

1. Out of 100 coffee drinkers surveyed, 70 take cream, and 60 take sugar. How many take it black (with neither cream nor sugar)?

2. What if 50 people took both cream and sugar?

3. Out of 100 food eaters, it was found that 50 ate breakfast, 70 ate lunch, and 80 ate dinner. How many ate three (square) meals a day?

4. What if 30 ate both breakfast and lunch, 40 ate both breakfast and dinner, and 40 ate both lunch and dinner?

5. A survey of 100 students asked for their opinions about pizza. They were specifically whether they liked pepperoni, mushrooms, and garlic.

- 43 students liked pepperoni.
- 39 students liked mushrooms.
- 40 students liked garlic.
- 12 students liked both pepperoni and mushrooms.
- 14 students liked both pepperoni and garlic.
- 13 students liked both mushrooms and garlic.
- 9 students liked all three toppings.

(a) How many students surveyed did not like any of the three toppings?

(b) How many students surveyed liked at least two of the toppings?

6. Suppose that  $A$ ,  $B$  and  $C$  are sets with 64, 57, and 58 members respectively.

(a) If  $A \cup B$  has 82 members, then  $A \cap B$  has \_\_\_\_\_ members.

(b) If it is further known that  $A \cap C$  has 35 members, then  $A \cup C$  has \_\_\_\_\_ members.

(c) If, in addition,  $B - C$  has 25 members, then  $B \cap C$  has \_\_\_\_\_ members.

(d) Finally, if we are given that the intersection of all three sets  $A$ ,  $B$ , and  $C$  has 20 members, then the union of these three sets has \_\_\_\_\_ members.