Directions: *Work on these sheets.*

Part 1: Multiple Choice. *Circle the letter corresponding to the best answer.*

1. Which of the following pairs of events are disjoint (mutually exclusive)?
   (a) A: the odd numbers; B: the number 5
   (b) A: the even numbers; B: the numbers greater than 10
   (c) A: the numbers less than 5; B: all negative numbers
   (d) A: the numbers above 100; B: the numbers less than –200
   (e) A: negative numbers; B: odd numbers

2. Which of the following are true?
   I. The sum of the probabilities in a probability distribution can be any number between 0 and 1.
   II. The probability of the union of two events is the sum of the probabilities of those events.
   III. The probability that an event happens is equal to 1 – (the probability that the event does not happen).
   (a) I and II only
   (b) I and III only
   (c) II and III only
   (d) I, II, and III
   (e) None of the above gives the complete set of true responses

3. Government data show that 26% of the civilian labor force has at least 4 years of college and that 15% of the labor force works as laborers or operators of machines or vehicles. Can you conclude that because (0.26)(0.15) = .039 about 4% of the labor force are college-educated laborers or operators?
   (a) Yes, by the multiplication rule
   (b) Yes, by conditional probabilities
   (c) Yes, by the law of large numbers
   (d) No, because the events are not independent
   (e) No, because the events are not mutually exclusive

4. If a peanut M&M is chosen at random, the chances of it being of a particular color are shown in the table below.

Color	Brown	Red	Yellow	Green	Orange	Blue
Probability	.3	.2	.2	.2	.1	

The probability of randomly drawing a blue peanut M&M is
   (a) 0.1
   (b) 0.2
   (c) 0.3
   (d) 1.0
   (e) According to this distribution, it's impossible to draw a blue peanut M&M.

5. If $A \cup B = S$ (sample space), $P(A \text{ and } B^c) = 0.25$, and $P(A^c) = 0.35$, then $P(B) =$
(a) 0.35
(b) 0.4
(c) 0.65
(d) 0.75
(e) None of the above. The answer is _____.

Part 2: Free Response
Answer completely, but be concise. Write sequentially and show all steps.

A box contains six red tags numbered 1 through 6, and four white tags numbered 1 through 4. One tag is drawn at random.

6. Write the sample space for this experiment.

Calculate the following probabilities:

7. P(red)

8. P(even number)

9. P(red and even)

10. P(red or even)

11. P(neither red nor even)

12. P(even | red)

13. P(red | even)

14. P(<4 | odd)

15. Suppose that for a group of consumers, the probability of eating pretzels is .75 and that the probability of drinking Coke is .65. Further suppose that the probability of eating pretzels *and* drinking Coke is .55. Determine if these two events are *independent*.

Consider the following experiment: The letters in the word AARDVARK are printed on square pieces of tagboard (same size squares)with one letter per card. The eight letter cards are then placed in a hat, and one letter card is randomly chosen (without looking) from the hat.

16. List the sample space S of all possible outcomes.

$$S = \{$$

17. Make a table that shows the set of outcomes (X) and the probability of each outcome:

Outcomes						
P(X)						

18. Consider the following events:

V: the letter chosen is a <u>vowel</u>.
F: the letter chosen falls in the <u>first</u> half of the alphabet
        (i.e., between A and M).

List the outcomes in each of the following events, and determine their probabilities:

V = {   P(V) =

F = {   P(F) =

V or F = {   P(V or F) =

complement of F = {   P(Fᶜ) =

19. Determine if the events V and F are independent.

Here is the assignment of probabilities that describes the age (in years) and the sex of a randomly selected American student.

Age	14-17	18-24	25-34	≥35
Male	.01	.30	.12	.04
Female	.01	.30	.13	.09

20. What is the probability that the student is a female?

21. What is the conditional probability that the student is a female given that the student is at least 35 years old?

22. What is the probability that the student is either a female or at least 35 years old?

23. If four cards are drawn from a standard deck of 52 playing cards and not replaced, find the probability of getting at least one heart.

24. If three dice are rolled, find the probability of getting triples – i.e., 1,1,1 or 2,2,2 or 3,3,3 etc.

I pledge that I have neither given nor received aid on this test: _____