Islington College
Module Code: MA4001NI Logic and Problem Solving

1. Calculate each of the following:
   a) 5! / 3! b) 2! / 0! c) 6! / 4! d) 9! / 6!

2. Calculate:
   a) ${}_5P_3$ b) ${}_6P_2$ c) ${}_7P_6$ d) ${}_8P_5$

3. Calculate:
   a) ${}_6C_2$ b) ${}_6C_3$ c) ${}_6C_4$ d) ${}_8C_3$

4. In how many ways can a committee of three people be selected from a total of eight people?
   8C3

5. An ice cream parlor has 15 different flavors. George orders a sundae and must select 3 flavors. How many different selections are possible?
   15C3

6. A teacher decides to give six identical prizes to 6 of the 30 students in the class. In how many ways can the students be selected?
   30C6

7. A teacher decides to give six different prizes to 6 of the 30 students in the class. In how many ways can the students be selected?
   30P6

8. A club consisting of eight people must choose a president, vice-president, and a secretary. How many different arrangements are possible?
   8P3

9. A student must select and answer four of five essay questions on a test. In how many ways can he do this?
   5C4

10. Chipola College must assign a new employee a 7-digit phone number, but the first three digits must be 526. How many different numbers can be assigned if:
    a) There are no restrictions on the remaining four numbers?
    b) If the phone number cannot have **any** digits repeated?
    c) If the new employee is in the math dept and all math dept phone numbers end with 00?

    (a) $10\times10\times10\times10$ = **10000**, (b) 7P4 or $7\times6\times5\times4$ = **840**, (c) 10×10 = **100**

11. Three of eight finalists will be selected and awarded $5000 scholarships each. In how many way can this be done?

8C3

12. The manager of a 9 member baseball team must arrange the batting order. In how many ways can the manager of a baseball team arrange his players if:

a) There are no restrictions on the order?
b) The pitcher must bat last?
c) The catcher must bat first and the pitcher must bat last?

(a) 9!,
(b) 8!,
(c) 7!

13. A man has 8 pairs of pants, 12 shirts, 15 ties, and 6 sport coats. If he wears one of each, how many different outfits can he wear?
8×12×15×6 or alternatively [8C1×12C1×15C1 × 6C1]

14. Explain the difference between Combinations and Permutations.

15. Six people form a line and three are female. How many permutations of the people are there if:
a) The 3 males must stand together?
b) 2 of the girls must stand together?

(a) 4! × 3!, (b) 3C2 × 5!

16. A group is to be chosen from 5 people. How many ways can four people be selected?
5C4

17. In how many ways can five cards be selected from a well-shuffled deck of 52 cards?
52C5

18. How many ways can 20 compact discs be arranged in alphabetical order?
20C20 = 1 way

19. How many 4-digit arrangements can be created using the digits 5, 7, 8 and 2 if,
a) the numbers can be repeated
b) the five must be the first number
c) the five must be the first number and the two the second

(a) 4^4,
(b) 4^3,
(c) 4^2

20. The baseball club has 50 members, 20 who are girls. A special group of 7 is to be selected. How many ways can this group be selected if,

a) everyone is considered equally
b) it must contain at least 4 girls
(a) $50C7$,
(b) $[(20C4 \times 30C3) + (20C5 \times 30C2) + (20C6 \times 30C1) + 20C7]$

- End of Tutorial -