Combinations, Permutations, and Related Counting Problems

Note: The number of permutations of n things taken r at a time = P(n, r).
       The number of combinations of n things taken r at a time = C(n, r).

Connect each problem number to both the a and b answers.

1.   a) C(9, 3) =

        b) How many distinct 5-letter permutations are there for the letters of the word
            ACORN, using all of the letters each time?

2.   a) C(8, 2) =

        b) How many distinct 6-letter permutations are there for the letters of the word
            ADIDAS, using all of the letters each time?

3.   a) C(7, 4) =

        b) How many arrangements are there for 7 people seated at a circular table with 7
            seats?

4.   a) P(5, 3) =

        b) How many ways may 8 keys be arranged on a key ring?

5.   a) P(5, 2) =

        b) How many different 5-digit license plates may be made if the first digit cannot be
            zero and repetitions of the digits are allowed?

6.   a) $P(7, 3) =$

         b) How many different ways can you answer a 6-question True-false exam?

7.   a) $C(9, 6) =$

         b) How many different ways can you answer a 7-question multiple choice exam (with 3 choices) if you know that no two consecutive answers are the same?

8.   a) How many different 5-card hands may be dealt from a standard deck of 52 cards? Express the answer as a permutation or combination – do not compute.

         b) $C(9, 6) =$

9.   a) $C(7, 3) =$

         b) How many different Bridge hands (13 cards) may be dealt from a standard deck of 52 cards? Express the answer as a permutation or combination – do not compute.

10.   a) How many 3-letter initials may be made from ACMLO, if repetition of the letters is allowed?

         b) How many different committees consisting of 3 males and 2 females may be formed from 36 males and 25 females? Express the answer as a permutation or combination – do not compute.

11.   a) Suppose a sundae consists of 1 flavor of ice cream; 1 sauce topping; marshmallow or whipped cream; and either a nut or a cherry. If 31 flavors are available, and 7 toppings are available, how many different sundaes are possible?

         b) How many 2-digit numbers may be written using 2, 3, 4, 5, 6 if repetition of the digits is not allowed?

12.   a) A statistician must choose a sample of 3 people from a group of 52 people. How
       many different samples are possible?

       b) How many 3-letter sorority names can be formed from the Greek letters,
           Β, Γ, Δ, Θ, Ψ, Π, Ε, if repetition of the letters is not allowed?

13. Complete the design without further clues.