Write all answers legibly in the space provided. The number of points possible for each question is indicated in square brackets – the total number of points on the quiz is 30, and you will have exactly 15 minutes to complete this quiz. You may not use calculators, textbooks or any other aids during this quiz.

Make sure you use formal notation for indicating any answer which must be a set.

If you use a counter example to prove something false, you must give specific values for the sets where the universal set is \{1, 2, 3, 4\}.

If you use a proof to prove something true, you must use only the rules on the two-sided cheatsheet.

1. [7 pnts.] List the elements in each of the sets \(A\) and \(B\) assuming

   \[A - B = \{a, b\}, \ B - A = \{c, d, e\} \text{ and } A \cap B = \{f\} \]

2. [10 pnts.] Prove or give a counter example to the following.

   For all sets \(A\), \(B\) and \(C\).

   \[A - (B \cup (A \cap C)) = (A - (B \cup C)) \cup (A \cap B \cap C)\]
3. [13 pts.] Prove or give a counter example to the following.

For all sets $A$, $B$ and $C$.

$(B \subseteq C) \rightarrow ((A \cup B) \subseteq (A \cup C))$