

1- Prove the following logical equivalence:

$$\sim ((\sim p \wedge q) \vee (\sim p \wedge \sim q)) \vee (p \wedge q) \equiv p$$

2- Construct truth table for the following statement.

$$P \wedge \sim R \leftrightarrow Q \vee R$$

3- Does the following argument form is Valid or Invalid?

$$p \vee q$$

$$p \rightarrow \sim q$$

$$p \rightarrow r$$