Exam I
Administered: Monday, September 13, 2004
22 points

For each problem part: 0 points if not attempted or no work shown,
1 point for partial credit, if work is shown,
2 points for correct numerical value of solution

Problem 1. (16 points)

Consider the following PDF

$$f(x) = \begin{cases} c(x^2 - 1) & for\ 1 \le x \le 3 \\ 0 & otherwise \end{cases}$$

(a) Is this PDF continuous or discrete?
(b) Find the value of c that normalizes this PDF.
(c) Find the probability that x is between 1 and 2.
(d) Find the probability that x is greater than 2.
(e) Find the mean of the random variable x.
(f) Find the mean of the function of the random variable, $g(x) = 5x - 12$

Problem 2. (10 points)

Studies have shown that approximately 92% of the human population is right-handed (or right hand dominant). Recently, a study was performed to examine the relationship between handedness and location of linguistics ability in the human brain. The following results were published[*].

	right-handed people	left-handed people
language dominant in right brain	5%	30%
language dominant in left brain	95%	70%

[*]McManus, I. C. 2002. Right Hand Left Hand. Great Britain: Weidenfeld & Nicolson, Ltd. 412p.

Using this information, answer the following questions.

(a) Draw a Venn Diagram of the sample space for the handedness and language dominance of a person.
(b) What is the probability that a person is language dominant in the right brain given that they are right handed?
(c) What is the probability that a person is language dominant in the left brain?
(d) What is the probability that a person is right-handed and language dominant in the right brain?
(e) What is the probability that a person is right-handed, given that they are language dominant in the right brain?