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: \( \overline{A - B} = \overline{A} \cup B \)