

FIRST-ORDER LOGIC

Prove the following assertions:

1. There are 8 ways to quantify $P(x, y)$. How many ways are there to quantify $P(x, y, z)$?
2. Translate each of the following statements into symbols, using quantifiers, variables, and predicate symbols.
 - (a) Not all birds can fly.
 - (b) Some babies are illogical.
 - (c) There is a student who likes mathematics but not history.
 - (d) For all integers x , x is odd and x is prime.
 - (e) Not every actor is talented who is famous.
3. Translate each of the following sentences into symbols, first using no existential quantifier, and then using no universal quantifier.
 - (a) No cats are intelligent.
 - (b) All babies are illogical.
 - (c) Every connected and circuit-free graph is a tree.
4. Write the negation of the following sentence by changing the quantifier:

Every complete bipartite graph is not planar.