

You MUST use good notation and show appropriate work.

**Math 102**  
(Section 1.6)

Name \_\_\_\_\_

**1.6 Survey Problems**

Use Venn diagrams to assist yourself in determining the number of elements (cardinality) of each of the following sets.

1. Assume set  $A$  contains 47 elements; set  $B$  contains 32 elements and set  $A \cup B$  has 65 elements. How many elements are in each of the following sets?

a)  $A \cap B$  \_\_\_\_\_

b)  $A' \cap B$  \_\_\_\_\_

c)  $A \cap B'$  \_\_\_\_\_

2. A certain store has 100 bikes for sale. 24 of these bikes are red and 32 are ten-speed. 8 of the ten-speed bikes are red. How many bikes are

(a) red or ten-speed? a) \_\_\_\_\_

(b) not red? b) \_\_\_\_\_

(c) red, but not ten-speed? c) \_\_\_\_\_

(d) not red or not ten-speed? d) \_\_\_\_\_

(e) neither red, nor ten-speed? e) \_\_\_\_\_

3. If  $A = \{\emptyset\}$  and  $B = \emptyset$  determine  $n(A)$  and  $n(B)$   $n(A) =$  \_\_\_\_\_

$n(B) =$  \_\_\_\_\_

4. Assume  $A$ ,  $B$ , and  $C$  are subsets of a universal set  $U$  and  $n(U) = 100$ ,  
 $n(A \cap B \cap C) = 10$ ,  $n(A \cap B) = 12$ ,  $n(A \cap C) = 18$ ,  $n(B \cap C) = 24$ ,  $n(A) = 27$ ,  $n(B) = 30$  and  $n(C) = 40$ .  
 Determine each of the following cardinal numbers.

$$n(A \cup B) \underline{\hspace{2cm}}$$

$$n(A \cap B') \underline{\hspace{2cm}}$$

$$n((A \cap B) \cup C) = \underline{\hspace{2cm}}$$

$$n(A' \cap B' \cap C') = \underline{\hspace{2cm}}$$

5. In a survey of 80 people at a picnic, the following data were collected. 36 people drank lemonade; 33 people drank coffee; 31 people drank soda pop; 16 drank soda pop and coffee; 14 drank coffee and lemonade; everyone who drank both soda and lemonade also drank coffee, and only 5 people drank all three of these beverages. How many people

- a) did not drink any of the three mentioned beverages? \_\_\_\_\_
- b) did not drink coffee? \_\_\_\_\_
- c) drank only lemonade? \_\_\_\_\_
- d) drank coffee or soda pop? \_\_\_\_\_
- e) drank neither coffee nor lemonade? \_\_\_\_\_