Algebra 1: 7.1 & 7.2 Quiz Review **Name** ____________________ **Period** ____

Linear Inequalities & Systems of Inequalities

SHOW YOUR WORK!!

Define each of the following terms. Use your notes and the Carnegie Learning handout for chapter 7 if you need help.

1) Linear Inequality - the graph is a shaded region of the coordinate plane with a boundary line.

2) Systems of Linear Inequalities - two or more linear inequalities

3) Constraints - another name for inequalities in a system of linear inequalities because the solutions are "constrained" to the shaded region of the graph.

Fill in the blanks.

4) The ordered pairs are located in the shaded area of the graph and on the solid line.

5) Ordered pairs that make the inequality or inequalities true are called solutions.

6) Solutions for a system of inequalities are all the ordered pairs in the overlapping shaded region.

7) If the shaded regions do not overlap, there is no solution.

Determine if the graph of each linear inequality will have a DASHED or SOLID line AND if you shade ABOVE or BELOW the line.

8) $y < 14x - 7$

dashed line

shade below

9) $y - 9x \geq 3$

$+9x \quad +9x$

$y \geq 9x + 3$

solid line

shade above

10) $4x - 2y \leq 8$

$-4x \quad -4x$

$\frac{-2y}{-2} \leq \frac{-4x}{-2} + \frac{8}{-2}$

$y \geq 2x - 4$

Flip the sign

solid line

shade above

11) Jacob can spend ***no more than*** \$4 for chips and candy. Chips cost \$1 each and candy costs \$0.50 each.

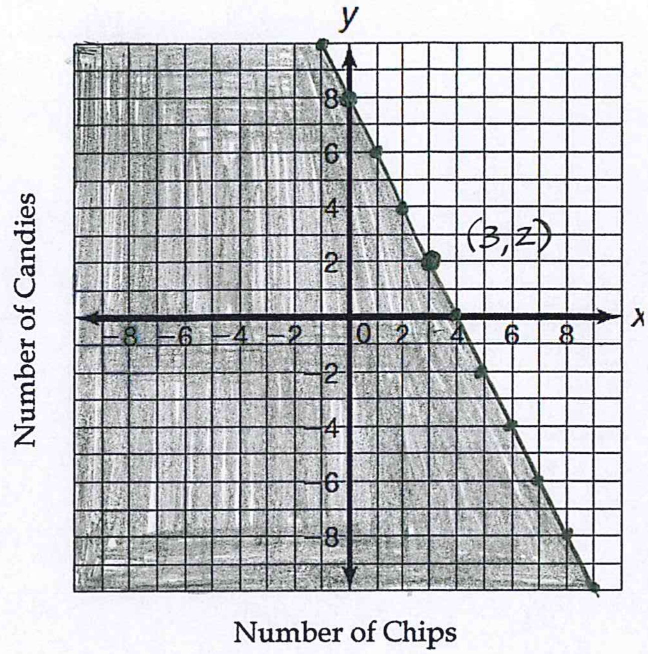
a. Write a linear inequality to represent the number of ways Jacob can spend \$4.

x = # of chips, y = # of candies

$1x + 0.5y \le 4$

b. Graph the inequality. Don't forget to shade! $y \le -2x + 8$

solid line, shade below



c. Use the graph to determine if the ordered pair (3, 2) is a solution to the problem situation? Yes, (3, 2) is a solution.

d. Prove algebraically that the ordered pair (4, 8) is a solution to the problem situation.

$x = 4, y = 8$ $\quad 1(4) + 0.5(8) \le 4$

$4 + 4 \le 4$

$8 \le 4$ No, (4,8) is <u>not</u> a solution.

e. Does the ordered pair (-2, -3) make sense as a solution in the context of this problem situation? Why or why not?

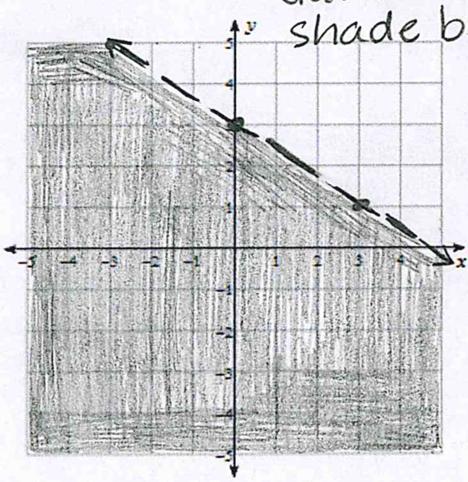
No, you can't buy a negative number of chips or candy.

Graph each of the linear inequalities.

12) $y < -\frac{2}{3}x + 3$

$-\frac{2}{3}$ or $\frac{2}{-3}$

dashed line
shade below



13) $x - 5y \ge -10$

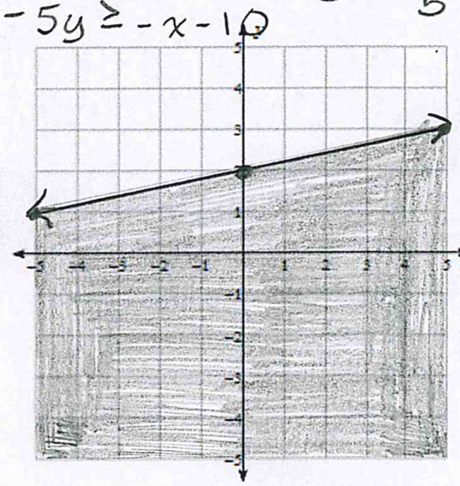
$-x \qquad -x$

$-5y \ge -x - 10$

$\frac{-5y}{-5} \ge \frac{-x}{-5} - \frac{10}{-5}$

$y \le \frac{1}{5}x + 2$

solid line
shade
below



Write a <u>system</u> of linear inequalities for each problem situation. Remember to define your variables.

14) Pablo's truck can carry ***a maximum of*** 1,000 pounds. He loads his truck with 20-pound bags of cement and 80-pound bags of cement. He plans to load ***at least*** 10 bags of cement into his truck.

x = # 20 lb bags of cement
y = # 80 lb bags of cement

$$\begin{cases} 20x + 80y \le 1000 \\ x + y \ge 10 \end{cases}$$

15) Kathryn makes flower arrangements to sell in her shop. She can make a small arrangement in 30 minutes (or 1/2 hour) that sells for $20. She can make a large arrangement in 1 hour that sells for $50. Kathryn hopes to make ***at least*** $350 by working ***no more than*** 8 hours.

x = # of small arrangements
y = # of large arrangements

$$\begin{cases} 20x + 50y \ge 350 \\ \frac{1}{2}x + 1y \le 8 \end{cases}$$

Prove algebraically whether the given point is a solution to the system of linear inequalities.

16) $\begin{cases} x + 5y < -1 \\ 2y \ge -3x - 2 \end{cases}$

Point: (0, -1) $x = 0,\ y = -1$

$0 + 5(-1) < -1$
$-5 < -1$
yes / true

$2(-1) \ge -3(0) - 2$
$-2 \ge -2$
yes / true

(0, -1) is a solution

17) $\begin{cases} 4x + y < 21 \\ \frac{1}{2}x \le 36 - 5y \end{cases}$

Point: (3, 7) $x = 3,\ y = 7$

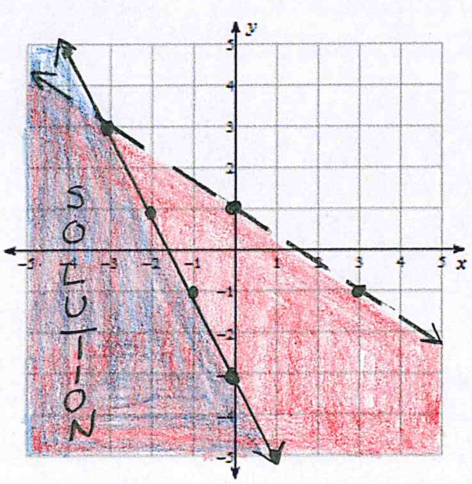
$4(3) + 7 < 21$
$19 < 21$
yes / true

$\frac{1}{2}(3) \le 36 - 5(7)$
$1.5 \le 36 - 35$
$1.5 \le 1$
no / not true

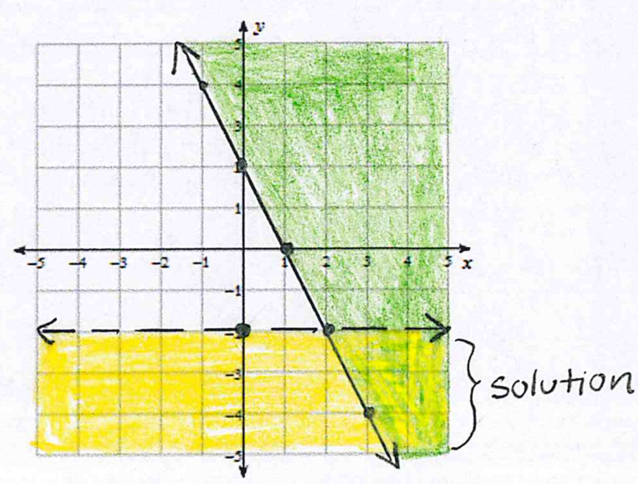
(3, 7) is not a solution

Graph each system of linear inequalities.

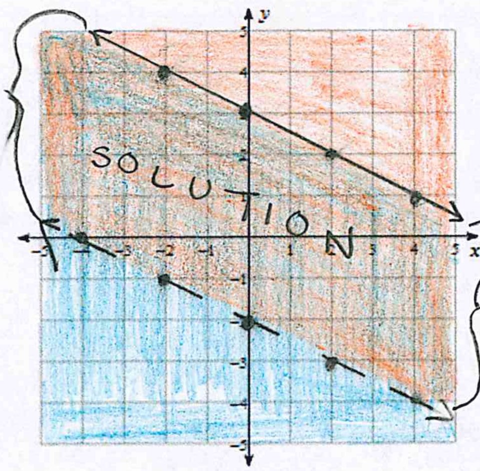
18) $\begin{cases} y \le -2x - 3 \\ y < -\frac{2}{3}x + 1 \end{cases}$



19) $\begin{cases} y \ge -2x + 2 \\ y < -2 \end{cases}$

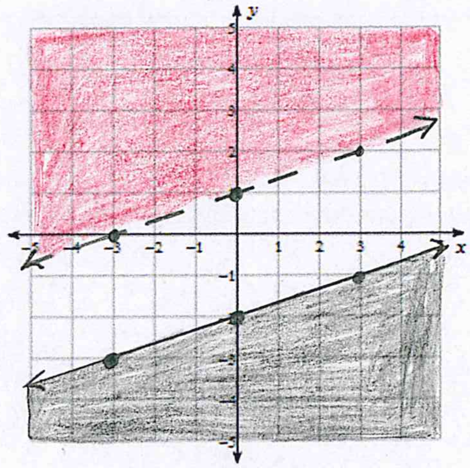


20) $\begin{cases} y > -\frac{1}{2}x - 2 \\ y \le -\frac{1}{2}x + 3 \end{cases}$



Solution

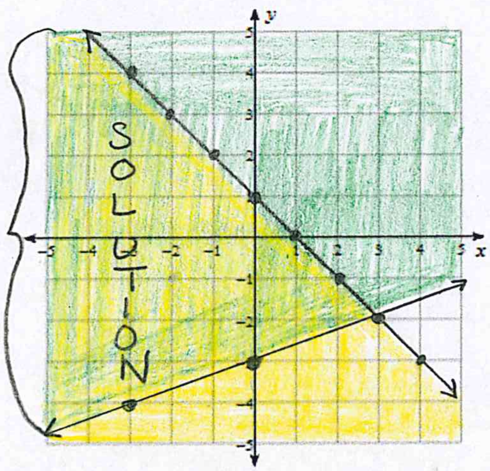
21) $\begin{cases} y \le \frac{1}{3}x - 2 \\ y > \frac{1}{3}x + 1 \end{cases}$



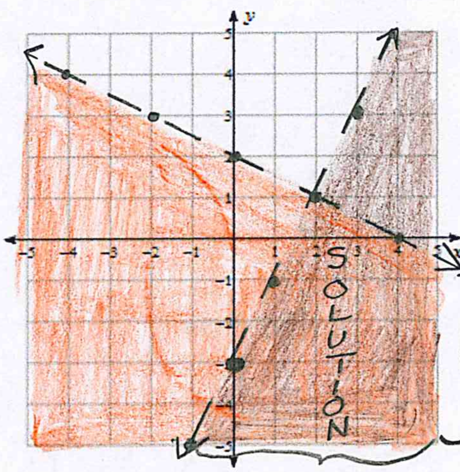
No solution

22) $\begin{cases} x + y \le 1 \\ x - 3y \le 9 \end{cases}$ $y \le -1x + 1$, $y \ge \frac{1}{3}x - 3$

Solution



23) $\begin{cases} x + 2y < 4 \\ 2x - y > 3 \end{cases}$ $y < -\frac{1}{2}x + 2$, $y < 2x - 3$



solution

$x + y \le 1$

$-x \quad -x$

$y \le -x + 1$

$x - 3y \le 9$

$-x \quad -x$

$\frac{-3y}{-3} \le \frac{-x}{-3} + \frac{9}{-3}$

$y \ge \frac{1}{3}x - 3$

$x + 2y < 4$

$-x \quad -x$

$\frac{2y}{2} < \frac{-1x}{2} + \frac{4}{2}$

$y < -\frac{1}{2}x + 2$

$2x - y > 3$

$-2x \quad -2x$

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

$y < 2x - 3$