Assignment

1) A box contains 2 marbles: 1 red, and 1 blue. Consider an experiment that consists of taking 1 marble from the box and then replacing it in the box and drawing a second marble from the box. Describe the sample space. Repeat when the second marble is drawn without replacing the first marble. Then again write down the sample space. [2]

2) Let X be a random variable with probability density function is given by

$$f(x) = Cxe^{-\frac{x}{2}} \qquad x>0$$

(a) What is the value of c? [2]
(b) What is the cumulative distribution function of X? [2]

3) The joint probability density function of X and Y is given by

$$f(x,y) = x+y \qquad 0 < x < c, \quad 0 < y < 1$$

(a) What is the value of c? [2]
(b) Construct the marginal probability density functions. g(x) and h(y). [4]
(c) Are the random variables X and Y independent? [0.5]
(d) If Y = 0.5, what is the conditional probability density function of X? [0.5]

4) The joint probability mass function is given by

		Y			
		0	1	2	3
X	1	0.10	0.15	0	0.05
	2	0.20	0.05	0.05	0.20
	3	0.05	0	0.10	0.05

(a) Find marginal probability mass function. [1]
(b) P(x|y=1) = ? [2]
(c) E(x|y=1) = ? [1]
(d) V(x|y=1) = ? [2]
(e) E(xy) = ? [1]