

Tutorial Sheet 2

(Set Operations and Applications)

1. Use identities of sets to simplify the following expressions. (You may use Venn diagrams to verify your results.)
 - a) $(\overline{A \cap B}) \cup (\overline{B \cap C})$
 - b) $(A \cup B \cup C) \cap (B \cup C) \cap \overline{A}$
 - c) $((A \cup B) \cap (A \cup \overline{B})) \cup (\overline{A} \cup \overline{B})$

2. A survey of 100 students produced the following statistics:
 32 study mathematics,
 20 study physics,
 45 study biology,
 15 study mathematics and biology,
 7 study mathematics and physics,
 10 study physics and biology, and
 3 study all three subjects.
 - a) Find the number of students not studying any of the three subjects.
 - b) Find the number of students taking exactly one of the three subjects.

3. A market research project studied student readership of certain news magazines. The following data were obtained after asking 100 students in the library.

28 students read *Time*;
 26 students read *Newsweek*;
 14 students read *Economist*;
 8 students read *Time* and *Newsweek*;
 4 students read *Time* and *Economist*;
 3 students read *Newsweek* and *Economist*; and
 3 students read all three magazines.

Use a Venn diagram as an aid to find the number of students who read:

- a) exactly one kind of magazine;
- b) *Newsweek* and *Economist* but not *Time*;
- c) only *Economist*;
- d) at least one of the magazines.