Name _____   **Period** _____

Homework Packet Week #1

All problems with answers or work are examples.

Lesson 7.1

Write a linear inequality in two variables to represent each problem situation.

EXAMPLE 1. Tanya is baking zucchini muffins and pumpkin muffins for a school event. She needs at least 500 muffins for the event.

$x + y \geq 500$

2. Patti makes decorative flower pots. It costs her $20 to purchase the materials for each pot. She wants to charge more than $6 per hour of labor plus her materials cost for each pot.

3. Jose and Devon are working on a construction job together. Devon can put in 4 times as many hours per week as Jose. Together they must work at least 80 hours per week.

Tell whether the graph of each linear inequality will have a dashed line or a solid line. Explain your reasoning.

EXAMPLE 4. $x - 3y \leq 32$

The line will be solid because the symbol is ≤.

5. $-5.2y - 8.3x \leq -28.6$ **6.** $y < 14x + 9$

For each inequality, use the test point (0, 0) to determine which half-plane should be shaded.

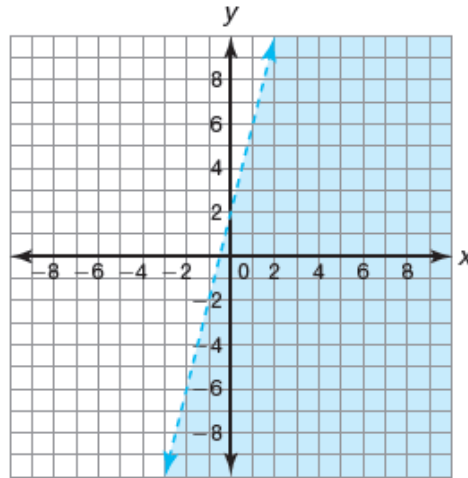**EXAMPLE 7.** $5x + 7y > -13$

$5(0) + 7(0) > -13$

$0 > -13$

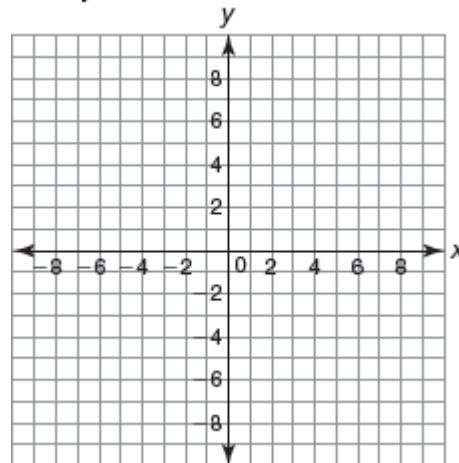The half-plane that includes (0, 0) should be shaded because the inequality is true for that point.

8. $46 \geq -5y + 10x$ **9.** $-8y > 6x + 12$

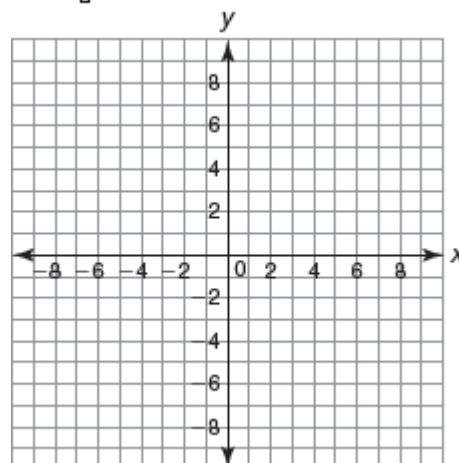**Graph each linear inequality.**

EXAMPLE 10. $y < 4x + 2$

11. $-x + y > 1$


12. $y \geq \dfrac{1}{2}x - 3$

Homework Packet Week #1

All problems with answers or work are examples.

Graph each inequality and determine if the ordered pair is a solution for the problem situation.

EXAMPLE 13. Marcus has 50 tokens to spend at the school carnival. The Ferris wheel costs 7 tokens and the carousel costs 5 tokens. The inequality $7x + 5y \le 50$ represents the possible ways Marcus could use his tokens on the two rides. Is the ordered pair (6, 3) a solution for the problem situation?
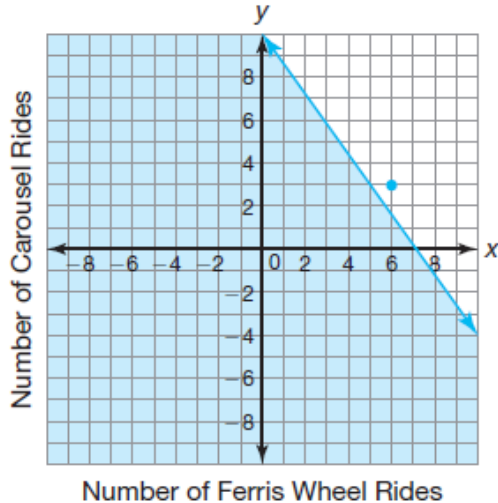

No. The ordered pair (6, 3) is not a solution to the inequality. It is not in the shaded half-plane.

14. Lea has $5 to buy notebooks and pens. Notebooks cost $1.25 each and pens cost $0.75 each. The inequality $1.25x + 0.75y \le 5$ represents the possible ways Lea could spend her $5. Is the ordered pair (5, 2) a solution for the problem situation?
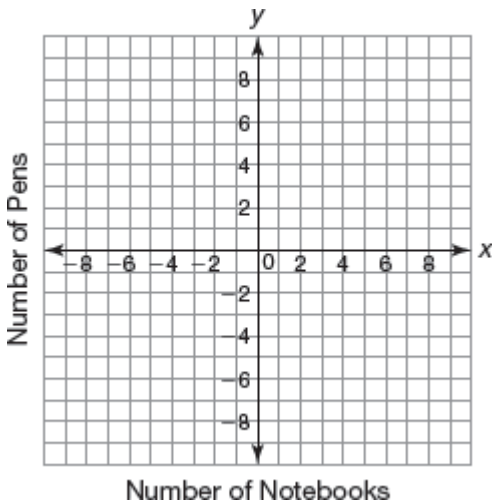
15. Noah plays football. His team's goal is to score at least 15 points per game. A touchdown is worth 6 points and a field goal is worth 3 points. Noah's league does not allow teams to try for the extra point after a touchdown. The inequality $6x + 3y \ge 15$ represents the possible ways Noah's team could score points to reach their goal. Is the ordered pair $(6, -1)$ a solution for the problem situation?
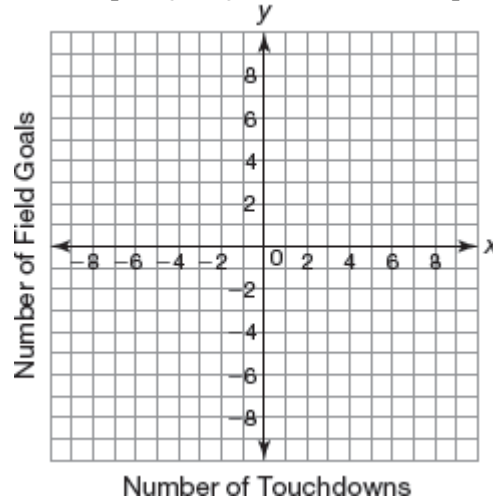
Lesson 7.2

Write a system of linear inequalities that represents each problem situation. Remember to define your variables.

16. Jamal runs the bouncy house at a festival. The bouncy house can hold a maximum of 1200 pounds at one time. He estimates that adults weigh approximately 200 pounds and children under 16 weigh approximately 100 pounds. For 1 four-minute session of bounce time, Jamal charges adults $3 each and children $2 each. Jamal hopes to charge at least $24 for each session.

x = the number of adults

y = the number of children

$$\begin{cases} 3x + 2y \ge 24 \\ 200x + 100y \le 1200 \end{cases}$$

17. Eiko is drawing caricatures at a fair for 8 hours. She can complete a small drawing in 15 minutes and charges $10 for the drawing. She can complete a larger drawing in 45 minutes and charges $25 for the drawing. Eiko hopes to make at least $200 at the fair.

Homework Packet Week #1

All problems with answers or work are examples.

18. Pablo's pickup truck can carry a maximum of 1000 pounds. He is loading his truck with 20-pound bags of cement and 80-pound bags of cement. He hopes to load at least 10 bags of cement into his truck.

Determine whether each given point is a solution to the system of linear inequalities.

EXAMPLE 19. $\begin{cases} 2x - y > 4 \\ -x + y \le 7 \end{cases}$

Point: $(-2, -10)$

$2x - y > 4$
$2(-2) - (-10) > 4$
$-4 + 10 > 4$
$6 > 4 \checkmark$

$-x + y \le 7$
$-(-2) + (-10) \le 4$
$2 - 10 \le 7$
$-8 \le 7 \checkmark$

Yes. The point $(-2, -10)$ is a solution to the system of inequalities.

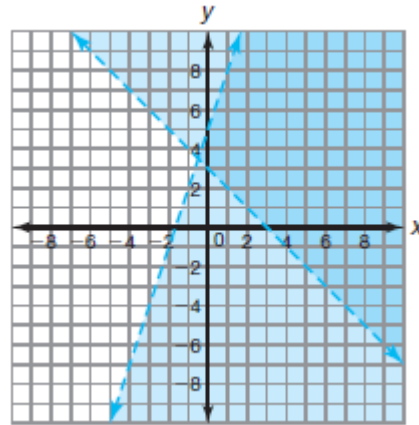**20.** $\begin{cases} 15x + 25y \ge 300 \\ 20x + 30y \le 480 \end{cases}$

Point: $(14, 8)$

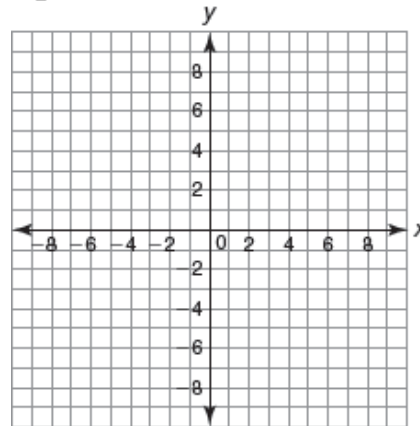**21.** $\begin{cases} 5x + 3y > 6 \\ -2x + 2y < 20 \end{cases}$

Points: $(-2, 6)$

Graph each system of linear inequalities and identify two solutions.

EXAMPLE 22. $\begin{cases} y - 3x < 5 \\ y + x > 3 \end{cases}$
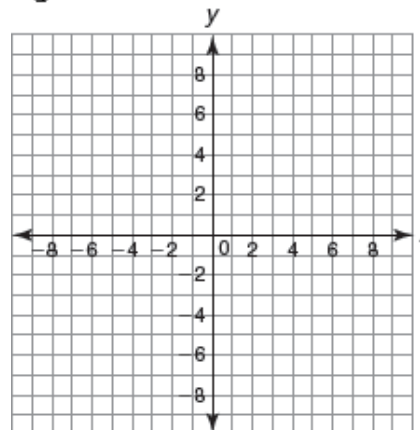

Answers will vary.
(2, 3) and (6, 0)

23. $\begin{cases} y \ge -\dfrac{1}{3}x + 4 \\ y \ge 2x + 5 \end{cases}$

24. $\begin{cases} y < -\dfrac{1}{2}x + 6 \\ y < 2x + 1 \end{cases}$

Homework Packet Week #1

All problems with answers or work are examples.

Lesson 7.3

Write a system of linear inequalities that represents each problem situation. Remember to define your variables.

EXAMPLE 25. Ronna is shopping for a winter coat. The regular price of a winter coat is between $65 and $180. The store is running a special promotion where all coats are up to 35% off the regular price. Write a system of linear inequalities that represents the amount Ronna could spend.

Let r represent the regular price.

Let s represent the amount Ronna could spend.

$$\begin{cases} r \geq 65 \\ r \leq 180 \\ s \leq 0.65r \end{cases}$$

26. A company manufactures at most 20 mattresses each day. The company produces a twin size mattress and a queen size mattress. Its daily production goal is to produce at least 5 of each type of mattress. Write a system of linear inequalities that represents the number of each type of mattress that can be produced.

27. Mario is shopping for a watch. The regular price of a watch is between $45 and $120. The store is running a special promotion where all watches are at least 25% off the regular price. Write a system of linear inequalities that represents the amount Mario could spend.

Graph the solution set for each system of linear inequalities. Label all points of intersection of the boundary lines. Then determine a point that satisfies all of the linear inequalities in the system.
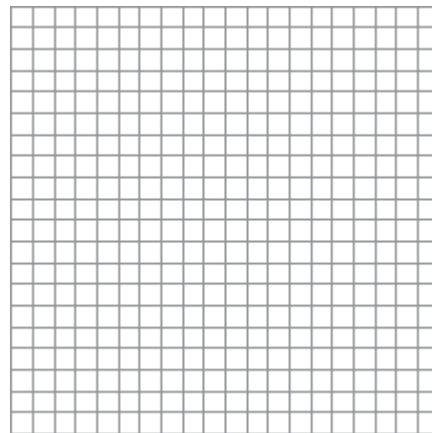
EXAMPLE 28. $\begin{cases} y \leq 4 \\ 2x - y \leq 10 \\ y > -x - 4 \end{cases}$
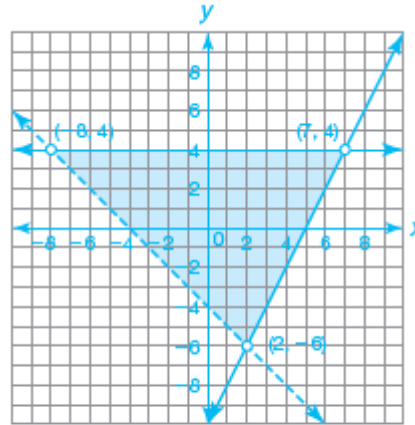
Answers will vary.
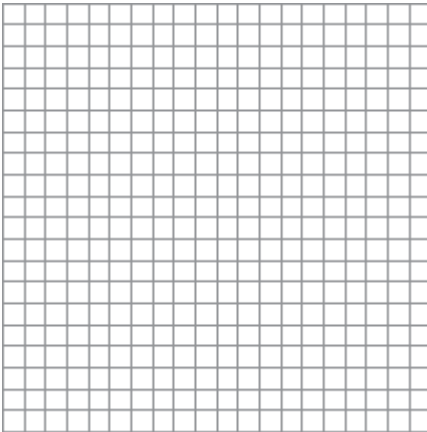
A solution to the system of inequalities would be (0, 0).

29. $\begin{cases} y > -2 \\ y \leq 5 \\ x \geq -3 \\ x \leq 1 \\ y > 3x + 1 \end{cases}$

Homework Packet Week #1

All problems with answers or work are examples.

30. $\begin{cases} y > -2 \\ y \le x + 1 \\ -x \le y + 3 \\ y \le -x + 1 \\ y \le 0 \end{cases}$

Lesson 7.4

Write a system of linear inequalities to represent each problem situation. Remember to define your variables.

EXAMPLE 31. A company is manufacturing two different models of lamps, a table lamp and a floor lamp. A table lamp takes 1 hour to make and a floor lamp takes 2 hours to make. The company has 9 employees working 8-hour days. The total manufacturing capacity is 40 lamps per day.

Let t represent the number of table lamps.

Let f represent the number of floor lamps.

9 employees × 8 hours per day = 72 work hours per day

$\begin{cases} t \ge 0 \\ f \ge 0 \\ t + f \le 40 \\ t + 2f \le 72 \end{cases}$

32. An electronics company is manufacturing headphones. In-ear headphones take 2 hours and $65 to make. Around-ear headphones take 3 hours and $85 to make. The company has 14 employees working 12-hour days. The daily operating budget is $5000 per day for materials to make at most 65 pairs of headphones.

33. A furniture company is manufacturing sofas and loveseats. A loveseat takes 5 hours and $650 to make. A sofa takes 8 hours and $950 to make. The company has 30 employees working 8-hour days. The daily operating budget is $25,000 per day for materials to make at most 40 pieces of furniture.

Graph the solution set for each system of linear inequalities. Label all points of intersection of the boundary lines.

34. $\begin{cases} y \ge 15 \\ x \ge 10 \\ 3x + 2y \le 90 \\ x + 2y \le 70 \end{cases}$
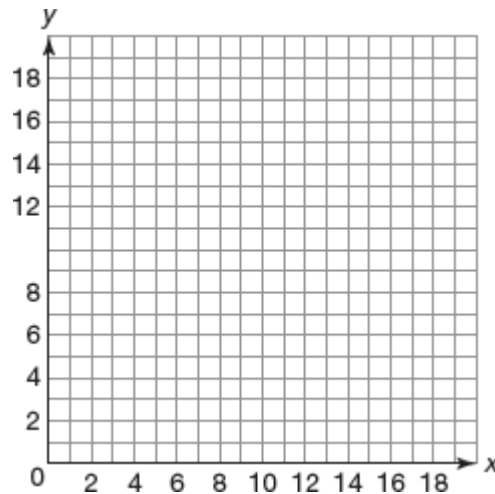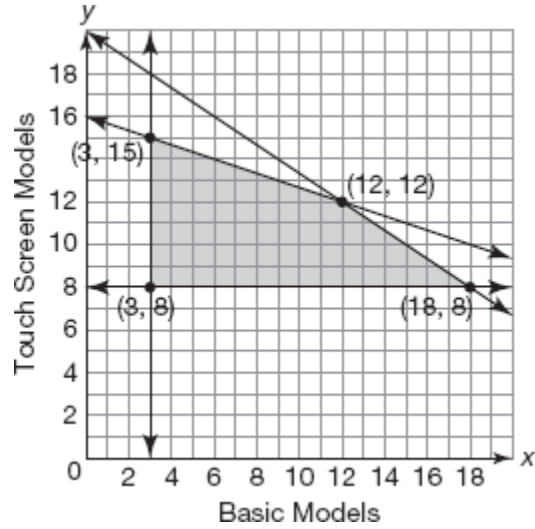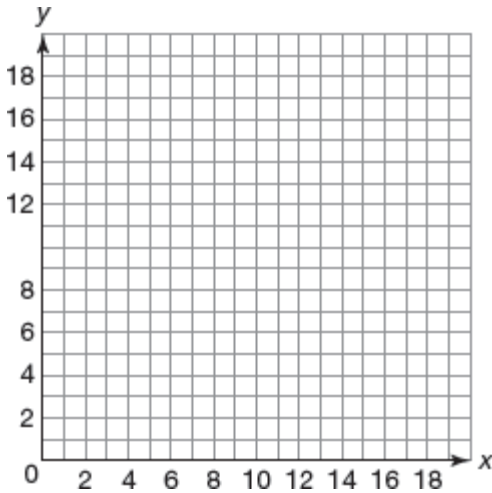
Homework Packet Week #1

All problems with answers or work are examples.

35.
$$\begin{cases} y \geq 10 \\ x \geq 20 \\ x + y \leq 90 \\ x + 4y \leq 240 \end{cases}$$

36. The company earns $30 for each basic model sold and $50 for each touch screen model sold. How many of each model should the company produce to **maximize their profit**?

Analyze the solution set for the system of linear inequalities to answer each question.

An electronics company is manufacturing electronic book readers. A basic model takes 4 hours and $40 to make. A touch screen model takes 6 hours and $120 to make. The company has 10 employees working 12-hour days. The daily operating budget is $1920 per day for materials. The company would like at least 3 basic models and 8 touch screen models produced per day. The system of linear inequalities represents the problem situation. The graph shows the solution set for the system of linear inequalities.

Let x represent the number of basic models.
Let y represent the number of touch screen models.

$$\begin{cases} y \geq 8 \\ x \geq 3 \\ 4x + 6y \leq 120 \\ 40x + 120y \leq 1920 \end{cases}$$

37. How many of each model would have to be produced to **maximize the company's daily cost**?