Exercise 1

Suppose that $B \subseteq A$ and $C \subseteq A$. Show that $(B \cap C) \subseteq A$ and $(B \cup C) \subseteq A$

Exercise 2

Find counter-examples for each of the following (incorrect) assertions:

a) $A - B = B - A$

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

Exercise 3

Show that:

$(A - B) \cup (B - A) = (A \cup B) - (A \cap B)$

Exercise 4

Each tile in a collection of 19 is a square or a triangle and is also red or blue. Suppose that 12 of the 19 tiles are squares. 11 are red, and 4 are blue squares. Using the inclusion-exclusion principle, determine:
(1) The number of tiles that are square or blue;
(2) The number of tiles that are triangles and red;
(3) The number of tiles that are red or squares.

Exercise 5

Show that: $\overline{A - B} = \overline{A} \cup B$