MAT 119 Review Test 3

CHAPTER 6

You should be able to:

Section 6.1:
• Identify relations between pairs of sets (Review exercises 1-16)
• Know the definition and notation for the empty set and the universal set.
• Find the union and intersection of two sets (Review exercises 3,4,6,9,11-13,15-18,23-28)
• Find the complement of a set (Review exercises 18a,c-f,24,26,28)
• Use Venn diagrams (Review exercises 19-22)

Section 6.2:
• Use the counting formula: \( c(A \cup B) = c(A) + c(B) + c(A \cap B) \) (Review exercises 29-34)
• Use Venn diagrams to analyze survey data (Review Exercises 35,36)

Review WeBWorK Assignment 8

Section 6.3:
• Use the multiplication principle. You should use it when the number of ways to do a procedure can be expressed as the product of the number of ways to do a sequence of tasks. (Review Exercises 63,64,65,68b,70a,71-75,80,82)

Section 6.4
• Evaluate factorials (Review Exercises 39-50)
• Solve counting problems involving permutations. Permutations should be used when order matters and the objects are distinct. Focus on key words and ideas. For permutations: ranking, arranging, positioning (in order). Understand how to deal with problems containing the phrases at least and at most, and how to use the complement in certain cases. Remember that, When we are making choice 1 AND choice 2, we MULTIPLY to find the total number of ways. When we are making choice 1 OR choice 2 we ADD to find the total number of ways. (Review Exercises 60-62,66a,67a,68,70b,71,72,77-79)

Review WeBWorK Assignment 9

Section 6.5:
• Evaluate combinations. (Review exercises 51-54)
• Solve counting problems involving combinations. Combinations should be used when order does not matter, the objects are distinct and repetition is not allowed. Key words: choosing, selecting (without order). (Review exercises 59,66b,67b,69,70c,73-76,81)
• Solve counting problems with combination questions when there is at least or at most in the question (always break it down to exactly statements). Remember that sometimes it is more convenient to work with the complement. (Review exercises 69b,76)
• Solve counting problems involving permutations with repetition (Review Exercises 83-86)

Review WeBWorK Assignment 10

READ ALL EXAMPLES IN THE TEXTBOOK FROM SECTIONS 6.1-6.5.
FORMULAS FROM CHAPTER 6:

**Permutation:** an ordered arrangement of \( r \) objects chosen from \( n \) objects.

- The \( n \) objects are distinct (different) and repetition is allowed in the selection of \( r \) of them: \( n^r \) permutations.
- The \( n \) objects are distinct (different) and repetition is not allowed in the selection of \( r \) of them, where \( r \leq n \):
  \[
P(n,r) = n(n-1) \cdots [n-(r-1)] = \frac{n!}{(n-r)!}.
  \]
- The number of permutations of \( n \) objects of which \( n_1 \) are of one kind, \( n_2 \) are of a second kind, ... and \( n_k \) are of a kth kind:
  \[
  \frac{n!}{n_1!n_2!\cdots n_k!}.
  \]

**Combination:** An arrangement, without regard to order, of \( r \) objects selected from \( n \) distinct objects without repetition, where \( r \leq n \):

\[
C(n,r) = \frac{n!}{(n-r)!r!}.
\]

CHAPTER 7

You should be able to:

**Section 7.1:**
- Find a sample space (Review Exercises 3-4)
- Assign probabilities (Review Exercises 5-8,27,28)
- Construct a probability model (Review Exercises 9a,10a,11a,12a)
- Find probabilities involving equally likely outcomes (Review Exercises 9b,10b,11b,12b,13-14)

**Section 7.2:**
- Find the probability of an event (Review Exercises 17,18,27,28)
- Find the probability of \( E \) or \( F \), when \( E \) and \( F \) are mutually exclusive (Review Exercises 23,24,29)
- Use the Additive rule (Review Exercises 15,16,19b,20b,21b,22a,25,26)
- Use Venn diagrams to find probabilities (Review Exercises 19,20,37,38c)
- Find the probability of the complement of an event (Review Exercises 15b,16b,19a,20a,21a,c,22b,c,23,24)
- Compute the **odds for** and the **odds against** an event: know how to find the odds given the probability and how to find the probability given the odds. (Review Exercises 31-34)

Review WeBWorK Assignment 11

**Section 7.3**
- Find the probability of events using counting techniques. (Review Exercises 39,40,45,47,48). Most of the problems in this section are based on the counting techniques from section 6.3,6.4 and 6.5. Recall the difference between a permutation (order matters) and a combination (order does not matter) and examples when the objects are not distinct or repetition is allowed. Understand how to deal with problems containing the phrases **at least** and **at most**, and how to use the **complement** in certain cases.

**Section 7.4:**
- Find conditional probabilities (Review Exercises 37a,b,38a,b,41c,42c,43,44)
- Find probabilities using the Product Rule (Review Exercises 41a,42a)
- Find probabilities using a tree diagram (Review Exercises 41,42)

Review WeBWorK Assignment 12
FORMULAS FOR CHAPTER 7:

Equally Likely Outcomes: \( P(E) = \frac{c(E)}{c(S)} \)

Complement of an Event: \( P(\bar{E}) = 1 - P(E) \)

Probability given Odds:
- If odds for \( E \) are \( a \) to \( b \) then \( P(E) = \frac{a}{a+b} \).
- If odds against \( E \) are \( a \) to \( b \) then \( P(E) = \frac{b}{a+b} \).

Odds given probability:
- Odds for \( E \) are \( \frac{P(E)}{P(\bar{E})} \).
- Odds against \( E \) are \( \frac{P(\bar{E})}{P(E)} \).

Additive Rule: \( P(E \cup F) = P(E) + P(F) - P(E \cap F) \)
- (If \( E \) and \( F \) are Mutually Exclusive Events: \( P(E \cup F) = P(E) + P(F) \))

Conditional Probability: \( P(E \mid F) = \frac{P(E \cap F)}{P(F)} \)

Product Rule: \( P(E \cap F) = P(F) \cdot P(E \mid F) \)