Recitation 2

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Exercise 1

An instructor of Statistics collected data from one of her classes in Spring 2016 to investigate the relationship between Study time per week (number of hours) to predict the final grade. For the 8 students in her class the data were as shown in the table.

Student	Study Time	Grade
1	14	26
2	25	30
3	15	20
4	5	18
5	10	23
6	12	25
7	5	21
8	21	28

1. Identify the response variable and the explanatory variable.
2. Construct a scatterplot.
3. Find and interpret the correlation coefficient.
4. If all grades increase by one, does the correlation coefficient change?

Exercise 2

You flip a coin three times.

1. Use a tree diagram to show the possible outcome patterns. How many outcomes are in the sample space?
2. Using the sample space constructed in part 1, find the probability (i) to have at least 2 heads; (ii) to have at least one tail.

Exercise 3

A die is rolled.

1. List the possible outcomes in the sample space.
2. What is the probabilty of getting a number which is even?
3. What is the probabilty of getting a number which is greater than 4?
4. What is the probabilty of getting a number which is less than 3? What is its complement?

Exercise 4

Two dice are rolled.

1. Construct the sample space. How many outcomes are there?
2. Find the probability of rolling a sum of 7.
3. Find the probability of getting a total of at least 10.
4. Find the probability of getting a odd number as the sum.

Exercise 5

Based on records of automobile accidents, it has been reported the counts who survived (S) and died (D) according to whether they wore a seat belt (Y=yes, N=no). The data are presented in the following contingency table.

Wore Seat Belt	Survived (S)	Died (D)
Yes (Y)	410	5
No(N)	160	15

1. What is the sample space of possible outcomes for a randomly selected individual involved in an auto accident?
2. Compute (i) P(D), (ii) P(N).
3. Compute the probability that an individual did not wear a seat belt and survived.
4. Based on part 1, what would the answer to part 3 have been if the events N and S were independent? So, are N and S independent, and if not, what does that mean in the context of these data?
5. Compute the probability that the individual survived, given that the person (i) wore and (ii) did not wear a seat belt. Interpret the results.

Exercise 6

It has been asked to 1000 people whether they were happy in their marriages.The poll reported that 46% were men, while 54% were women. Among men, 40% declared to be very happy, 51% pretty happy, while 9% not too happy. Among women, 43% declared to be very happy, 49% pretty happy, while 8% not too happy.

1. Set up a contingency table that cross classifies gender by level of happiness.
2. Compute the probability that a married adult is very happy.
3. Compute the probability that a married adult is very happy, (i) given that their gender is male and (ii) given that their gender is female.
4. For these subjects, are the events being very happy and being a male independent?

Exercise 7

A wheat farmer living in Pennsylvania finds that his annual profit is $ 80 if the summer weather is typical, $ 50 if the weather is unusually dry, and $ 20 if there is a severe storm that destroys much of his crop. Weather bureau records indicate that the probability is 0.70 of typical weather, 0.20 of unusually dry weather, and p of a severe storm. Let X be the farmer's profit.

1. Construct the probability distribution of X and find p.
2. Find the mean of the probability distribution of X.
3. Find the variance of the probability distribution of X.

Exercise 8

In a population the vehicle speed distribution is well approximated by a Normal curve with mean 50 and standard deviation 15. Compute the probability that

1. a randomly selected vehicle speed is greater than 73;
2. a randomly selected vehicle speed is between 40 and 73;
3. a randomly selected vehicle speed is less then 85.

Exercise 9

At one private college, a minimum IQ score of 125 is necessary to be considered for admission. IQ scores can be well approximated with a Normal distribution with mean of 100 and standard deviation of 15.

1. Compute the probability of being admitted.
2. Compute the probability that a randomly selected IQ score is between 120 and 145.
3. Compute the probability that a randomly selected IQ score is less than 125.
4. Compute the probability that a randomly selected IQ score is less than 90.

Exercise 10

Let the random variable Z follow a standard Normal distribution. Compute the probabilities below:

1. $P(-2 < Z < -1)$
2. $P(Z > 1.52)$
3. $P(-2 < Z < 0.89)$
4. $P(0 < Z < 2.15)$