More and More Permutation Practice Problems

1. In how many ways can 6 plants be arranged on a shelf?

2. How many 5-digit numbers can be made from the digits 1, 2, 3, 4, 5 if no digit can be used more than once in the same number?

3. a) In how many ways can seven children sit on a bench?
   b) In how many of these arrangements are the two oldest always together?

4. In how many ways can the letters A, B, C, D and E be arranged in a row?

   In how many of these arrangements
   a) is D always the first?
   a) is A first and E last?

5. How many 4-digit numbers can be made from the digits 4, 5, 6, 7 if no digit is repeated in the same number?

   a) How many of these numbers are greater than 7000?
   b) How many of these numbers end in 7?
   c) How many of these numbers are less than 6000?

6. How many different arrangements can be made from the letters of the word PROBLEM?

   a) How many of these arrangements begin with a vowel?
   b) In how many of these arrangements do the two vowels come together?

7. Find the number of different ways in which the letters of the following words can be arranged

   a) RETAIN
   b) STATISTICS

8. Seven children, including one set of twins, are arranged in a line. How many different arrangements can be made?

   In how many of these arrangements are the twins
   a) always together?
   b) always apart?

9. How many different arrangements can be made from the letters of the word OPPOSITE?

   a) How many of these arrangements begin with the letters PP?

10. A code consists of any permutation of the letters A, B, and C followed by any permutation of the numbers 1, 2, and 3.

   a) How many different codes can be made if no letter or number can be repeated?
   b) How many different codes can be made if no two numbers can be beside each other?

11. How many arrangements can be made from the letters of the word COOPERATOR when all the letters are used?

   a) How many arrangements have three O's together?
   b) How many arrangements begin with 2 R's?

12. In how many different ways can 4 letters be put in 6 envelopes if not more than one letter is put in each envelope?

13. How many different 4-digit numbers can be made from the digits 0, 1, 3, 5, and 7 if no digit is repeated in a number and zero cannot be first number?

14. How many ways can 4 people be arranged at a round table?

15. How many different 4-letter words can be arranged from letters from the word BRIDGE?

16. How many different 4-letter words can be made from the letters of the word EXAMPLE if each permutation begins with an E and ends with an E

17. A person has 10 ornaments, including a clock, of which only 7 ornaments will fit on the mantelpiece. If the clock must go in the centre, how many different arrangements can be made with the ornaments?

18. Three girls and four boys are to sit in a row of seven chairs. How many arrangements are possible if:

   a) the girls sit in adjacent chairs?
   b) no two boys may sit beside each other?

19. Express as a product of three factors, one of which is a factorial: $(n+2)!+(n+1)!+n!$

ANSWERS
1) 720 2) 120 3a) 5040 3b) 1440 4) 120 4a) 24 4b) 6 5) 24 5a) 6 5b) 6 5c) 12 6) 5040
6a) 1440 6b) 1440 7a) 720 7b) 50400 8) 5040 8a) 1440 8b) 3600 9) 10080 9a) 360
10a) 36 10b) 144 11) 302400 11a) 20160 11b) 6720 12) 360 13) 96 14) 6 15) 360
16) 20 17) 60480 18a) 720 18b) 144 19) $n!(n+2)(n+2)$