

1. *Negate the following sentences formally and verbally.*

If John is at home then he studies logic.

All politicians are corrupted.

2. *Prove the logical validity of the following arguments.*

John is at home or went to the pub.

If John is at home then he studies logic.

If John doesn't study logic, he went to the pub.

No student likes exams.

Some students are logicians.

Some logicians don't like exams.

3. *For each of the following formulas, find a model and interpretation that is not a model.*

$\forall x [P(x) \supset Q(x)]$

$\exists x [P(x) \wedge Q(x)]$

$\forall x [P(x) \supset R(x, a)]$

$\forall x P(x, f(x))$