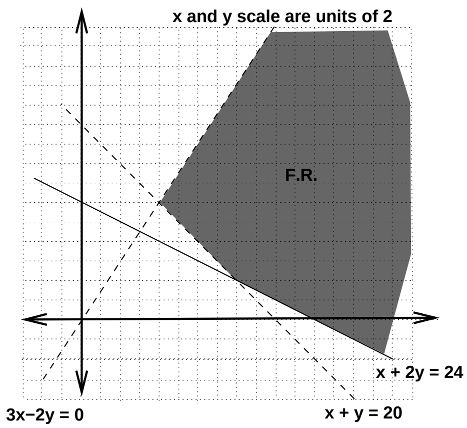
Week in Review #4

Section 3.1: Graphing Systems of Linear Inequalities in Two Variables.
Section 3.3: Graphical solution of Linear Programing Problem.

- Method of corners
  - graph the feasible region
  - find corner points
  - evaluate the objective function at each corner point
  - solution can be at one point or infinitely many points if two adjacent corner points maximize or minimize the objective function.

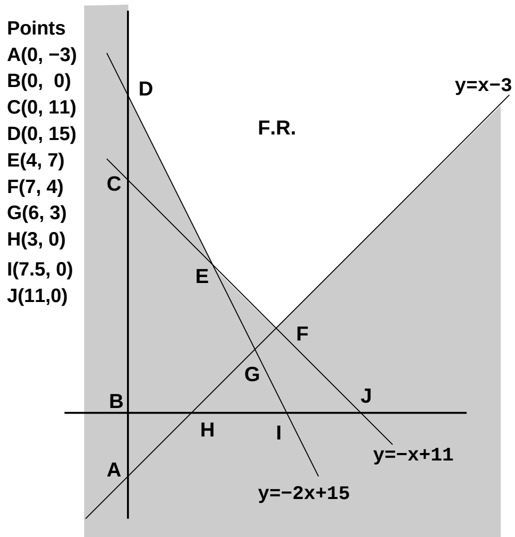
1. Write the system of inequalities that will give the shaded feasible region.



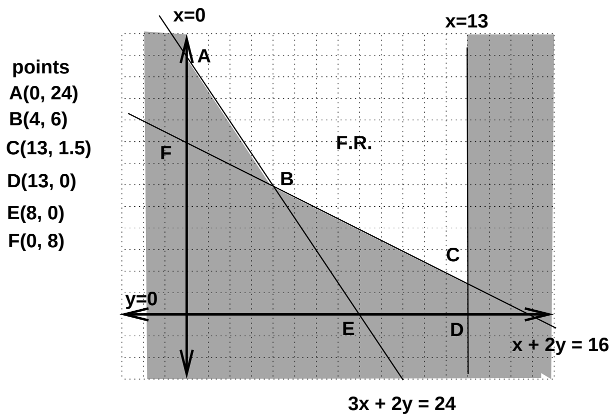
2. Find the maximum of $F = 4x + 2y$ and the location of its maximum subject to:

   $5x + 2y \geq 20$
   $x + 2y \geq 8$
   $x + 4y \leq 32$
   $x \geq 0, y \geq 0$

3. Use the Feasible region to find where is the objective function $g = 2x + y$ minimized and the minimum value of g?



4. Use the Feasible region to find the indicated results for these objective functions.



(a) maximum value of $h = 10x - 3y$ and the location(s) of the maximum value.

(b) maximum value of $j = 3x + 4y$ and the location(s) of the maximum value.

Section 6.1: Set and Set Operations.

- a set is a well defined collection of objects
  - x is an element of set A, $x \in A$, if x is an object in A.
- roster notation: $A = \{1, 2, 3\}$
- set builder notation: B = {x | x is a positive integer }
- set A and B are equal if they have exactly the same elements.
- Subset, $A \subseteq B$
  - A is a subset of B if every element in A is also an element of B
  - A is a proper subset, $A \subset B$, if A is a subset of B but is not equal to B.
- Empty set, $\phi = \{\}$, is a set that contains no elements
- Universal set, U, is the set that contains all of the elements possible in a problem.
- Set operations
  - Union, $A \cup B$
  - Intersection, $A \cap B$
  - Compliment, A^C
- $n(A)$ denotes the number of things in set A, $n(\phi) = 0$
- Set A and B are **disjoint** provided that $A \cap B = \phi$

5. Write the set {x | x is a letter in the word **ENCYCLOPEDIA**} in roster notation.

6. U={ 0, 1, 2, 3, 4, 5, 6, 7, 8, 9}, A = { 0, 3, 6, 9}, B={ 0, 2, 4, 6, 8}, and C={ 1, 3, 5, 7, 9}
   Find the following.

   (a) $n(A) =$

   (b) $n(A \cup B) =$

   (c) $A \cup C^C =$

   (d) $A \cap B \cap C =$

   (e) $(A \cap C)^C \cap B =$

   (f) How many subsets does B have?

   (g) How many proper subsets does B have?

   (h) Are A and B disjoint?

   (i) Are B and C disjoint?

7. Shade the following

   (a) $A \cup B \cup C$

   (b) $(B \cup C)^C$

   (c) $(A^C \cap B) \cup C$

8. U = the set of A & M students.
   M = $\{ x \in U | x$ is male$\}$
   F = $\{ x \in U | x$ is female$\}$

   D = $\{ x \in U | x$ drinks Dr. Pepper$\}$
   S = $\{ x \in U | x$ drinks Sprite$\}$
   C = $\{ x \in U | x$ drinks coffee$\}$

   (a) Describe each of the given sets in words.

      i. $S \cup C^C$

      ii. $M \cap (D \cup S)$

   (b) Write the set(use set notation) that represents each of the given statements.

      i. The female students at A& M that drink sprite but do not drink coffee.

      ii. The students at A& M that drink coffee or do not drink Dr. Pepper.