

8 Using a Venn diagram, show that:

a) $(A \cup B)' = A' \cap B'$

b) $(A \cap B)' = A' \cup B'$

9 In a group of 35 people:

- 7 people are left-handed.
- 15 people wear glasses.
- 17 people have brown hair.
- 3 people with brown hair wear glasses and are left-handed.
- 25 people have brown hair or wear glasses.
- 7 people have brown hair and wear glasses.
- 20 people are left-handed or have brown hair.
- 5 people wear glasses and are left-handed.

A person is chosen at random from this group. The following are 3 possible events:

- A: choosing a left-handed person
- B: choosing a person who wears glasses
- C: choosing a person with brown hair

- a) Represent this situation using a Venn diagram.
- b) Express each of the following statements using set-builder notation.
- 1) Choosing a person who wears glasses and is left-handed.
 - 2) Choosing a left-handed person who wears glasses or has brown hair.
 - 3) Choosing a person who has brown hair and wears glasses or a left-handed person who has brown hair.
- c) Calculate:
- | | | |
|---------------------------|---------------------------|---------------------------|
| 1) $P(A \cup B)$ | 2) $P(A \cap B)$ | 3) $P(A \cup B \cup C)$ |
| 4) $P((A \cap B) \cap C)$ | 5) $P((A \cup B) \cap C)$ | 6) $P((B \cap C) \cup A)$ |
- d) Calculate the probability of choosing a person:
- 1) who wears glasses and does not have brown hair
 - 2) who does not wear glasses and is not left-handed
 - 3) who is left-handed, does not wear glasses and does not have brown hair

It is estimated that between 10% and 12% of the population is left-handed. Having a left-handed parent increases the probability that a child will also be left-handed.