MDM4U **Practice- Counting Principles, Sum & Product Rules** Date: _____

1. A store sells clothes for men. It has 3 different kinds of jackets, 6 different kinds of shirts, and 4 different kinds of pants. Find the number of ways a person can buy:
   a) one of the items for a present,

   b) one of each of the items for a present.

2. A restaurant has, on its dessert menu, 4 kinds of cakes, 3 kinds of cookies, and 5 kinds of ice cream. Find the number of ways a person can select:
   a) one of the desserts,

   b) one of each kind of dessert

3. A class contains 8 male students, and 6 female students. Find the number of ways that the class can elect:
   a) a class representative,

   b) two class representatives, one male and one female,

   c) a president and a vice-president.

4. There are 6 roads between A and B and 4 roads between B and C. Find the number of ways a person can drive :
   a) from A to C by way of B,

   b) round-trip from A to C by way of B,

   c) round-trip from A to C by way of B without using the same road more than once.

5. Suppose a code consist of two letters followed by a digit. Find the number of :
   a) codes

   b) codes with distinct letters,

   c) codes with same letters.

6. How many different telephone numbers can a given area code have, if the first digit cannot be a zero?

7. In how many ways can a coin come up if tossed once? twice? three times? n times?

8. Three dice are tossed.
   a) In how many ways can the dice come up?

   b) In how many ways can the dice each come up a different number?

   c) In how many ways will the dice come up with at least two of the numbers the same?

Answers:

1. A store sells clothes for men. It has 3 different kinds of jackets, 6 different kinds of shirts, and 4 different kinds of pants. Find the number of ways a person can buy:
   d) one of the items for a present,
   3 + 6 + 4 = 13
   b) one of each of the items for a present.
   (3)(6)(4)=72
2. A restaurant has, on its dessert menu, 4 kinds of cakes, 3 kinds of cookies, and 5 kinds of ice cream. Find the number of ways a person can select:
   c) one of the desserts,
   4 + 3 + 5=12
   d) one of each kind of dessert
   (4)(3)(5)=60
3. A class contains 8 male students, and 6 female students. Find the number of ways that the class can elect:
   a) a class representative,
   8 + 6 =14
   e) two class representatives, one male and one female,
   (8)(6)=48
   f) a president and a vice-president.
   (14)(13)=182
4. There are 6 roads between A and B and 4 roads between B and C. Find the number of ways a person can drive :
   d) from A to C by way of B,
   (6)(4)=24
   e) round-trip from A to C by way of B,
   (6)(4)(4)(6)=576
   f) round-trip from A to C by way of B without using the same road more than once.
   (6)(4)(3)(5)=360
5. Suppose a code consist of two letters followed by a digit. Find the number of :
   a) codes
   (26)(26)(10)=6760
   d) codes with distinct letters,
   (26)(25)(10)=6500
   e) codes with same letters.
   (26)(1)(10)=260 or By indirect method: 6760 − 6500 = 260 from (a) and (b)
6. How many different telephone numbers can a given area code have, if the first digit cannot be a zero?
   Area code: 9 10 10 = 900 Phone: # 9 10 10 10 10 10 10 =9 x 10^6 Total: 8 100 000 000
7. In how many ways can a coin come up if tossed once? twice? three times? n times?
   2, 2 2 = 2^2, 2 2 2 =2^3, 2^n

8. Three dice are tossed.
   a) In how many ways can the dice come up?
   6 6 6 = 216
   b) In how many ways can the dice each come up a different number?
   6 5 4 = 120
   c) In how many ways will the dice come up with at least two of the numbers the same?
   Total - #ways dice different = 216 – 120 = 96