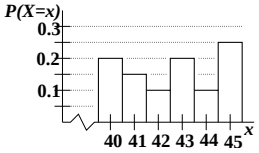
Fall 2006
Math 141 Week-in-Review #9
Exam 3 Review

courtesy: Kendra Kilmer

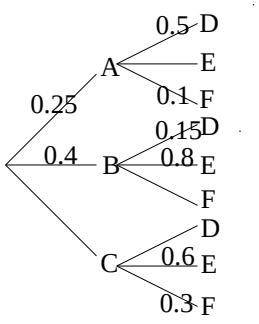
(covering Sections 7.1-7.6 and 8.1-8.3)

(Please note that this review is not all inclusive)

1. An experiment consists of selecting 2 coins (without replacement) from a bowl containing a penny, a nickel, a dime, and a quarter. (Note: We are only observing which coins we select. The order we select them in does not matter.)
   (a) Give the sample space for this experiment.
   (b) Find the event E where E is the event that the sum of the coins is greater than \$0.11.
   (c) Find the probability of the event E.
2. Sue lives in a house divided. That is, her mom is an Aggie and her dad is a Longhorn. She is packing her bag to go to Austin for the football game. Her drawer contains twelve Aggie shirts and nine longhorn shirts. In packing her bag, she randomly selects five shirts.
   (a) What is the probability that she packs exactly two Aggie shirts?
   (b) What is the probability that the second shirt she packs is an Aggie shirt if the first shirt is a longhorn shirt?
3. Meghan and Natalie go to eat at Freebirds. Since it is Freebirds 15th anniversary they each get to roll a pair of special dice for a chance to win a Monster Burrito. Each fair die has six sides with one of the sides having a backwards F on it. If both of the dice land on the backwards F, you win a Monster. What is the probability that at least one of the girls wins a Monster?
4. An accounting firm employs 20 accountants, of whom 8 are CPAs. If a delegation of 7 accountants is randomly selected from the firm to attend a conference, what is the probability that at least 2 CPAs will be selected?
5. Three balls are randomly selected without replacement from a box containing 10 tennis balls and 8 baseballs. Let the random variable X denote the number of baseballs drawn. Find the probability distribution of X.
6. It is known that the mean of an exam was 70 with a standard deviation of 4. Using Chebychev's Inequality, estimate the probability that a randomly selected student scored between a 58 and 82, inclusive.
7. The weather forecaster predicts that the probability that it will rain on Friday is 0.38. What are the odds that it will NOT rain on Friday?
8. Six people are selected at random. What is the probability that at least two of the people in this group were born on the same DAY of the week?
9. For two events, E and F, we know the $P(E \cap F^c) = 0.2$, $P(F) = 0.5$, and $P(E \cap F) = 0.4$. Find $P((E \cap F^c) \cup (E^c \cap F))$.
10. Jack and Jill decide to play a game. Jill rolls a pair of fair six-sided dice. If the sum of the numbers is less than 4, Jill pays Jack \$1. If the sum of the number is greater than 9, Jack pays Jill \$10. Otherwise, Jill pays Jack \$$A$. Find the value of A that makes this game fair.
11. The following is a histogram for the random variable X.



   (a) Find $E(X)$.
   (b) What is the mode?
   (c) What is the median?
   (d) What is the standard deviation?
   (e) What is the variance?
   (f) Find $P(X > 43)$
12. Determine whether each statement is true or false.
   (a) Given any two events A and B, $P(A \cap B) = P(A) \cdot P(B)$.
   (b) Let the random variable X represent the number of times a student takes a driving test before passing. X is an infinite discrete random variable.
   (c) The numbers 1, 2, and 3 are written separately on 3 pieces of paper. An experiment consists of drawing two slips from the bowl and observing the numbers. This experiment has 3 events. (Note: The order in which the numbers are selected is not observed.)
   (d) An experiment consists of casting two fair dice and recording the sum of the numbers appearing uppermost. The sample space for this experiment has equally likely outcomes.
   (e) The sample space associated with an experiment is given by $S = \{a, b, c, d, e\}$. The events $E = \{a, b\}$ and $F = \{c, d\}$ are mutually exclusive. Hence the events E^c and F^c are mutually exclusive.
   (f) We say that a game is fair if the expected value of a player's net winnings is zero.
13. A pharmaceutical company is in the process of researching a pregnancy test. Among those women who are pregnant, the probability that the test is positive is 0.99. However, the probability that the test will erroneously indicate that the woman is pregnant is 0.02. It is estimated that 30% of the women in this study are actually pregnant. If the pregnancy test is positive, what is the probability that the woman is actually pregnant?
14. Complete the following tree diagram and use it to answer the following questions:



   (a) Find $P(D|C)$
   (b) Find $P(E)$
   (c) Find $P(B|E)$
   (d) Find $P(A \cup F)$