

STUDENT'S NAME: \_\_\_\_\_ ID #: \_\_\_\_\_

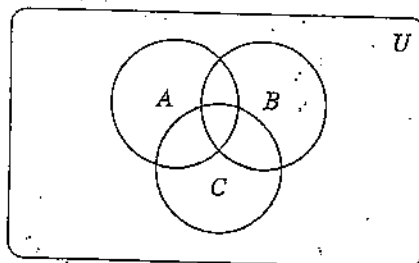
DEPARTMENT OF MATHEMATICS AND STATISTICS  
UNIVERSITY OF NEW BRUNSWICK  
MATH 1833 (OCTOBER 11, 2006)  
TEST 1  
TIME: 2 HOURS  
SHOW ALL YOUR WORK

1. Let  $U = \{2, 3, 4, 5, 7, 9\}$ ;  $X = \{2, 3, 4, 5\}$ ;  $Y = \{3, 5, 7, 9\}$ ; and  $Z = \{2, 4, 5, 7, 9\}$ . List the elements of each of the following sets, and write them down using set braces. (For example,  $X \cap Y = \{3, 5\}$ .)

(a) (2 marks)  $X^c \cap Y^c$

(b) (2 marks)  $X \cup (Y \cap Z)$

2. (2 marks) Shade the area representing  $(A \cap B^c) \cup C$  in the diagram below.



3. After a genetics experiment, the number of pea plants having certain characteristics was tallied, with the results as follows. 22 were tall; 25 had green peas; 39 had smooth peas; 9 were tall and had green peas; 17 were tall and had smooth peas; 20 had green peas and smooth peas; 6 had all three characteristics; 4 had none of the characteristics.

(a) (2 marks) Find the total number of plants counted.

(b) (2 marks) How many plants were tall and had peas that were neither smooth nor green?

4. (3 marks) The union leadership and the management team have agreed to each select 2 representatives to try to negotiate a settlement. There are 5 union leaders and 6 members of the management team. Determine in how many ways the four negotiators can be chosen.

5. (3 marks) How many different words can be made by rearranging the letters in the word MIRAMICHI? (The words do not have to mean anything.)

6. A 4-letter computer password is to be chosen from the letters in the word SHAOLIN. No letter is to be used more than once.

(a) (3 marks) How many different passwords can be made?

(b) (3 marks) What is the probability that the password will contain the letter S?

7. (3 marks) A store accepts Visa and Mastercard. No other credit cards are accepted. The probability that a customer carries a Visa card is 0.60. The probability a customer carries a Mastercard is 0.55. The probability a customer carries both cards is 0.30. What is the probability a customer carries a card the store will accept?

8. You are given  $P(A) = 0.35$   $P(B) = 0.55$   $P(A \cup B) = 0.8$

(a) (1 mark) Compute  $P(A^c)$

(b) (1 mark) Compute  $P(A \cap B)$

(c) (1 mark) Compute  $P(A^c \cup B^c)$

(d) (1 mark) Compute  $P[(A \cup B)^c]$

9. (3 marks) There are ten burritos in the freezer. Six of them are Superhot, four are Mild. There are no labels on the packaging, so you choose two burritos at random. What is the probability that at least one is Superhot?

