LECTURE 6

DEF: The _______________ ______________________ of a discrete random variable (DRV) is a table, graph, formula, or other device used to specify ________ possible values of the DRV, along with the respective probabilities.

example: Flip 2 coins and let x=number of heads shown

Now show this graphically:

Properties of a probability distribution

1. ________________
2. ________________

Mean of a discrete probability distribution

_____________ _______________ of the RV and in the case of the DRV it is the arithmetic mean μ

so E(x)=______________=μ

example: calculate the mean for the coin flipping distribution

<table>
<thead>
<tr>
<th>x</th>
<th>P(x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>__</td>
</tr>
<tr>
<td>1</td>
<td>__</td>
</tr>
<tr>
<td>2</td>
<td>__</td>
</tr>
</tbody>
</table>

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Variance of a discrete probability distribution

example: Calculate the variance for the coin flipping distribution.
Helpful vocabulary:

- no more than 5
- at least 5
- between 5 and 10
- more than 5
- less than 5
- between 5 and 10, inclusive
- under 13
- fewer than 13
- 5 or fewer
- 5 or more
- exactly 5
- none
- at most 13
BINOMIAL DISTRIBUTION:

derived form the Bernoulli trial in which there are only
_____ possible outcomes which are also _____________________.

EXAMPLES OF BINOMIAL DISTRIBUTION PROBLEMS

1. An insurance company has found that 10% of its claims are for
damages resulting from burglaries. What is the probability that
a random sample of 15 claims will contain fewer than 4 that are
for burglary damages?

2. Using the previous information, what is the probability that
a sample of 15 claims will contain at least 2 claims for damages
resulting from burglaries?

3. Find the P(_____________ n=15, p=.10) and tell what the
question would have to be for that notation; using the
information from the previous two examples.
4. A horticulturist knows from experience that 80% of a certain kind of seedling will survive being transplanted. A random sample of 5 seedlings is selected from current stock. What is the probability that exactly 3 will survive?

To calculate mean or variance for the binomial distribution:

\[ \mu = \text{____________} \quad \text{and} \quad \sigma^2 = \text{____________} \]

ASSIGNMENT:

Read in your textbook: pages 181-197

Written assignment: p187: 2, 4, 5  
 p195: 12, 15  
 p197: 21, 22, 23 and do the extra problem

EXTRA PROBLEM: Based on past experience the computer center is operating its network properly 90% of the time. If a random sample of 10 inspections is made

a) What is the probability that the computer network is operating properly  
   1) Exactly nine times? 
   2) At least seven times? 
   3) At most eight times? 
   4) More than nine times? 
   5) Fewer than nine times? 
   6) Between six and nine times? 

b) How many times can the computer network be expected to operate properly?

Computer part of assignment:

1. Use Minitab to check your answers for problem 15a-c, 22, and 23b-d. Please have printout for me.

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Binomial Probabilities

Choose Calc
Choose Probability Distributions
Choose Binomial
Enter the number of trials, $n$
Enter the probability of success, $\pi$
Click input constant
Enter the number of successes for which you want the probability
Click OK

NOTE: cumulative probabilities are also available.
To obtain all the probabilities for a particular distribution
Input values from 0 to the number of trials value in column C1, name it: $x$
Choose Calc
Choose Probability Distributions
Choose Binomial
Enter the number of trials, $n$
Enter the probability of success, $\pi$
Choose input column
Click on input column dialog box
Choose $x$ variable and place in dialog box
Click OK