

9-12-2014 (1)

D.M (5+6) (2)

$$\textcircled{1} (P \rightarrow Q) \wedge (P \rightarrow R) \vdash P \rightarrow (Q \wedge R) \vdash P \oplus Q$$

$$\equiv (\neg P \vee Q) \wedge (\neg P \vee R) \equiv \neg P \vee (Q \wedge R)$$

$$\equiv (\neg P \vee Q) \wedge (\neg P \vee R)$$

Distribution law

$$\textcircled{3} \vdash (P \wedge Q) \vee P \text{ in Tautology}$$

$$\equiv \vdash (P \wedge Q) \vee P$$

$$\equiv (\neg P \vee \neg P) \vee P \text{ Demorgan}$$

$$\equiv (P \vee \neg P) \vee P$$

(2) Commutative & Associative

$$\equiv T \vee P$$

$$\equiv T \text{ Tautology}$$

Qno 5

$$(P \rightarrow R) \vee (Q \rightarrow R) \text{ and } (P \vee Q) \rightarrow R$$

$$\equiv (\neg P \vee R) \vee (\neg Q \vee R)$$

$$\equiv \neg P \vee \neg Q \vee R \vee R$$

$$\equiv \neg P \vee \neg Q \vee R$$

$$\equiv \neg (P \vee Q) \vee R$$

$$\equiv (\neg P \vee \neg Q) \vee R$$

implication khat Karni to pehaka sath
 not(\rightarrow) ~~2~~ 2rs so^{or}(v)

D.M

~~$(P \leftrightarrow Q) \leftrightarrow (P \leftrightarrow Q)$ Tautology~~ and $P \leftrightarrow Q$
 $P \leftrightarrow Q$ in true when Same
 $P \leftrightarrow Q$ is False when diff
 $\rightarrow (P \oplus Q)$ is false when diff
 $\rightarrow (P \oplus Q)$ is True when diff

$P \rightarrow (P \vee Q)$ Q no 4
 $\equiv P \vee (P \vee Q)$
 $\equiv (\neg P \vee P) \vee Q$
 $\equiv T \vee Q$
 $\equiv T$
 n Tautology

$\rightarrow (P \rightarrow Q) \rightarrow P$ Q no 6
 n Tautology
 $\equiv \rightarrow (\neg P \vee Q) \rightarrow P$
 $\equiv \rightarrow \rightarrow (\neg P \vee Q) \vee P$
 $\equiv (\neg P \vee Q) \vee P$
 $\equiv (P \vee \neg P) \vee Q$
 $\equiv T \vee Q$
 $\equiv T$
 Tautology

9-12-2019

D.M

Quantifiers

Predicate

\exists There exist

$P(x)$ x has Submitted fees

\forall for All

Domain All student

$\exists x P(x)$ \forall Koi (T) b T

$\forall x P(x)$ \wedge Koi (F) to F

$Q(x)$ x got A grade in calculus

Domain All student

$r(x)$ $x > 4$

Domain $\{1, 2, 3, 4, 5\}$

$$\forall x P(x) \equiv P(1) \wedge P(2) \wedge P(3) \wedge P(4) \wedge P(5) \quad \forall x P(x) \rightarrow F$$

$$\exists x P(x) \equiv P(1) \vee P(2) \vee P(3) \vee P(4) \vee P(5) \quad \exists x P(x) \rightarrow T$$

$$\rightarrow \exists x P(x) \equiv P(1) \vee P(2) \vee P(3) \vee P(4) \vee P(5)$$

$$\equiv \neg P(1) \wedge \neg P(2) \wedge \neg P(3) \wedge \neg P(4) \wedge \neg P(5)$$

$$\equiv \forall x \neg P(x)$$

9-12-2019

D.M

Rule

$\rightarrow \exists n P(n) \equiv \forall n \rightarrow P(n)$
 $\rightarrow \forall n P(n) \equiv \exists n \rightarrow P(n)$

$\rightarrow \exists n \equiv \text{not All}$
 $\rightarrow \forall n \equiv \text{not All}$

$\rightarrow \exists n P(n)$ No body

$\rightarrow \forall n P(n)$ Not Every body (Kuch)

$P(n)$ n is perfect
 $f(n)$ n is your friend

Domain Student of This class

- (i) No one is perfect
- (ii) All students are your friends and perfect
- (iii) All of your friends are perfect
- (iv) Some of your friends are perfect
- (v) Some one is your friend and is not perfect

(i) $\rightarrow \exists n P(n)$ Ans

(ii) $\forall n f(n) \wedge P(n)$ Ans

(iii) $\forall n (f(n) \rightarrow P(n))$ Ans

(iv) $\exists n (f(n) \rightarrow P(n))$ Ans

(v) $\exists n (f(n) \wedge \neg P(n))$ Ans

mad
 kuch
 kya
 na