

STAT 324 HOME WORK 1A (covers chapter 2)

To be assigned during week 4 (6-4-143 to 10-4-1434)

Due in the lab during week 5 (13-4-1434 to 17-4-1434)

Q1.

An engineering firm is hired to determine if certain waterways in Virginia are safe for fishing. Samples are taken from three rivers.

- (a) List the elements of a sample space S , using the letters F for safe to fish and N for not safe to fish.
- (b) List the elements of S corresponding to event E that at least two of the rivers are safe for fishing.
- (c) Define an event that has as its elements the points $\{FFF, NFF, FFN, NFN\}$.

Q2.

If $S = \{x / 0 < x < 12\}$, $M = \{x / 1 < x < 9\}$, and $N = \{x / 0 < x < 5\}$, find

- (a) $M \cup N$;
- (b) $M \cap N$;
- (c) $M^c \cap N^c$

Q3.

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

Education	Male	Female
Elementary	38	45
Secondary	28	50
College	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;
- (b) the person does not have a college degree, given that the person is a female.

Q4.

In how many different ways can a true-false test consisting of 9 questions be answered?

Q5.

Four students are selected at random from a chemistry class and classified as male or female. List the elements of the sample space S_1 , using the letter M for male and F for female. Define a second sample space S_2 where the elements represent the number of females selected.

Q6.

The probability that a patient recovers from a delicate heart operation is 0.8. What is the probability that

- (a) exactly 2 of the next 3 patients who have this operation survive?
- (b) all of the next 3 patients who have this operation survive?

Q7.

In the field of quality control, the science of statistics is often used to determine if a process is “out of control.” Suppose the process is, indeed, out of control and 20% of items produced are defective.

- (a) If three items arrive off the process line in succession, what is the probability that all three are defective?
- (b) If four items arrive in succession, what is the probability that three are defective?

Q8.

Let W be a random variable giving the number of heads minus the number of tails in three tosses of a coin.

List the elements of the sample space S for the three tosses of the coin and to each sample point assign a value w of W .

Q9.

A large industrial firm uses three local motels to provide overnight accommodations for its clients. From past experience it is known that 20% of the clients are assigned rooms at the Ramada Inn, 50% at the Sheraton, and 30% at the Lakeview Motor Lodge.

If the plumbing is faulty in 5% of the rooms at the Ramada Inn, in 4% of the rooms at the Sheraton, and in 8% of the rooms at the Lakeview Motor Lodge, what is the probability that

- (a) a client will be assigned a room with faulty plumbing?
- (b) a person with a room having faulty plumbing was assigned accommodations at the Lakeview Motor Lodge?

Q10.

A construction company employs two sales engineers. Engineer 1 does the work of estimating cost for 70% of jobs bid by the company. Engineer 2 does the work for 30% of jobs bid by the company. It is known that the error rate for engineer 1 is such that 0.02 is the probability of an error when he does the work, whereas the probability of an error in the work of engineer 2 is 0.04. Suppose a bid arrives and a serious error occurs in estimating cost. Which engineer would you guess did the work?

Note: In week 5 (20-4-1434 to 24-4-1434), you will receive HW 1B and in the week 7 during the lab, you will have Quiz1 based on Home works 1A and 1B. Solution of the Home works may be given in the lab after all home works are received.