

$$\frac{1}{2} - \frac{1}{2}(-5) = \frac{1}{2} + \frac{5}{2} = \frac{6}{2} = 3$$

$$0 - \frac{1}{2}(2) = 0 - 1 = -1$$

$$R_1 = [1, 0 | 3, -1]$$

$$\left[\begin{array}{cc|cc} 1 & 0 & 3 & -1 \\ 0 & 1 & -5 & 2 \end{array} \right]$$

$$A^{-1} = \begin{bmatrix} 3 & -1 \\ -5 & 2 \end{bmatrix}$$

Homework N4

Problem N1

- a) False d) True
- b) True e) True
- c) True

Problem N2

- a) $p \wedge q$
- b) $p \wedge \neg q$
- c) $\neg p \wedge \neg q$
- d) $q \vee p$
- e) $p \rightarrow q$
- f) $(p \vee q) \wedge (p \rightarrow \neg q)$
- g) $p \leftrightarrow q$

Problem
a) $a^2 =$
b) $a^4 =$
c) $a^6 =$
d) a^4
Problem
a) \dots

b)

c)

Problem № 3

a) $a^2 = 4$

b) $a^4 = 16$

c) $a^6 = 64$

d) $a^4 = 16$

Problem № 4

p	$\neg p$	$p \wedge \neg p$	$p \vee \neg p$
T	F	F	T

p	$\neg p$	$p \vee \neg p$	$p \wedge \neg p$
T	F	T	F

p	q	$\neg q$	$p \vee \neg q$	$p \vee \neg q \rightarrow q$
T	T	F	T	T
T	F	T	T	F
F	T	F	F	T
F	F	T	T	F

Problem

1 P

Prob

a)

b)

c)

d)

e)

f)

g)

h)

d) p q		p \wedge q	p \vee q	$(p \vee q) \rightarrow (p \wedge q)$
T	T	T	T	T
T	F	F	T	F
F	T	F	T	F
F	F	F	F	T

e) p q		$p \rightarrow q$	$\neg q \rightarrow \neg p$	$(p \rightarrow q) \leftrightarrow (\neg q \rightarrow \neg p)$
T	T	T	T	T
T	F	F	F	T
F	T	F	T	T
F	F	F	T	T

f) p q		$p \rightarrow q$	$q \rightarrow p$	$(p \rightarrow q) \rightarrow (q \rightarrow p)$
T	T	T	T	T
T	F	F	T	T
F	T	T	F	F
F	F	T	T	T

$\rightarrow (p \wedge q)$

Problem N5

1p; 2p; ($\frac{1}{2}p \wedge \frac{1}{2}q$) $n \rightarrow 3p$

Problem N6

- Jan is not rich or not happy.
- Carlos will not buy eggs and will not run tomorrow
- Mei does not walk and does not take the bus to class
- Ibrahim is not smart or not hard working.

Problem 7

a) $p \quad q \quad p \wedge q \quad (p \wedge q) \rightarrow p$

T	T	T	T
T	F	F	T
F	T	F	T
F	F	F	T

\checkmark

b) $p \quad q \quad p \vee q \quad p \rightarrow (p \vee q)$

T	T	T	T
T	F	T	T
F	T	T	T
F	F	F	T

c) $p \mid q \mid \neg p \mid p \rightarrow q \mid \neg p \rightarrow (p \rightarrow q)$

p	q	$\neg p$	$p \rightarrow q$	$\neg p \rightarrow (p \rightarrow q)$
T	T	F	T	T
T	F	F	F	T
F	F	T	T	T
F	T	T	T	T

Problem 8

a) $(p \wedge q)$

c) $\neg p$

e) $\neg p$

Problem

(p -

Prob

a) T

b) T

c) V

d) P

Pr

d) $p \mid q \mid p \wedge q \mid p \rightarrow q \mid (p \wedge q) \rightarrow (p \rightarrow q)$

p	q	$p \wedge q$	$p \rightarrow q$	$(p \wedge q) \rightarrow (p \rightarrow q)$
T	T	T	T	T
T	F	F	T	T
F	T	F	T	T
F	F	F	T	T

e) $p \mid q \mid p \rightarrow q \mid \neg(p \rightarrow q) \mid \neg q \mid \neg(p \rightarrow q) \rightarrow \neg q$

p	q	$p \rightarrow q$	$\neg(p \rightarrow q)$	$\neg q$	$\neg(p \rightarrow q) \rightarrow \neg q$
T	T	T	F	F	T
T	F	F	F	F	T
F	T	T	T	F	T
F	F	F	F	F	T

$\rightarrow q$)
Problem 8

a) $(p \wedge q) \rightarrow \neg p$

b) $\neg p \rightarrow (p \vee q) \rightarrow T$

c) $\neg p \rightarrow (p \rightarrow q) \rightarrow T$

d) $(p \wedge q) \rightarrow (p \rightarrow q) \rightarrow T$

e) $\neg(p \rightarrow q) \rightarrow \neg p \rightarrow T$

f) $\neg(p \rightarrow q) \rightarrow \neg q \rightarrow T$

Problem 9.

$$(p \rightarrow r) \wedge (\neg p \rightarrow r)$$

$$(p \vee q) \rightarrow r$$

Problem 10

a) $\exists x (P(x) \wedge Q(x))$

b) $\exists x (P(x) \wedge \neg Q(x))$

c) $\forall x (P(x) \vee Q(x))$

d) $\forall x (\neg P(x) \wedge \neg Q(x))$

Problem N11

a) False

c) True

b) False

d) False

Problem N12

a) $P(0) \vee P(1) \vee P(2) \vee P(3)$

b) ~~$\neg P(0) \vee \neg P(1) \vee \neg P(2) \vee \neg P(3)$~~

c) ~~$\neg P(0) \wedge \neg P(1) \wedge \neg P(2) \wedge \neg P(3)$~~

d) $P(0) \wedge P(1) \wedge P(2) \wedge P(3)$

e) $\neg(P(0) \vee P(1) \vee P(2) \vee P(3))$

c) $\neg P(0) \vee \neg P(1) \vee \neg P(2) \vee \neg P(3)$

f) $\neg(P(0) \wedge P(1) \wedge P(2) \wedge P(3))$

Problem 13 ~~PT(*)~~

a) $\exists x P(x)$ - speaks Hindi

b) ~~$\forall x Q(x)$~~ - is friendly

c) $\exists x \neg R(x)$ - not born in CA

d) $\exists x S(x)$ - has been in movie

e) $\neg \forall x L(x)$ - not taken course

Problem N14

a) $\neg M$

b) $\neg M \vee T$

c) $\neg M$

$$d) \forall x M$$

$$e) \forall x \neg T$$

$$f) \forall x (T \vee M)$$

$$g) \exists x \forall y (y \neq x \rightarrow M(x, y))$$

$$h) \exists x \forall y (y \neq x \rightarrow (M \vee T))$$

$$i) \exists x \exists y (x \neq y \wedge M \wedge N)$$

$$j) \exists x M$$

$$k) \exists x \forall y (x \neq y \rightarrow (\neg M \wedge \neg T))$$

$$l) \forall x \exists y (x \neq y \wedge (M \vee T))$$

$$m) \exists x \exists y (x \neq y \wedge (M \wedge T))$$

$$n) \exists x \exists y (x \neq y \wedge \forall z ((z \neq x \wedge z \neq y)) \rightarrow M \vee M \vee T \vee T)$$