Math 160/263 Minitab Assignment # 6 - Unix Version

Chapter 4 - Probability

1. An urn contains five balls. One of the balls is numbered with a two, one of the balls is numbered with a four, one of the balls is numbered with a six, one of the balls is numbered with an eight, and one of the balls is numbered with a ten. Suppose that a ball is selected at random from the urn. The distribution of the number on the ball is given below.

Number	2	4	6	8	10
Prob	0.20	0.20	0.20	0.20	0.20

   (a) Explain why the distribution is a legitimate discrete probability distribution.

   (b) Use the **RANDom** command with the **DISCrete** subcommand to simulate 100 random selections of a ball from the urn, and use the **TALLy** command to summarize the simulated values.

   (c) Produce graphical and numerical descriptions of the simulated values. Are the simulated values consistent with the corresponding probability distribution?

   (d) Use the **LET** command to find the mean and standard deviation of the number on a ball selected at random from the urn.

   (e) How close is the mean of the simulated values to the mean of the corresponding probability distribution? How close is the standard deviation of the simulated values to the standard deviation of the corresponding probability distribution?

2. Now suppose that two balls are selected at random from the urn with replacement. The distributiion of the average number on the balls is given below.

Average	2	3	4	5	6	7	8	9	10
Prob	0.04	0.08	0.12	0.16	0.20	0.16	0.12	0.08	0.04

   (a) Use the **RANDom** command with the **DISCrete** subcommand to simulate two columns of 100 random selections of a ball from the urn, and use the **LET** command to find the average of each row of simulated values.

   (b) Produce graphical and numerical descriptions of the averages. Are the averages consistent with the corresponding probability distribution?

   (c) Use the **LET** command to find the mean and standard deviation of the average number on two balls selected at random from the urn with replacement.

   (d) How close is the mean of the averages to the mean of the corresponding probability distribution? How close is the standard deviation of the averages to the standard deviation of the corresponding probability distribution?

3. A recent Gallup Poll showed that 30% of Americans believe that the U.S. economy is getting better. Suppose that 20 Americans are selected at random and asked for their opinions about the economy.

   (a) Use the **PDF** command with the **BINOmial** subcommand to find the probability that all 20 Americans believe that the economy is getting better.

   (b) Use the **CDF** command with the **BINOmial** subcommand to find the probability that more than two of the 20 Americans do not believe that the economy is getting better.

   (c) Use the **LET** command to find the mean and standard deviation of the number of Americans among the 20 that believe that the economy is getting better.