MA 110 WORKSHEET (7.3)

Name ________________________________

1. Noting that there are 26 letters in the English alphabet and 10 digits. How many different license plates can a state make if each license plate contains:
   
   A. 7 different digits?
      
      \[10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 = 604,800\]
   
   B. 7 digits with repeats permitted?
      
      \[10^7 = 10,000,000\]
   
   C. 3 letters followed by 3 digits, repeats permitted?
      
      \[26^3 \times 10^3 = 17,576,000\]

2. Suppose a person planning a banquet cannot decide how to seat 6 guests at the head table. How many ways can they be seated in the 6 chairs on one side of the table?
   
   \[6! = 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720\]

3. Eight horses are entered in a race. How many ways can the horses finish?
   
   \[8! = 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 40,320\]

4. The call letters for radio stations must begin with K or W followed by any 3 additional letters. How many sets of call letters are possible?
   
   \[2 \times 26^3 = 35,152\]

5. How many different outfits can be formed from
   
   A. 4 pairs of pants and 6 shirts?
      
      \[4 \times 6 = 24\]
   
   B. 4 pairs of pants, 6 shirts, and 3 sweaters?
      
      \[4 \times 6 \times 3 = 72\]
6. An automobile manufacturer produces 7 models, each available in 6 different colors. In addition, the buyer can choose one of 4 different upholstery fabrics and one of 5 different colors for the interior. How many varieties can be ordered from the manufacturer?

\[7 \times 6 \times 4 \times 5 = 840\]

7. How many different ways can 10 questions on a true-false test be answered?

\[2^{10} = 1024\]

8. How many different arrangements can be made with the letters, M, A, T, H, if:

A. each letter can be used only once?

\[4 \times 3 \times 2 \times 1 = 24\]

B. each letter can be used more than once?

\[4 \times 4 \times 4 \times 4 = 256\]

9. How many 7-digit telephone numbers can be formed if the first digit cannot be a 1 or 0?

\[8 \times 10^6 = 8,000,000\]

10. How many different 7-digit telephone numbers begin with 587 or 589?

\[2 \times 10^4 = 20,000\]

11. How many 3-letter code words can be formed if the middle letter must be a vowel?

\[26 \times 5 \times 26 = 3,380\]

12. Make up your own counting problem and solve it.