Mathematics 3201

Unit 2: Counting Methods

Review Questions

1. (A) How many ways can the letters in the word MISSISSIPPI be arranged?

 (B) How many arrangements are there if the first letter has to be S?

2. How many 4-digit numbers can be formed using the digits 1-9 if repetition is allowed?

3. There are six coloured marbles in a box and you take one out at a time. How many different ways can you take out four marbles?

4. (A) How many arrangements of the word “PHONE” exist if the letters O and E have to be together?

 (B) How many arrangements are there if the letters O and E can’t be together?

5. How many passwords using at least 3 but no more than 5 digits can be made using the digits of 46723819 where repetition is not allowed?

6. How many ways can you order the letters from the word TREES if:

 A) S must be at the beginning

 B) the R must be in the middle

 C) It begins with exactly one E

 D) Consonants and vowels alternate

7. How many ways can 4 rock, 5 pop, and 6 classical albums be ordered if all the albums of the same genre must be kept together?

8. How many ways can you order the letters in FORTUNES if the vowels must never be together?

9. If an ice cream dessert can have 2 toppings, and 9 are available, how many different topping selections can you make?

10. There are 9 possible toppings for a sandwich, but you only want 4 toppings, one of which must be pickles. How many different sandwiches can be made?

11. If a crate of radio controlled cars contain 10 working cars and 4 defective cars, how many ways can you choose 5 cars where only three work?

12. If a student must select two courses from Group A (Math 3201, Chem 3202, Physics 3204 and Biology 3201), two courses from Group B(Eng 3201, Science 3200) and one course from Group C (Math 3208, Earth Systems 3208, French 3201), how many combinations are there?

13. A student council of 5 members is to be formed from a selection pool of 6 boys and 8 girls. How many councils can have

 A) Jason on the council

 B) Katie, but not John

 C) Zach, but not Caroline, Allison or Mark

 D) At least 3 boys, but one of these boys can’t be Brian

14. A research team of 7 people is to be formed from 8 chemists, 4 politicians, 3 economists and 2 biologists. How many teams have:

 A) At least 5 chemists? B) Exactly three economists

 C) Four chemists, but no economists D) At least two biologists

15. It there are 8 boys & 7 girls in a selection pool and a school council of President, VP, treasurer and Secretary to be formed, in how many ways can

 A) exactly one boy be on council B) exactly two girls be on council

 C) no boys on council

16. If a sports team with six unique positions is to be formed from 5 men and 7 women, in how many ways can two positions be filled by men and four positions by women?

17. Simplify:

 A) $\frac{(n-1)!}{(n-3)!}$ B)$\frac{(3n+2)!}{(3n+3)!}$

18. Solve:

 A) $\frac{(n-1)!}{(n-3)!}=2$ B) $\left(n+2\right)!=12n!$

19. Solve:

 (A) nC2 = 15 (B) n+1Cn = 20 (C) n+1P2 = 20