Quiz #1 on Logic

Key

Name: and ID:

Using the following interpretation for the Predicate constant convert the statements into logical statement of the first order logic or propositional logic as you see fit.

Interpretation of the predicate symbols:

Person(X) : X is a person
Father(X, Y): X is father of Y
Mother(X,Y): X is mother of Y
Parent(X,Y): X is parent of Y
Uncle(X,Y): X is uncle of Y
Loves(X,Y): X loves Y
Male(X): X is male
Female(X): X is female

Statements:

a. Every person has mother and a father.
b. There is no one without a mother
c. Mother loves her child

Answers:

a. $\forall_x \text{Person}(x) \rightarrow \exists_y \exists_z (\text{Mother}(y, x) \wedge \text{Father}(z, x))$

b. $\forall_x \text{Person}(x) \rightarrow \exists_y \text{Mother}(y, x)$ (or)

$\neg (\exists_x \text{Per}(x) \wedge \neg \exists_y \text{Mother}(y, x))$

c. $\forall_x \forall_y \text{Mother}(x, y) \rightarrow \text{loves}(x, y)$.