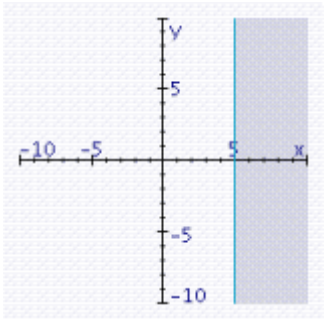
MATH M118 Practice Test Chapter 7

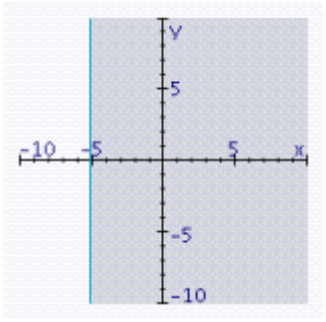
Problems #1-10: Identify the best answer from the given choices. Place the letter on the answer line.

1) Select the correct graph of $x \le -5$

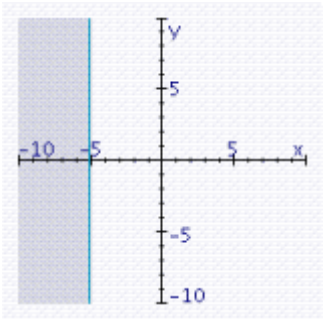
A.



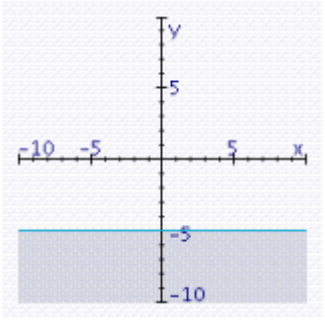
B.



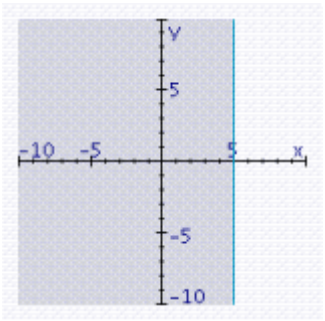
C.



D.

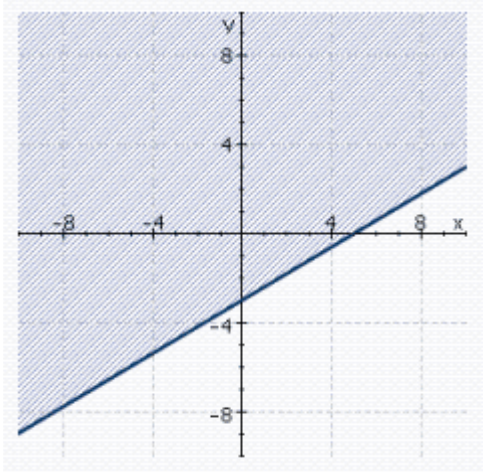


E.



Answer to #1 _____

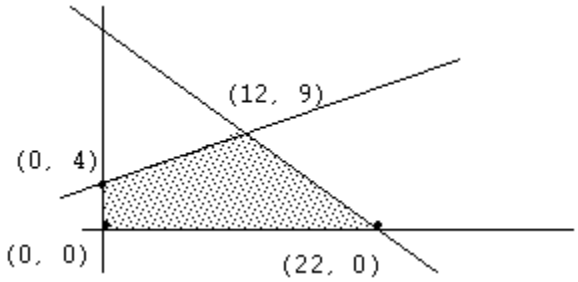
2) Which inequality does the graph satisfy?



A. $5x - 3y \le 15$
B. $3x - 5y \le 15$
C. $5x - 3y \ge 15$
D. $-3x - 5y \le 15$
E. $3x - 5y \ge 15$

Answer to #2 _____

3) Find the maximum value of $F = -30x + 50y$ in the feasible region shown below.



A. 1100
B. 90
C. 660
D. 200
E. 330

Answer to #3 _____

4) Select the point which is in the feasible region of the system of inequalities.

$$4x + y \le 8$$
$$2x + 5y \le 18$$
$$x \ge 0$$
$$y \ge 0$$

A. $(2, 4)$
B. $(1, 3)$
C. $(-1, 2)$
D. $(4, 1)$
E. $(0, 5)$

Answer to #4 _____

5) Which point is NOT a corner point of the feasible region of the following system of inequalities?

$$4x + 3y \le 15$$
$$x + 6y \le 9$$
$$x \ge 0$$
$$y \ge 0$$

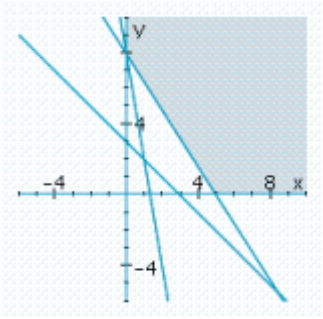
A. $(0, 5)$
B. $(3, 1)$
C. $(3.75, 0)$
D. $(0, 0)$
E. $(0, 1.5)$

Answer to #5 _____

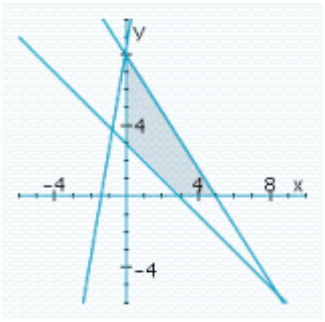
6) Select the correct graph of the given system of inequalities and indicate whether the solution set is bounded or unbounded.

$$8x + 5y \le 40$$
$$6x + y \ge 8$$
$$x + y \ge 3$$
$$x \ge 0$$
$$y \ge 0$$

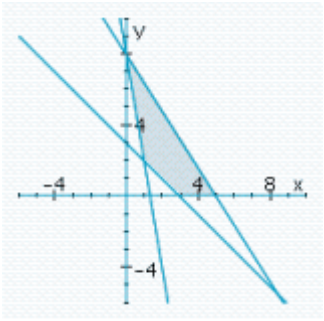
A. Unbounded



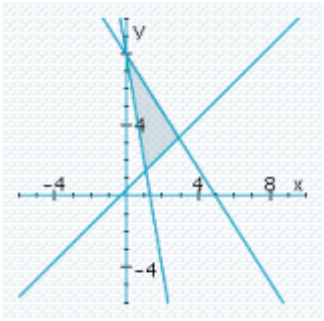
B. Bounded



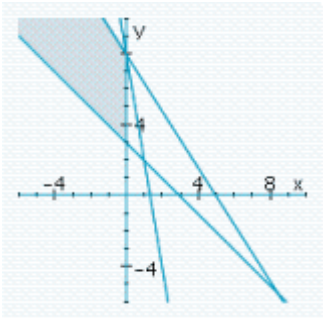
C. Bounded



D. Bounded



E. Unbounded



Answer to #6 _____

7) Solve the linear programming problem

Maximize $F = 8x + 2y$

Subject to $x + y \le 4$

$2x + y \le 5$

$x \ge 0$

$y \ge 0$

A. Max of 20 at $(2.5,\ 0)$

B. Max of 28 at $(2.5,\ 4)$

C. Max of 10 at $(0,\ 5)$

D. Max of 14 at $(1,\ 3)$

E. Max of 8 at $(0,\ 4)$

Answer to #7 _____

8) Solve the linear programming problem

Minimize $C = -3x + y$

Subject to $x + 3y \le 9$

$4x + 3y \le 12$

$x \ge 0$

$y \ge 0$

A. Min of 3 at $(0, 3)$

B. Min of 0 at $(0, 0)$

C. Min of -10 at $(4, 2)$

D. Min of -9 at $(3, 0)$

E. Min of -12 at $(4, 0)$

Answer to #8 _____

9) A tailor has 80 yards of cotton material and 120 yards of woolen material. A suit requires two yards of cotton and one yard of wool. A dress requires one yard of cotton and three yards of wool. A suit sells for $30 and a dress sells for $20. Let x = # of suits made and y = # of dresses made. If the goal is to maximize income, which of the following inequalities is a constraint to this linear programming problem?

A. $3x + y \ge 120$

B. $2x + y \ge 80$

C. $x + 2y \le 80$

D. $x + 2y \ge 120$

E. $x + 3y \le 120$

F. $3x + y \le 80$

Answer to #9 _____

10) The maximum daily production of an oil refinery is 1400 barrels. The refinery can produce two types of fuel: gasoline and heating oil. The production cost per barrel is $6 for gasoline and $8 for heating oil. The daily production budget is $9600. The profit is $3.50 per barrel on gasoline and $4 per barrel on heating oil. What is the maximum total profit, given these constraints?

A. $4800

B. $4900

C. $5000

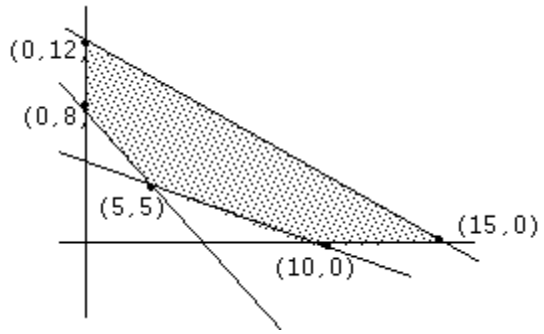
D. $5200

E. $5300

Answer to #10 _____

#11-16: Show all your work.

11) Find the minimum and maximum values of $F = 8x - 3y$ in the feasible region shown below.



Max value of _____ at x = _____ , y = _____

Min value of _____ at x = _____ , y = _____

12) Graph the following system of linear inequalities and shade the feasible region. Is it bounded or unbounded? Find the coordinates of all corner points. Show all your work.

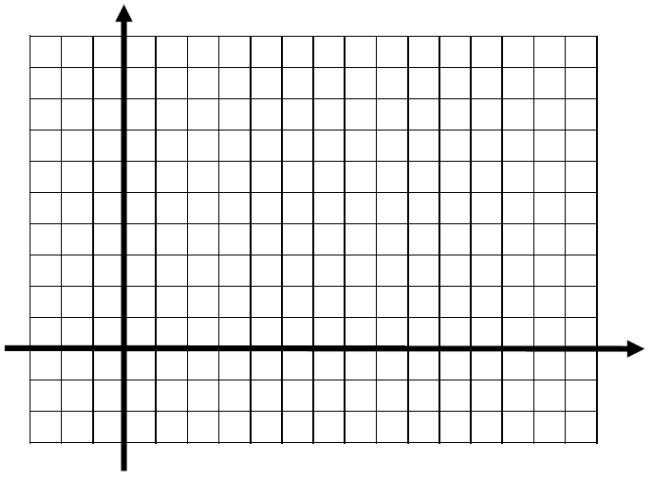
$2x + y \geq 6$

$x - y \leq 3$

$x - y \geq -5$

$x \leq 5$

Corner points at (write as ordered pairs):



Circle: Feasible region is bounded / unbounded

13) Find the minimum value of $C = 28x + 14y$ and the point at which it occurs. Be sure to shade the feasible region on the graph below. Show all your work.

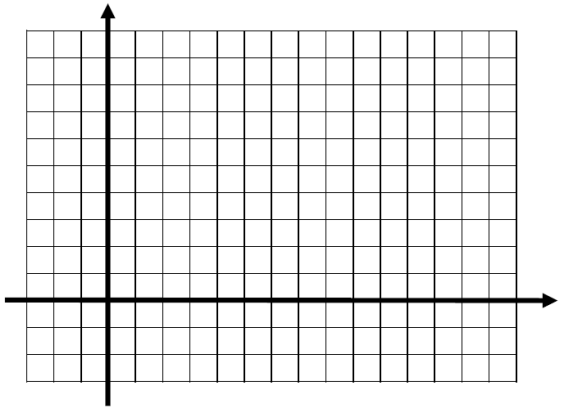
$5x + 2y \geq 10$

$4x + 3y \geq 12$

$x \geq 0$

$y \geq 0$

Corner points at (write as ordered pairs):



There is a minimum value of _____ at x = _____ , y = _____

14) Find the maximum and minimum values of $F = -11x - 23y$ and the points at which they occur. Be sure to shade the feasible region on the graph below. Show all your work.

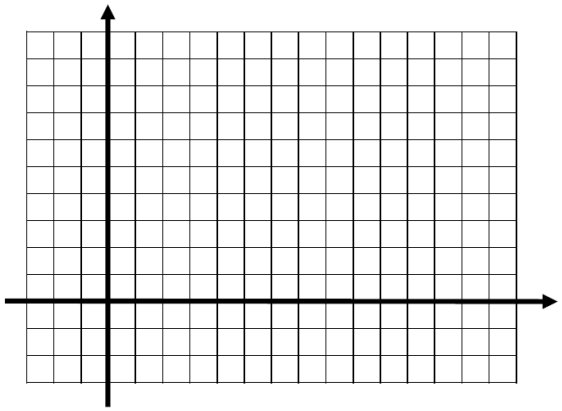
$x + 4y \leq 8$

$5x + 4y \leq 20$

$x \geq 0$

$y \geq 0$

Corner points at (write as ordered pairs):



There is a maximum value of _____ at x = _____ , y = _____

There is a minimum value of _____ at x = _____ , y = _____

15) An airline with two types of airplanes, *x* and *y*, has contracted with a tour group to provide accommodation for a minimum of each of 2800 first-class, 2000 tourist, and 5600 economy-class passengers. Airplane *x* costs $15000 to operate and can accommodate 40 first-class, 40 tourist, and 20 economy-class passengers, while airplane *y* costs $12000 to operate and can accommodate 20 first-class, 10 tourist, and 70 economy-class passengers. If the goal is to find the number of each type to minimize operating costs, write the objective function and ALL constraints for this linear programming problem (i.e. **SET UP BUT <u>DO NOT SOLVE</u>**).

Minimize: Cost = _____

Subject to the following constraints:

16) Suppose a horse feed to be mixed from soybean meal and oats must contain at least 200 lb of protein and 40 lb of fat. Each sack of soybean meal costs $55 and contains 60 lb of protein and 10 lb of fat. Each sack of oats costs $25 and contains 20 lb of protein and 5 lb of fat.

(a) How many sacks of each should be used to minimize cost?
(b) What is the minimum cost?

Answer 16a: _____ Answer 16b: _____