

Homework Assignment #6 (Probability)

Note: Please explain your answers to all questions, what's the sample space? How do you calculate the size of sample space? What's the event? How do you calculate the size of the event? The two questions marked with stars are extra credit questions.

1 Answer the following questions for the experiment where you toss a coin for 6 times and record the results as the sequence of H's and T's that you get.

(a) How large is the sample space? Draw the Venn Diagram with the U (universal set) being the sample space, and draw and label two outcomes.

(b) What is the probability of getting a head in the first toss?

(c) What is the probability of getting 2 heads and 4 tails, in any order?

(d) What is the probability of getting 3 heads and 5 tails, in any order?

(e) What's the probability that you get more heads than tails?

2 Its known that there are 10 faulty light bulbs among a shipment of 100 light bulbs. The testing department randomly chooses 5 light bulbs from the shipment to test.

(a) What's the size of sample space?

(b) What's the probability that there is 4 faulty light bulb among the 5 chosen to be tested.

(c) whats the probability that there is at least one faulty light bulb among the 5 chosen to be tested?

3 Two cards are drawn from a deck of 52 cards, with replacement. (This means that one person chooses a card, looks at it, and returns it, and then another person chooses a card, looks at it, and returns it.) Find the probability that:

a. The first card is an ace and the second card is black.

b. Both cards are spades.

c. Neither card has a value from 2,3,4,5

d. At least one card is an ace.

e. If the two cards are drawn without replacement (i.e., first card drawn out is not put back before drawing second card), find the probabilities of that both cards are spades.

4 A club with 12 female members and 11 male members is electing a president and vice president. How many election outcomes are possible? Assuming each outcomes is equally likely, find the probability that

a. Both officers are male.

b. The president is female.

c. The two officers are of different genders.

5 You have one standard 6-sided die. You roll it five times and record the results.

i. How many possible outcomes are there?

ii. What is the probability that you get all 6s ?

iii. What is the probability that you get exactly three 6s?

iv. What is the probability that none of the five rolls yields a value of 5 or 6 ?

v. Whats the probability that you get an even number on the first roll or on the second roll?

6* You and two best friends of yours are invited to a party of 10 people (including the host).

i. Suppose the 10 people are randomly seated along the dining table. What's the probability that you and your best friends happen to sit next to each other, i.e., no one sits in between any of the three of you?

ii. After the dinner, four people are drawn randomly to play video games. What's the probability that at least one of your best friends are picked?

7* In a class of 50 students, what's the probability that there are at least two students sharing the same birthday, assuming that there are 365 different birthdays, and every student was equally likely to be born in any of the 365 days of the year?