

Q4) We will start with the left side:

$$\overline{B - A}$$

Complement $\Rightarrow U - (B - A)$

$$\Rightarrow (B \cup \bar{B}) - (B - A)$$

*Note $(B \cup \bar{B})$ is equivalent to the universe as they both represent every possible value that could exist in the universe:

Set difference $\Rightarrow (B \cup \bar{B}) \wedge (\neg (B - A))$

Set difference $\Rightarrow (B \cup \bar{B}) \wedge (\neg (B \wedge (\neg A)))$

De Morgan's law $\Rightarrow (B \cup \bar{B}) \wedge ((\neg B) \vee (\neg (\neg A)))$

$$\Rightarrow (B \cup \bar{B}) \wedge (\bar{B} \vee A)$$

Distributive law $\Rightarrow \bar{B} \vee (A \wedge B)$

$$\therefore \overline{B - A} = \bar{B} \vee (A \wedge B)$$