

**MA114 Intro Finite Math Test 1 - A Spring 2007**

Answer all questions on your blue books, please try and keep it organized. You must **SHOW ALL WORK** for credit, and clearly mark your final answer. Calculators are allowed. Good luck!

1. (12 points) Let  $A = \{2,3,5\}$  and  $B = \{1,7,9,4\}$ . Answer the following by writing TRUE or FALSE

(a)  $\{2\} \in A$

**F**

(b)  $\phi \subset B$

**T**

(c)  $\{5,2,3\} = A$

**T**

(d)  $9 \subset B$

**F**

(e)  $\{1,9\} \subset B$

**T**

(f)  $\phi \in A$

**F**

2. (12 points) A group of 365 students were asked what kinds of dessert they liked, the survey showed,

100 people liked Candy

140 people liked Pie

100 people liked Ice Cream

25 liked Candy and Pie

20 liked Candy and Ice Cream

35 liked Pie and Ice Cream

5 like Candy and Pie and Ice Cream

- (a) Draw the Venn diagram that represents this data.

- (b) How many like at least one of the three desserts?

**265**

- (c) How many people don't like any of the three desserts?

**100**

- (d) How many people like exactly two of the desserts?

**65**

3. (10 points) List all the elements in the following sets.

- (a)  $A = \{x \mid x \text{ is a letter in the word "following"}\}$   
 $\{\mathbf{f, o, l, w, i, n, g}\}$
- (b)  $B = \{x \mid x \text{ is an integer and } -4 < x < 4\}$   
 $\{\mathbf{-3, -2, -1, 0, 1, 2, 3}\}$
4. (10 points) List all the 3-element subsets of  $U = \{a, f, j, l, p\}$ .  
 $\{\mathbf{a, f, j}, \{\mathbf{a, f, l}, \{\mathbf{a, f, p}, \{\mathbf{a, j, l}, \{\mathbf{a, j, p}, \{\mathbf{a, l, p}, \{\mathbf{f, j, l}, \{\mathbf{f, j, p}, \{\mathbf{f, l, p}, \{\mathbf{j, l, p}\}}$
5. (12 points) Given the universal set  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ ,  $A = \{2, 3, 5, 8\}$ ,  $B = \{1, 2, 6, 8, 9\}$ ,  $C = \{1, 2, 4, 5, 9\}$ . List the elements in the following sets.
- (a)  $A^c \cup (B \cap C)$   
 $\{\mathbf{1, 2, 4, 6, 7, 9}\}$
- (b)  $(B \cup C)^c \cup A$   
 $\{\mathbf{2, 3, 5, 7, 8}\}$
- (c)  $(A \cap C) \cup (A^c \cap C)$   
 $\{\mathbf{1, 2, 4, 5, 9}\}$
6. (10 points) 6 cars show up at a drive through at the same time. How many different ways can they line up for the drive through...
- (a) if there are no restrictions?  
 $\mathbf{6! = 720}$
- (b) if the manager only lets 3 of the 6 to line up, how many ways can you line up 3 of the cars?  
 $\mathbf{P(6, 3) = 6 \times 5 \times 4 = 120}$
7. (12 points) If the fridge has 4 pears and 1 apple in it, and you pull out one fruit at a time, stopping when you have either one apple or 3 pears,
- (a) Draw the tree diagram that represents this action.
- (b) How many possible ways are there to pull the fruit in this way?  
 $\mathbf{4}$
- (c) How many possibilities does your tree show in which you stop after you draw 2 fruits from the fridge?  
 $\mathbf{1}$
8. (12 points) A pastry shop has 9 different flavors of donuts, 10 different flavors of danishes and 6 different kinds of bagels.

(a) How many different ways can you pick 3 pastries if each is a different kind (donut, danish or bagel)?

$$9 \times 10 \times 6 = 540$$

(b) How many different ways can you pick 5 items from the shop if exactly 2 of them must be a danish?

$$C(10,2) \times C(15,3) = 20475$$

(c) How many different ways can you pick 5 items from the shop is at most 1 of them must be a bagel?

$$C(6,1) \times C(19,4) + C(19,5) = 34884$$

9. (10 points) How many visibly different ways can you arrange the letters in the word "BANANA"

$$C(6,3) \times C(3,2) \times C(1,1) = 60$$