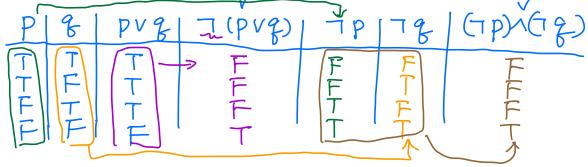
MAT2440, Classwork6, Spring2025

ID:______ Name:____

1. Group I of the logically equivalences: Identities related to ' \neg ', 'V', ' Λ '.

Identity laws $p \wedge \mathbf{T} \equiv \underline{\hspace{0.2cm}}$	Domination laws $p \lor T \equiv \underline{\hspace{1cm}}$
$p \lor \mathbf{F} \equiv \underline{\hspace{0.2cm}}^{P}$	$p \wedge \mathbf{F} \equiv \underline{\hspace{1cm}} \mathcal{F}$
Idempotent laws $p \lor p \equiv $	Negation laws $p \lor \neg p \equiv \underline{\mathcal{T}}$
$p \wedge p \equiv \underline{\hspace{0.2cm}}$	$p \land \neg p \equiv \underline{\mathcal{F}}$
Double Negation laws	Commutative laws $p \lor q \equiv \boxed{\begin{array}{c} ? \lor P \\ \hline \end{array}}$
$\neg(\neg p) \equiv \underline{\hspace{0.2cm}}$	$p \wedge q \equiv q \wedge p$
Associate laws $(p \lor q) \lor r \equiv P \lor (q \lor r)$	Distributive laws $p \lor (q \land r) \equiv (p \lor q) \land (p \lor r)$
$(p \land q) \land r \equiv \underbrace{P \land (Q \land r)}_{}$	$p \wedge (q \vee r) \equiv (p \wedge q) \vee (p \wedge r)$
Absorption laws $p \lor (p \land q) \equiv $	De Morgan's laws $\neg (p \land q) \equiv \underline{\neg p \lor \neg g}$
$p \wedge (p \vee q) \equiv \underline{\qquad \qquad P}$	$\neg (p \lor q) \equiv \underline{\neg p \land \neg q}$

2. Prove one of the De Morgan's laws: " $\neg (p \lor q) \equiv (\neg p) \land (\neg q)$ " by using truth table.



3. Show that " $\neg (p \lor (\neg p \land q)) \equiv \neg p \land \neg q$ "

4. Using De Morgan's laws to express the negation of the given proposition:

"Miguel has a cellphone, and he has a laptop"

5. Group II of the logically equivalences: Identities related to conditional statements.

$p \rightarrow q \equiv (7p) \vee g$	$p \rightarrow q \equiv \neg q \rightarrow \neg p$
$\neg p \rightarrow q \equiv p \vee g$	
$\neg(p \to q) \equiv P \land (\neg q)$	
$\neg(p \to \neg q) \equiv \rho \land \mathcal{C}$	
$(p \to q) \land (p \to r) \equiv P \longrightarrow (q \land r)$	$(p \to r) \land (q \to r) \equiv (p \lor q) \Longrightarrow r$
$(p \to q) \lor (p \to r) \equiv p \to (q \lor r)$	$(p \to r) \lor (q \to r) \equiv (p \land q) \longrightarrow r$

6. Use the truth table to prove " $p \rightarrow q \equiv (\neg p) \lor q$ "

