MATH 110 – 30 SEPTEMBER 2009 – EXAM 1

Answer each of the following questions. Show all work, as partial credit may be given. This exam is counted out of a total of 80 points.

1. (10 pts. each) An automobile insurance company classifies applicants by their driving records for the previous three years. Let $S = \{\text{applicants who have received speeding tickets}\}$, $A = \{\text{applicants who have caused an accident}\}$, and $D = \{\text{applicants who have been arrested for drunk driving}\}$.

   (a) Describe the set $X = \{\text{applicants who have not been arrested for drunk driving but who have received speeding tickets}\}$ in set theoretic notation.

   (b) Describe in words the set $S' \cap (A \cup D)$.

2. (10 pts.) Find $n(S \cap T)$ given that $n(S) = 18$, $n(T) = 10$ and $n(S \cup T) = 25$.

3. (10 pts. each) A survey at a small New England college showed that out of a total student population of 800, 400 students skied, 300 played ice hockey and 150 did both.

   (a) Draw a two-circle Venn diagram illustrating this situation and determine the number of elements in each basic region.

   (b) How many students participated in at least one of these sports?

4. (10 pts.) A multiple choice quiz consists of 5 questions with 3 choices for each question. In how many ways can the quiz be completed if the student is not required to answer all of the questions?

5. (10 pts.) A certain club has 20 members. In how many different ways can a 3-member board of directors be chosen if the board consists of three officers: a president, a secretary and a treasurer?

6. (10 pts.) How many different 12 letter words (that is, sequences of letters) can be formed using 7 A's and 5 B's?