Question 1

Use the fact that $X - Y = X \cap \bar{Y}$ and steps from Thm 1.1.21 to show that for any sets $A, B, C,$

$$(C \cap A) - (B - A) = \emptyset.$$
Question 2

Use Thm. 1.1.21 and induction to prove that for sets $A, B_1, B_2, \ldots, B_n$, we have, for all $n \geq 1$,

$$A \cap (B_1 \cup B_2 \cup \ldots \cup B_n) = (A \cap B_1) \cup (A \cap B_2) \cup \ldots (A \cap B_n).$$

*******

Question 3

Let $R, S$ be two relations on a set $X$. Give either a counterexample (if false) or a proof (if true) of the following statement. “If $R$ and $S$ are anti-symmetric, then $R \circ S$ is anti-symmetric.”

*******