HOMEWORK 8 - MATH 111
DUE DATE: Friday, April 4
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Let $A = \begin{bmatrix} -1 & 3 & -5 & 0 \\ 2 & 6 & -1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 3 & 2 \\ -1 & 7 \\ 1 & -5 \end{bmatrix}$. Compute $A \cdot B$ and $B \cdot A$.

2. Compute the inverses of the matrices $A = \begin{bmatrix} -1 & -2 \\ 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & -1 \\ 6 & -3 \end{bmatrix}$.

3. Let A, B be sets in a universe U. Suppose that $n(A) = 5, n(B) = 9, n(A \cap B) = 2$ and $n(U) = 20$. what is $n((A \cup B)^c)$?

4. Suppose that A, B and C are sets in a universe U. If $n(A) = 22, n(B) = 20, n(C) = 12, n(A \cap B) = 11, n(A \cap C) = 9, n(B \cap C) = 5, n(A \cap B \cap C) = 3$ and $n(U) = 44$, fill in the number of elements of each region in the appropriate Venn diagram.

5. Consider the experiment of tossing a coin twice and then rolling a die.

   (a) Write the sample space for this experiment.
   (b) Give the event "an even number of heads occurs and the die comes up odd". (This is one event!!)

6. Consider the experiment of drawing a card from an ordinary deck of 52 cards. Find the probability of drawing a black face card.

7. Consider the experiment of successively drawing two balls out of an urn that contains 5 white, 6 red, 12 green and 7 black balls *without replacement*. What is the probability of the first ball being red and the second black? (This is one probability!!)

8. Consider a very small community college with 500 students. This fall semester 150 students are taking Business 101 and 120 are taking Math 111. 70 of these students are taking both Business 101 and Math 111. If one of the students is picked at random from the college population, what is the probability that he will be taking Business 101 or Math 111?