality, determine whether the line would be dotted (D) or solid (S). Determine whether you would shade above (A) or below (B) the line.

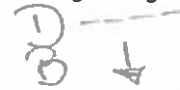
a. $y > 2x + 2$



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



c. $y < \frac{7}{3}x + \frac{8}{3}$



Multiple Choice Practice

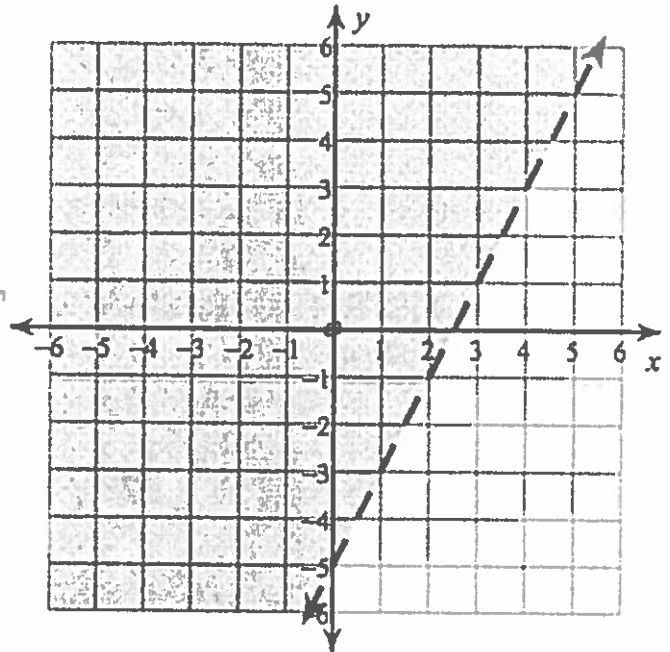
(1) What is the inequality for the graph on the right? EXPLAIN why each INCORRECT answer is incorrect.

a. $y < 2x - 5$; Because this is below, and least than

b. $y < 2x + 5$; Because this is below, and least than and a solid line.

c. $y > 2x - 5$

d. $y \geq 2x - 5$; Because this is below and a solid line.



Test the point (0, 0) in the inequality you chose and show your work. Does this test confirm your answer?

$y > 2x - 5$
 $(0) > 2(0) - 5$
 $0 > 0 - 5$
 $0 > -5$ ✓
 (0, 0) is in shaded region ✓

(2) Ms. Draper's sister has already painted 2 letters for wall decorations for her friend. She can paint at most 5 letters per hour. Write an inequality for the number of letters she can paint, y , given the number of hours, x , she has been painting.

a. $y \leq 2x + 5$

b. $y \leq 5x + 2$
 at most

c. $y \geq 7x$

d. $y \geq 2x + 5$

(3) Cameron has a maximum of \$5 to spend on healthy snacks. Apples are \$1 each and oranges are \$1.50 each. Write an inequality to represent the situation if x is number of apples and y is number of oranges.

a. $y \leq 2.50x$

b. $1.50y \leq x + 5$

c. $x + 1.50y \geq 5$

d. $x + 1.50y \leq 5$