**Pre-Calculus 12**

*Permutations and Combinations*

1. How many arrangements could be made of the word?
2. **FATHER** if **F** is first? b) **UNCLE** if **C** is first and **L** is last?

c) **DAUGHTER** if **UG** is last? d) **MOTHER** if the vowels are first and last?

1. How many arrangements of the following words can be made if all the vowels must be kept together?
2. **FATHER** b) **DAUGHTER** c) **EQUATION**
3. Determine the number of different arrangements of the six letters in the word **ANSWER**
4. Without restrictions b) that begin with an **S**

c) that begin with a vowel and end with a consonant.

d) that have the letters **A, N,** and **S** adjacent and in the order **ANS**

e) that have the three letters **A, N,** and **S** adjacent but not necessarily in that order

1. How many different arrangements can be made using all the letters of each word?
2. **COCHRANE** b) **WINNIPEG** c) **OSOYOOS**
3. A race at the Olympics has 7 runners. In how many orders can their countries finish if
4. There are 2 Canadian, 1 Russian, 1 German, 1 South African, and 3 American runners?
5. There are 1 Canadian, 2 British, 2 Ethiopian, 1 Algerian, and 2 Kenyan runners?
6. Pete’s Perfect Pizza Company has 9 choices of topping available.
7. How many different 2-topping pizzas can be made?
8. How many different 3-topping pizzas can be made?
9. A theatre company consisting of 6 players is to be chosen from 15 actors. How many selections are possible if the company must include Mrs. Jones?
10. Edinburgh High School has a twelve-member student council. A four member sub-committee is to be selected to organize dances.
11. How many different sub committees are possible?
12. How many four member sub-committees are possible if the council president and vice-president must be members?
13. A basketball coach has five guards and seven forwards on his basketball team.
14. In how many different ways can he select a starting team of two guards and three forwards?
15. How many different starting teams are there if the star player, who plays guard, must be included?
16. Consider a standard deck of 52 cards. Determine the number of distinct six card hands that are possible which include
17. No restrictions b) only clubs c) 2 clubs and 4 diamonds

d) No sevens e) 4 tens f) exactly 1 Jack and 4 Queens

1. A group of 4 journalists is to be chosen to cover a murder trial. There are 5 male and 7 female journalists available. How many possible groups can be formed
2. Consisting of 2 men and 2 women? b) Consisting of at least 3 men?

c) Consisting of at least 1 woman?

Answer Key

1. a) 120 b) 6 c) 720 d) 48
2. a) 240 b) 4320 c) 2880
3. a) 720 b) 120 c) 192 d) 24
4. a) 20 160 b) 10 080 c) 105
5. a) 3360 b) 5040
6. a) 36 b) 84
7. 2002
8. a) 495 b) 45
9. a) 350 b) 140
10. a) 20 358 520 b) 1716 c) 55770 d) 12 271 512 e) 1128 f) 176
11. a) 210 b) 75 c) 490