MTH 207.
Drop Quiz 1.

KEY

NAME :

ID :

① Write the negation of this statement:

" If the sun is shining and if I am in a good mood, I will go to the beach.

Let p = sun is shining , q = I am in a good mood
r = I will go to the beach. This is $p \wedge q \longrightarrow r$

rule 1)
$\longleftrightarrow$ $\overline{p \wedge q} \vee r$ $\overset{De\ Morgan}{\longleftrightarrow}$ $\bar{p} \vee \bar{q} \vee r$ $\overset{twice\ De\ Morgan}{\overline{}}$ $\overline{\bar{p} \vee \bar{q} \vee r} = (p \wedge q) \wedge \bar{r}$

The negation of this statement is
Which translates to English as:
                          was in
The sun was shining & I ~~was in a~~ good mood
But I did not go to the beach. [If you write
                                    it the present, it's
                                      also ok]

② Mention all the cases where $(\bar{p} \vee \bar{q}) \longrightarrow r$

is false

To reduce the search, note that this implication is
false ONLY when $\bar{p} \vee \bar{q}$ T and r F

When is $\bar{p} \vee \bar{q}$ T ?   { $\bar{p}$ T $\bar{q}$ T   { p F q T r F
                                      { $\bar{p}$ T $\bar{q}$ F $\Rightarrow$ { p F q F r F
                                      { $\bar{p}$ F $\bar{q}$ T   { p T q T r F

all cases.

③ Let D be the domain of all students in MTH 207 class.

Let $A(x)$ be the predicate : Student x has an LAU webmail account.

Let $M(x,y)$ be the predicate (composite):
student x has sent an email message to student y. $(x, y \in D)$

(quantifier + predicate + D + may be Logical connectors)

<u>Using quantified expressions</u>, write the following:

a) Not everyone in class has a webmail accou
b) No one in class has sent a message to Lama.
c) Someone in class has a webmail account but has not sent an email to anyone.

a) The statement means $(\overline{\forall x, A(x)})$ {negation of everyone in class haP webmail}

$\langle\longrightarrow \exists x, \overline{A(x)}$
rule for negation of quantified expression

b)

$\forall x \; \blacksquare \; \overline{M(x, Lama)}$

c) $\exists x \forall y \{L(x) \wedge \overline{M(x,y)}\}$