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Kelas: Matematika Diskrit C

## **TUGAS 1**

## **Proof that these below statement is Tautology**

1.  $p \rightarrow (p \lor q)$ 

 $\neg p \lor (p \lor q) \{p \text{ is always true}\}$ 

_ 1 (1 1/4) /	,		
р	q	p∨q	¬p ∨ (p ∨ q)
1	1	1	1
1	0	1	1
0	1	1	1
0	0	0	1

**2.**  $\neg p \rightarrow (p \rightarrow q)$ 

$$\neg p \rightarrow (\neg p \lor q)$$

 $p \vee (\neg p \vee q)$  {p is always true}

<u> </u>			
р	q	$\neg p \lor q$	$p \lor (\neg p \lor q)$
1	1	1	1
1	0	0	1
0	1	1	1
0	0	1	1

## Proof that these below statements are Equivalent

1.  $(p \rightarrow q) \land (p \rightarrow r) \equiv p \rightarrow (q \land r)$ 

$$(\neg p \lor q) \land (\neg p \lor r) \equiv \neg p \lor (q \land r)$$

 $\neg p \lor (q \land r) \equiv \neg p \lor (q \land r)$  {Equivalent on both side}

	( / / ( )			
р	q	r	<i>q</i> ∧ r	$\neg p \lor (q \land r)$
1	1	1	1	1
1	1	0	0	0
1	0	1	0	0
1	0	0	0	0
0	1	1	1	1
0	1	0	0	1
0	0	1	0	1
0	0	0	0	1

2.  $(p \rightarrow r) \lor (q \rightarrow r) \equiv (p \land q) \rightarrow r$ 

$$(\neg p \lor r) \lor (\neg q \lor r) \equiv \neg (p \land q) \lor r$$

 $(\neg p \lor \neg q) \lor r \equiv (\neg p \lor \neg q) \lor r \{Equivalent on both side\}$ 

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р	q	r	$\neg p \lor \neg q$	$(\neg p \lor \neg q) \lor r$
1	1	1	0	1
1	1	0	0	0
1	0	1	1	1
1	0	0	1	1
0	1	1	1	1
0	1	0	1	1
0	0	1	1	1
0	0	0	1	1