

## Week 3 Exercises

1. Let the set operator,  $\wedge$ , be defined so that:

$$X \wedge Y = X \cup \overline{Y}$$

where  $\overline{X}$  is the complement of  $X$ .

Determine by Veitch diagrams whether:

- (a)  $A \wedge B = \overline{\overline{A} \cap B}$
- (b)  $A \cap B = \overline{\overline{A} \wedge B}$
- (c)  $A \wedge (B \cap C) = (A \wedge B) \wedge C$
- (d)  $A \wedge (B \cup C) = (A \wedge B) \cap (A \wedge C)$
- (e)  $(A \cap B) \wedge C = (A \wedge C) \cap (B \wedge C)$

2. Among 73 students, 52 play the piano, 25 play the violin and 20 play the flute.

Also,

17 play both the piano and the violin,

12 play the piano and flute,

7 play the violin and flute,

but only one student can play all three instruments.

- (a) How many students do not play any of these instruments.
- (b) How many students play the violin but not the piano.