SJSU, Math 70, Practice Final, Fall 2010, Instructor: Plamen Koev

Closed book, closed notes, no calculators.

Reference formulas:

$$\begin{aligned}
\text{Sets:} \quad & n(A \cup B) = n(A) + n(B) - n(A \cap B) \\
\text{Probability:} \quad & P(A \cup B) = P(A) + P(B) - P(A \cap B) \\
\text{Conditional probability:} \quad & P(A|B) = P(A \cap B)/P(B) \\
\text{Bayes:} \quad & P(U_1|E) = \frac{P(U_1 \cap E)}{P(E)} = \frac{P(U_1 \cap E)}{P(U_1 \cap E) + \cdots + P(U_n \cap E)}
\end{aligned}$$

1. (20 points) Compute the inverse of the matrix:

$$\begin{bmatrix} 1 & 2 & 3 \\ 3 & 5 & 11 \\ -1 & -1 & 4 \end{bmatrix}.$$

2. Find the maximum value of $x + 3y$ on the region defined by $y \geq 0,\ x \geq y,\ 2x + y \leq 5$

3. (10 points) Decide whether $[(p \to q) \vee \neg q] \Rightarrow \neg p \wedge q$.

4. (10 points) 50 students were surveyed. Of those 50 students, 22 had soccer as a hobby, 20 had tennis as a hobby, and 10 had neither soccer nor tennis as a hobby. What is the probability that a randomly chosen person has both soccer and tennis as a hobby?

5. (10 points) A 5 person team is selected from a group of 5 women and 5 men. What is the probability that the team will have exactly 3 men and 2 women?

6. A box contains 2 red, 3 white, and 4 green balls. Two balls are drawn out of the box in succession without replacement.

   - (10 points) What is the probability that both balls are the same color?
   - (10 points) If the second ball is red, what is the probability that both balls are the same color?