Exam I
Administered: Tuesday, September 17, 2013
26 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. (10 points)

Consider the following mean values obtained for two discrete random variables, x and y.

variable	X	Y	X^2	Y^2	XY
mean	10.3500	5.5419	107.2074	30.8305	57.2907

(a) Find the variance of X.
(b) Find the standard deviation of X.
(c) Find the covariance of x and y.
(d) Find the correlation coefficient of x and y.
(e) Are x and y independent random variables?

Problem 2. (8 points)

Consider the following PDF

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

(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 3/2.
(d) Find the probability that x is greater than 3/2.

Problem 3. (8 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 left brain given that they are left handed?
(c) What is the probability that a person is language dominant in the right brain?
(d) What is the probability that a person is left-handed and language dominant in the left brain?