Concepts to Know #2

Math 141

3.1-3.3, 6.1-6.4, 7.1-7.3

- **3.1 - Graphing Inequalities**

Graphing Lines

Labeling lines (EQUALITIES!)

Shading the ~~FALSE~~ only region or only true

Finding corner points

Bounded - can enclose feasible region in a circle

Unbounded - cannot enclose feasible region in a circle

- **3.3 - Graphical Solutions to LP Problems**

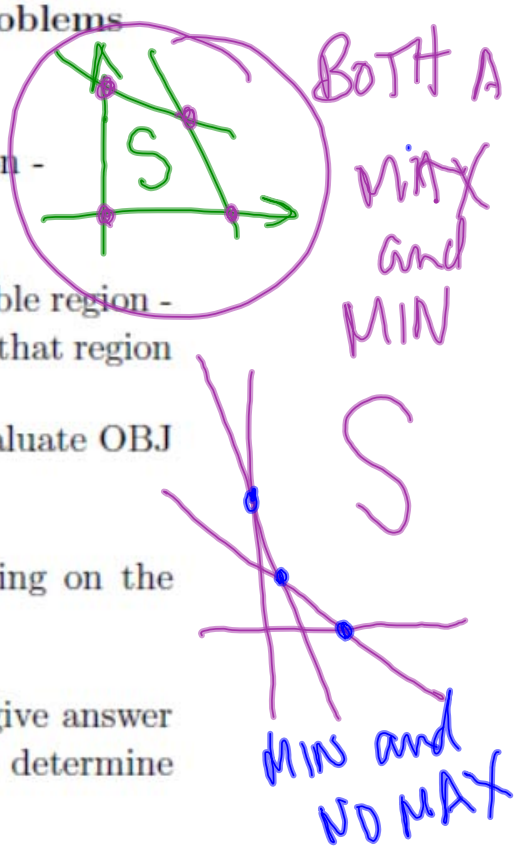
Graph constraints to find feasible region - including corner points

Look at the placement of the feasible region - decide if a max or min exists in that region

Set up chart with corner points and evaluate OBJ function at each corner point

Locate the max or min value depending on the problem

If solving a word problem, be able to give answer in terms the problem. Be able to determine leftover resources.



- **6.1 - Sets and Set Operations**

  Know how to read both roster and set-builder notation

  Know the meaning of $\emptyset, \in, \notin, \subseteq, \subset, \cap, \cup, A^C$, and U

  Know DeMorgan's Laws

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

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

  Be able to shade portions of Venn diagrams

  Be able to use set notation to describe regions

  Be able to read set notation to describe sets in words

- **6.2 - The Number of Elements in a Set**

  $n(A)$ = the number of elements in a set

  If disjoint $n(A \cup B) = n(A) + n(B)$

  For any sets $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

  Be able to fill in the sections of a Venn diagram with the number of elements in each section

- **6.3 - The Multiplication Principle**

  The total # of ways to perform a large task is the product of the # of ways to perform each subtask

  Be able to draw a tree diagram

- **6.4 - Permutations and Combinations**

  Permutations - ORDER MATTERS!

  Things in a Line or Row, Titles for Group Members, etc.

  $n!$ ways to permute n distinct objects

  $\frac{n!}{n_1!n_2!...n_r!}$ ways to permute n non-distinct obj.

  Combinations - ORDER DOES NOT MATTER!

  Groups where people have no titles, etc.

  Know how to use calc. to find the # of perm. and comb.

  Mixed Problems - counting with both perm. and comb. in the same problem

- **7.1 - Experiments, Sample Spaces, and Events**

  Sample Points - outcomes of an exp.

  Sample Space (S) - all possible sample points

  SET

  A common sample space is that of rolling two fair dice.

  Events - subsets of S

  $\emptyset$ - impossible event

  S - certain event

  Simple Events - contain exactly one sample point

  There are 2^n total events for an exp. having n sample points.

  Mutually Exclusive Events - don't occur at the same time

  $A \cap B = \emptyset$

  $P(A \cup B) = P(A) + P(B)$

1:1
1-2
1-3
. . . :)

52 cards in a std deck

- **7.2 - Definition of Probability**

  $P(E)$ denotes the prob. that event E occurs

  $P(E)$ is a NUMBER such that $0 \leq P(E) \leq 1$

  Uniform Sample Space - all outcomes are equally likely; the prob. of each simple event is $1/n$ where n=the number of outcomes

  Probability Distribution - a TABLE giving the prob. associated with each simple event

counting or tree

- **7.3 - Rules of Probability**

  $P(S) = 1$

  $0 \leq P(E) \leq 1$ for every event E

  $P(E \cup F) = P(E) + P(F) - P(E \cap F)$

  $P(E) + P(E^c) = 1$