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 $A = \{\varnothing\}$ and $B = \varnothing$ 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.

$n(A \cup B)$ _____

$n(A \cap B')$ _____

$n((A \cap B) \cup C) =$ _____

$n(A' \cap B' \cap C') =$ _____

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? _____