HW 2 - Permutations HW Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 **COMPLETE ALL WORK ON A SEPARATE SHEET OF PAPER. SHOW ALL WORK.**

1. How many four-digit numbers can be made from the digits 1 – 8 if:

 a) repetition of digits is not allowed? b) repetition of digits is allowed?

c) no repetition is allowed and the number must be greater than 5000?

 d) repetition is allowed and the number is even?

e) repetition is not allowed and the number must be less than 3000?

2. In how many ways can a chairman, treasurer, and secretary be selected from a Board of Directors with eight members?

3. If 100 people enter a contest in which there is a first prize, a second prize and a third prize, in how many ways can the prize be given?

4. Twelve different portraits are in the Ling family’s collection.

 a) In how many ways can five of them be hung in a row on the living room wall?

 b) If Grandma Ling’s picture must be included, and must be hung in the middle of the group of 5, how many different arrangements are there?

5. In how many ways can three different awards be distributed to 20 students if

 a) no student can receive more than one award

 b) there is no limit on the number of awards a student can receive

6. Find the number of ways the letters in the word MATCHING can be rearranged if

 a) there are no restrictions

 b) the first letter must be M

 c) the odd-numbered positions must remain unchanged

 d) the arrangement must end in NG

7. In how many ways can the letters in the following words be rearranged?

 a) MAXIMUM

 b) CANADA

 c) BOOKKEEPER

 d) MATHEMATICS

8. How many five digit numbers can be formed by using two 4s and three 6s?

9. A man bought two vanilla ice cream cones, three chocolate cones, four strawberry cones, and one pistachio cone for his ten children. In how many ways can he distribute the flavors among the children?

10. Yuri is shelving books in a display in the school library. He has four different books with three copies of each. In how many ways can he arrange the books on the shelf if the like copies must stay together?

11. How many permutations of the letters in the word BASKETBALL are there?

 a) How many of the arrangements begin with K?

 b) How many of the arrangements start with a B?

 c) In how many of the arrangements would the two Ls be together?

12. A quarterback has a series of six plays possible. If the coach asks the quarterback not to repeat any plays in a game, how many different orders of plays is possible?

13. In how many ways can five girls and five boys in a choir stand in a line if boys and girls must alternate positions?