Ch 5 Probability Distributions and Predictions

Sec 5.1 Hypergeometric Distribution.

1. Go to your team's roster and list the players on your team that belong to the following positions.
   WR, QB, CB, DT and DE (Use an Excel spreadsheet.)

2. Suppose you want to select a committee of 5 from the above list of players.

a) Construct a table that will show the theoretical probability distribution table for X = the number of WR's on the committee.
b) How many possible committees can be made if there are no restrictions.
c) Find the following probabilities:
   i) That the committee will contain 2 WR.
   ii) That the committee will contain at least 2 WR
   iii) What is the expected number of WR's on the committee?

d) Graph the probability distribution table with X = independent variable and P(X) as the dependent variable.

Binomial Distributions

3. Let success be number of wins your team records in last years regular season.
   Ie. p = PCT = (games won) ÷ (16)
a) Describe why this would be considered a Binomial Experiment. (5 criteria on page 292)
b) Create a theoretical probability distribution table for the number of wins that your team will have based on your teams PCT.
c) Using your information fill in the following general form of your Binomial Probability Distribution:

$$P(X = k) = \binom{n}{k} (p)^k (1 - p)^{n-k}$$

d) Find the expected value of the Binomial Experiment. Use the long way and the short cut.

Binomial Distribution and Spreadsheets.

4. Choose your teams main quarterback.
   Record their name and their completion percentage. Completions divided by Attempts.
a) Create a Binomial Distribution Table for making a completion on 5 attempts.
b) Find the probability that your quarterback will complete at least 2 of 5 attempts.
c) Calculate your quarterback's expected number of completions.

5. Use an Excel spreadsheet to solve the following questions.
If your quarterback attempts 40 throws to his receivers.
Find the probability of completing
a) at least 20 of his attempts.
b) between 25 and 35 attempts.

Geometric Distribution

6. Chose your teams field goal kicker and record their field goal percentage.
a) Create a Geometric Distribution Table for X = **missing** a Field Goal in "x" attempts
b) Estimate the Expected number of field goals kicked before the kicker misses a field goal.
c) Create a Geometric Probability Distribution Graph showing Field goal attempts to probabilities.