Mathematics 3201

Unit 2: Counting Methods

Review Questions

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Answer all of the following questions showing all work.

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

2. If a multiple choice test has 10 questions, of which one is answered A, 4 answered B, 3 answered C, and 2 answered D, how many answer sheets are possible?

3. How many 3-digit numbers can be formed?

4. There are six coloured balls in a box and you pull them out one at a time. How many different ways can you pull out four balls?

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

 A) a vowel must be at the beginning?

 B) it must start with a consonant and end with a vowel?

 C) the R must be in the middle

 D) It begins with an E?

 E) It begins with exactly one E?

 F) Consonants and vowels alternate

6. How many 3-digit, 4-digit, or 5-digit numbers can be made using the digits of 46723819?

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 take out 5 cars and have only three work?

12. if a student must select two courses from Group A (Math 3201, Chemistry 3202, Physics 3204 and Biology 3201), two courses from Group B(English 3201, World Geography 3202) and one course from Group C (Math 3208, Earth Systems 3208, French 3201), how many combinations are there?

13. There are 8 parents and 43 students going on a field trip. Two groups are made, a large one with 30 students and 5 parents and a small group with 13 students and 3 parents.

 A) How many different ways can the parents be chosen for the small group?

B) How many ways can the students be chosen for the large group if Stefan and Dylan must be in the small group?

C) How many ways can the students be chosen for the small group if Wade and both his parents must be in the small group?

14. 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 Ale

 C) Zach, but not Caroline, Allison or Jamie

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

15. A research team of 6 people is to be formed from 10 chemists, 5 politicians, 8 economists and 15 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

16. It there are 14 boys & 12 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

17. 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?

18. Simplify:

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

19. Solve:

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