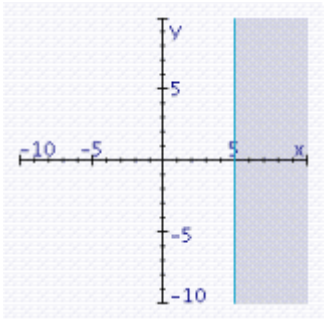
MATH M118 Practice Test Chapter 7

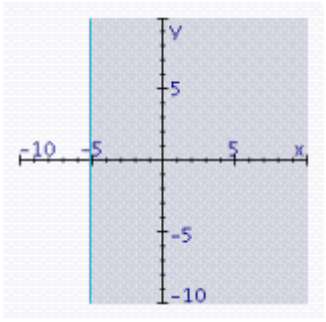
Problems #1-10: Identify the best answer from the given choices. Place the letter on the answer line.

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

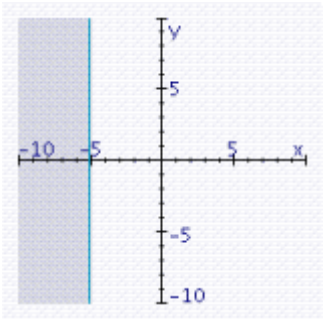
A.



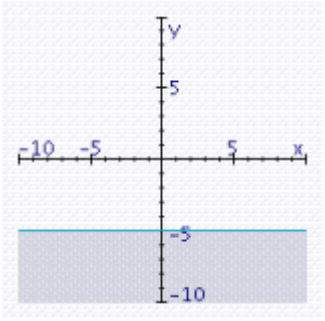
B.



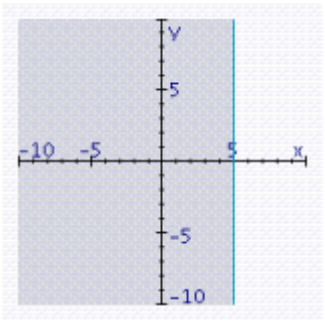
C.



D.

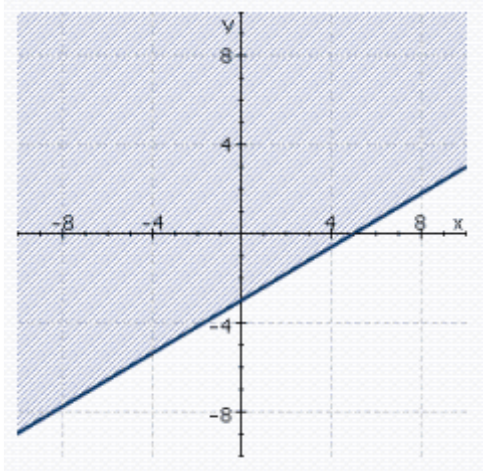


E.



Answer to #1 _____

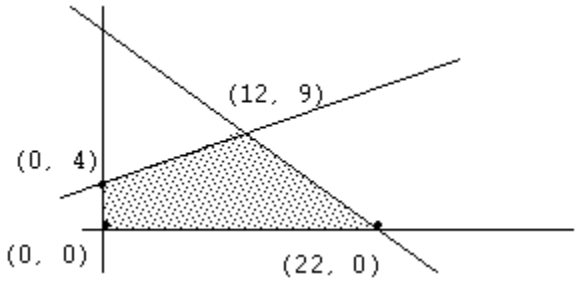
2) Which inequality does the graph satisfy?



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?

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

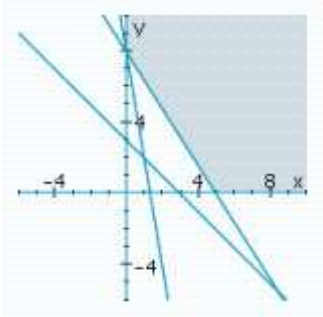
A. $(0, 5)$
B. $(3, 1)$
C. $(3.75, 0)$
D. $(0, 0)$
E. $(0, 1.5)$

Answer to #5 _____

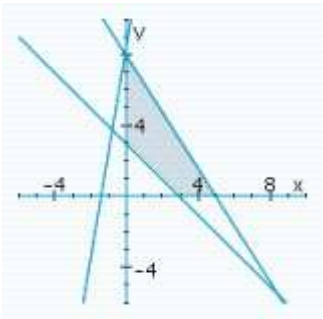
6) Select the correct graph of the given system of inequalities and indicate whether the solution set is bounded or unbounded.

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

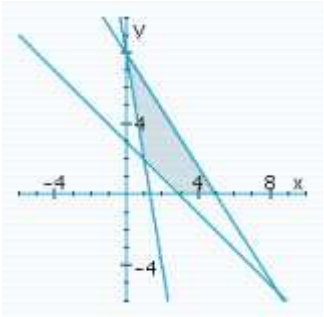
A. Unbounded



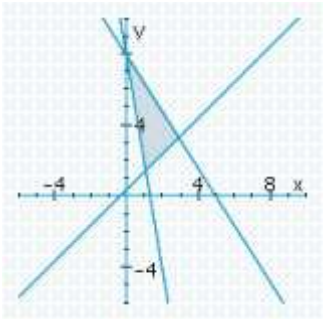
B. Bounded



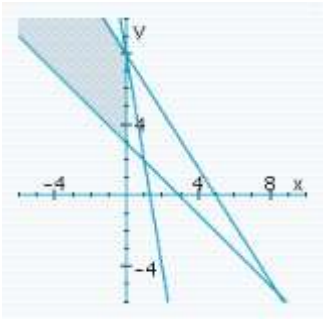
C. Bounded



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. 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

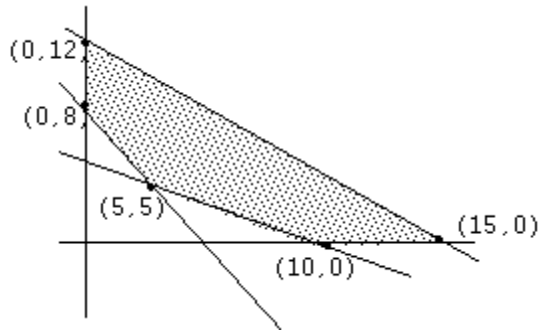
D. $5200

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.

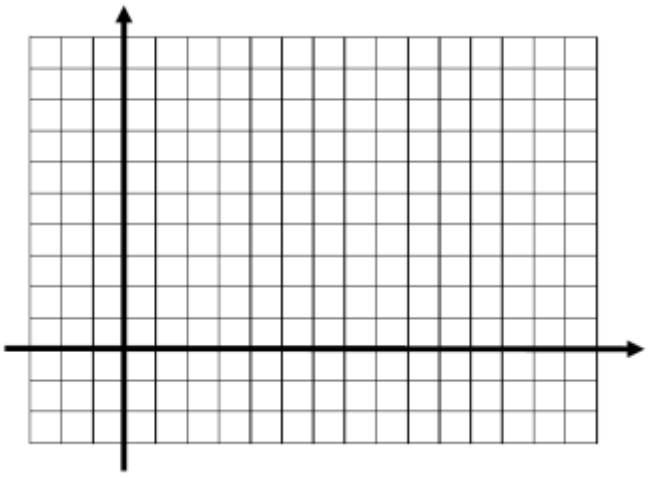
$2x + y \geq 6$

$x - y \leq 3$

$x - y \geq -5$

$x \leq 5$

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 sketch the feasible region on the graph below. Show all your work.

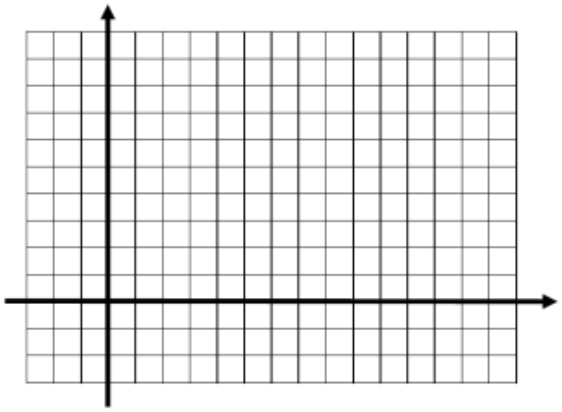
$5x + 2y \geq 10$

$4x + 3y \geq 12$

$x \geq 0$

$y \geq 0$

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 sketch the feasible region on the graph below. Show all your work.

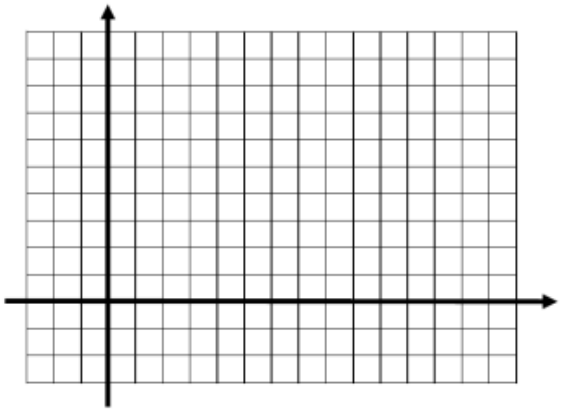
$x + 4y \leq 8$

$5x + 4y \leq 20$

$x \geq 0$

$y \geq 0$

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 constraints for this linear programming problem (i.e. SET UP BUT DO NOT SOLVE).

Minimize: Cost = _____

Subject to:

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: _____