Each event can occur in the given number of ways. Find the number of ways all of the events can occur.

1.) Event *A*: 2 ways; Event *B*: 4 ways

2.) Event *A*: 5 ways; Event *B*: 2 ways

3.) Event *A*: 4 ways; Event *B*: 3 ways
    Event *C*: 5 ways

4.) Event *A*: 3 ways; Event *B*: 6 ways
    Event *C*: 5 ways; Event *D*: 2 ways

For the given configuration, determine how many different license plates are possible if (a) digits and letters can be repeated, and (b) digits and letters cannot be repeated.

5.) 4 letters followed by 3 digits

   a.)

   b.)

6.) 2 letters followed by 5 digits

   a.)

   b.)

7.) 5 digits followed by 3 letters

   a.)

   b.)

8.) 6 letters

   a.)

   b.)

Evaluate the expression.

9.) 7!

10.) 0!

11.) 3(4!)

12.) $\dfrac{8!}{(8-5)!}$

13.) $\dfrac{9!}{4! \cdot 4!}$

Find the number of permutations.

14.) $_4P_4$ 15.) $_8P_7$ 16.) $_{15}P_0$ 17.) $_9P_2$

Find the number of <u>distinguishable</u> permutations of the letters in the word.

18.) OFF   19.) GRAVEL   20.) HONOLULU   21.) CLEVELAND

22.) You want to purchase a class ring. The ring can be made from 3 different metals. You can choose from 6 different side designs and 12 different stones. How many different class rings are possible?

23.) A photographer lines up the 15 members of a family in a single line in order to take a photograph. How many different ways can the photgrapher arrange the family members for the picture?

24.) The Spanish club is electing a president, vice president, and secretary. The club has 9 members who are eligible for these offices. How many different ways can the 3 offices be held?

25.) Your chores for the week are to cut the grass, wash the car, clean your room, clean the garage, and do the laundry. You are to do 1 chore each day from Monday through Friday. You can do each chore on whatever day you want, except that you must wash the car either Thursday or Friday. In how many different orders can you perform your chores?