Name Key Period _____

Lesson 6.6 Notes (Systems of Inequalities)

Objectives:

- Solve systems of linear inequalities by graphing.
- Apply systems of linear inequalities.

System of Inequalities – a set of two or more inequalities with the same variables

- **Solve by Graphing** – solution is the set of ordered pairs that satisfy all of the inequalities in the system
  - represented by the overlap, or intersection, of the graphs of the inequalities
  - **No Solution -** the regions never intersect (no points in common)

Examples: Solve each system of inequalities by graphing.

1. $\begin{cases} y > -2x + 1 \\ y \leq x + 3 \end{cases}$

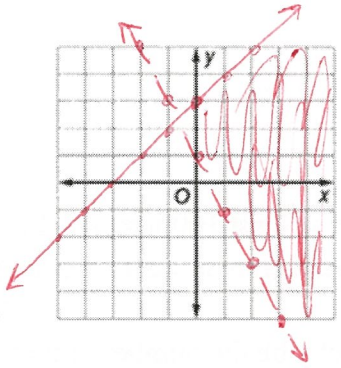
Test (3,0):

$0 > -2(3) + 1$

$0 > -5$ ✓

$0 \leq 3 + 3$

$0 \leq 6$ ✓



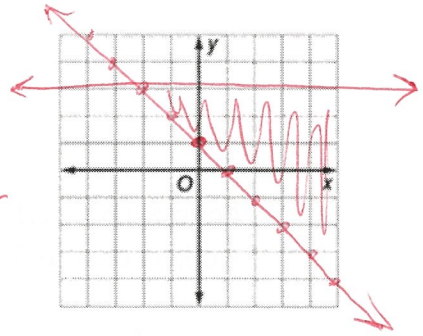
2. $\begin{cases} y \leq 3 \\ x + y \geq 1 \end{cases} \Rightarrow y \geq -x + 1$

Test (3,0):

$0 \leq 3$ ✓

$3 + 0 \geq 1$

$3 \geq 1$ ✓



Practice: Solve each system of inequalities by graphing.

3. $\begin{cases} x + y > 2 \\ -4x + 2y < 8 \end{cases} \Rightarrow y > -x + 2 \Rightarrow y < 2x + 4$

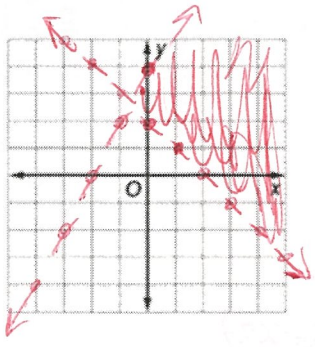
Test (4,0):

$4 + 0 > 2$

$4 > 2$ ✓

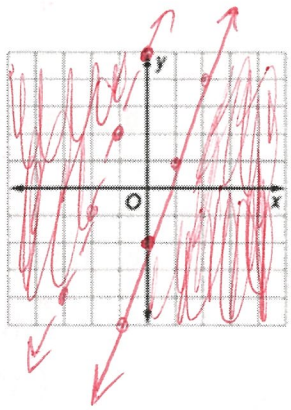
$-4(4) + 2(0) < 8$

$-16 < 8$ ✓



4. $\begin{cases} 3x - y \geq 2 \\ 3x - y < -5 \end{cases} \Rightarrow y \leq 3x - 2 \Rightarrow y > 3x + 5$

NO Solution



Name _____ Period _____

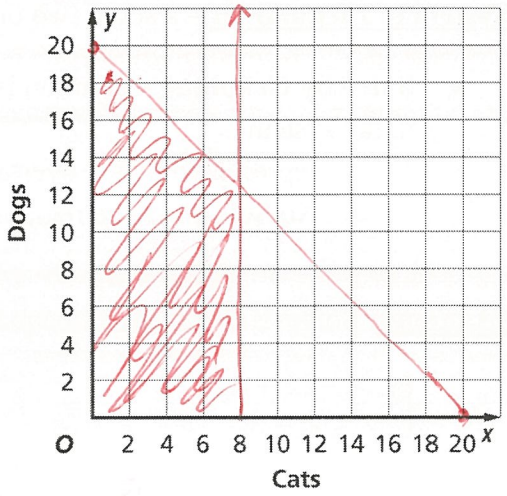
Real-world Applications:

5. Renée's Pet Store never has more than a combined total of 20 cats and dogs and never more than 8 cats.

   a. Define the variables, and write a system of inequalities to represent this situation. Then graph the system. c = cats d = dogs

   $c + d \leq 20$

   $c \leq 8$



   b. Name one possible solution.

   4 cats, 6 dogs

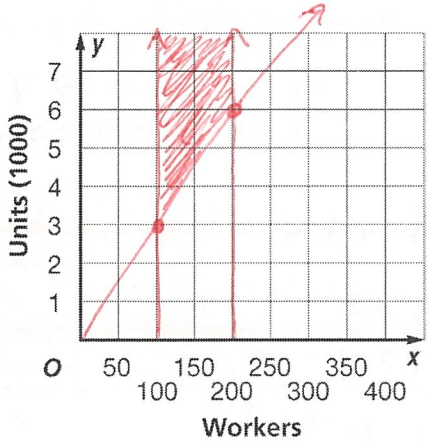
6. For maximum efficiency, a factory must have at least 100 workers, but no more than 200 workers on a shift. The factory also must manufacture at least 30 units per worker.

   a. Let x be the number of workers and let y be the number of units. Write three inequalities expressing the conditions in the problem given above.

   $x \geq 100$

   $x \leq 200$

   $y \geq 30x$



   b. Graph the system of inequalities.

   c. List at least three possible solutions.

   (110, 3410) (180, 6300)

   (150, 5100)