Concepts to Know #2
Math 141
3.1-3.3, 6.1-6.4, 7.1

- **3.1 - Graphing Inequalities**

    Graphing Lines

    Labeling lines (EQUALITIES!)

    Shading the FALSE region

    Finding corner points

    Bounded - can enclose S in a circle

    Unbounded - cannot enclose S in a circle

- **3.2 - Setting-Up LP Problems**

    Defining variables correctly

    OBJ Function (Max or Min statement)

    SUBJ TO Constraints
        (Almost always inequalities)

    Know how to format your set-up

- **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 no-
        tation

    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

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

    If disjoint, $n(A \cup B) = n(A) + n(B)$
        (Disjoint: $n(A \cap B) = 0$)

    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 series of tasks is
        the product of the # of ways to perform each
        subtask

    Be able to draw a tree diagram

- **6.4 - Permutations and Combinations**

    Permutations: arranging items -
        ORDER MATTERS!

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

        $n!$ ways to permute n distinct objects
        $\frac{n!}{n_1! n_2! \ldots n_r!}$ ways to permute n non-distinct obj.
    Combinations: choosing groups -
        ORDER DOES NOT MATTER!

        Picking groups where people have no titles,
            etc.

        Choosing a subset of items from a group - you
            only care what you select and don't select

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

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

- **Counting Handouts**

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

  Sample Points - outcomes of an exp. (elements)

  Sample Space (S) - a set of all possible sample points

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

  Events - subsets of S

    $\emptyset$ - impossible event

    S - certain event

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

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

    $A \cap B = \emptyset$