Assignment
Solve the following questions

Q1. For married couples living in a certain suburb, the probability that the husband will vote on a bond referendum is 0.21, the probability that the wife will vote on the referendum is 0.28, and the probability that both the husband and the wife will vote is 0.15. What is the probability that

(a) at least one member of a married couple will vote? 0.34
(b) a wife will vote, given that her husband will vote? 0.71
(c) a husband will vote, given that his wife will not vote? 0.083
(d) a husband will not vote OR his wife will not vote? 0.85

Q2. In an experiment to study the relationship of hypertension and smoking habits, the following data are collected for 180 individuals:

	Nonsmokers(A1)	Moderate Smokers(A2)	Heavy Smokers(A3)
H	21	36	30
NH	48	26	19

where H and NH in the table stand for Hypertension and Nonhypertension, respectively. If one of these individuals is selected at random, find the probability that the person is

(a) experiencing hypertension, given that the person is a heavy smoker, 30/49
(b) a nonsmoker, given that the person is experiencing no hypertension. 48/93=0.516
(c) a person is experiencing no hypertension OR Nonsmoker. 114/180

Q3. A random sample of 200 adults is classified below by sex and their level of education attained.

Education	Male	Female
Elementary (A1)	38	45
Secondary(A2)	28	50
College(A3)	22	17

If a person is picked at random from this group, find the probability that

(a) the person is a male, given that the person has a secondary education, 14/39
(b) the person have a college degree, given that the person is a female 17/112

Q4. A certain disease affects about 1 out of 10,000 people. There is a test to check whether the person has the disease. The test is quite accurate. In particular, we know that

- the probability that the test result is positive (suggesting the person has the disease), given that the person does not have the disease, is only 2 percent;
- the probability that the test result is negative (suggesting the person does not have the disease), given that the person has the disease, is only 1 percent.

A random person gets tested for the disease and the result comes back positive. What is the probability that the person has the disease? 0.0049

Q5. Suppose that the four inspectors at a film factory are supposed to stamp the expiration date on each package of film at the end of the assembly line.

John, who stamps 20% of the packages, fails to stamp the expiration date once in every 200 packages.
Tom, who stamps 60% of the packages, fails to stamp the expiration date once in every 100 packages.
Jeff, who stamps 15% of the packages, fails to stamp the expiration date once in every 90 packages.
Pat, who stamps 5% of the packages, fails to stamp the expiration date once in every 200 packages.

If a customer complains that her package of film does not show the expiration date, what is the probability that it was inspected by John? 0.1124

Q6. A regional telephone company operates three identical relay stations at different locations. During a one-year period, the number of malfunctions reported by each station and the causes are shown below.

	Station A1	Station A2	Station A3
Problems with electricity supplied (E)	2	1	1
Computer malfunction(C)	4	3	2
Malfunctioning other equipment(O)	5	4	2
Caused by other human errors(H)	7	7	5

(a). Suppose that a malfunction was reported and it was found to be caused by other human errors. What is the probability that it came from station A3? 0.2632

(b). P(malfunction is not by human error/it came from station A3)=? 1/2

HINT for part (b): Hint:$P(\bar{A} \cap B) = P(B) - P(A \cap B)$

Q7. A paint-store chain produces and sells latex and semi gloss paint. Based on long-range sales, the probability that a customer will purchase latex paint is 0.75. Of those that purchase latex paint, 60% also purchase rollers. But only 30% of semi gloss paint buyers purchase rollers. A randomly selected buyer purchases a roller and a can of paint. What is the probability that the paint is latex? 0.857