

**UNIVERSITY OF NEW BRUNSWICK**  
**DEPARTMENT OF MATHEMATICS AND STATISTICS**  
Winter 2004

**Math 1833**  
**Finite Mathematics for the Management Sciences**

**Test #1: Worth 30% of your final mark**

**Time:** 2 hours

**Mark:** \_\_\_\_\_/30

**Instructions:**

- Show all your work.
- Work neatly and in an organized manner.
- If you run out of space in a problem, use the space on the back of the page and clearly indicate where the solution continues.
- Graphing calculators are **not** allowed!
- Good Luck! 😊

1. [4 marks] Let  $U = \{a, b, c, d, e, f, g, h\}$ ,  $R = \{a, c, e\}$ ,  $S = \{b, f, g\}$ ,  $T = \{e, f, g, h\}$ .

Find elements in the following sets:

a)  $R' \cap T$

b)  $(R \cup S) \cap (R \cup T)$

2. [2 marks] Draw a neat three circle Venn diagram to illustrate  $(A' \cup B) \cap C$ .

3. [1 mark] Your favourite restaurant offers a total of 14 desserts, of which 8 have ice cream as a main ingredient and 9 have fruit as a main ingredient. Assuming that all of them have either ice cream or fruit or both as a main ingredient, how many have both?

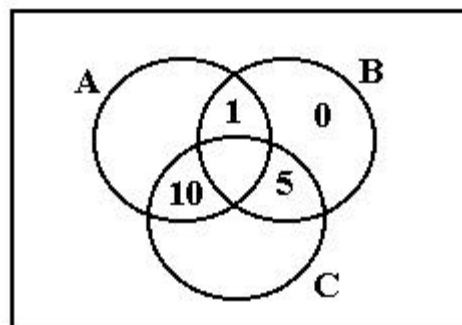
4. [2 marks] Use the given information to complete the partially solved Venn Diagram

$$n(A) = 16$$

$$n(B) = 11$$

$$n(C) = 30$$

$$n(U) = 40$$



5. [2 marks] A test requires that you answer either Part A or Part B. Part A consists of eight true/false questions, and Part B consists of five multiple-choice questions. In each of the multiple-choice questions, you must select the correct answer from a list of five. How many completed answer sheets are possible?
6. [1 mark] The local diner offers a meal combination consisting of an appetizer, a soup, a main course, and a dessert. There are five appetizers, two soups, four main courses, and five desserts. How many four course meals are possible?
7. [1 mark] Mary has 20 different coffee mugs but only has room to display 5 on a shelf. How many different arrangements are possible?
8. [4 marks] A bag contains three red, two green, one lavender, two yellow, and two orange candies. Four candies are selected at random.
  - a) How many ways can the four candies be selected?
  - b) How many ways can all the red candies be selected?
  - c) How many ways can at least 1 red be selected?
  - d) How many ways can the four candies include one of each colour other than lavender?
9. [2 marks] A packet of gummy candy contains four strawberry, four lime, and two orange gums. John sticks his hand in and selects four at random. What is the sample space?
10. [2 marks] Consider the following events.  $S$  = an author is successful and  $N$  = An author is new.
  - a) Describe the event  $N \cap S'$  in words.
  - b) Are  $S'$  and  $N$  mutually exclusive? Justify your answer.
11. [2 marks] The Lottery requires you to select six different numbers from 1 through 49. (Order is not important.) You are a Big Winner if the six numbers you select agree with those in the drawing. What is the probability of being a Big Winner?
12. [1 mark] Five people are selected at random. What is the probability that none of the people were born on the same day of the week?
13. [4 marks] My couch potato friend enjoys sitting in front of the TV and grabbing handfuls of 5 chocolates at random from his snack jar. Unbeknownst to him, I have replaced 1 of the 20 chocolates in his jar with a cashew. (He hates cashews with a passion.).
  - a) What is the probability that he grabs the cashew, the first time he reaches in and grabs five chocolates?
  - b) If he did not get the cashew in his first handful of chocolates, what is the probability that he will grab it in the second handful?
14. [2 marks] A survey of needy and disabled youths showed that 51% of those who had no preschool education were arrested or charged with a crime by the time they were 19, whereas only 31% who had preschool education wound up in this category. If 20% of youths attended preschool, what percentage of the youths arrested or charged with a crime had no preschool education?