

PY1003: Introduction to Logic
Example Class 5
More predicate logic

1. Translate the following sentences into the language of sentential logic. Provide a translation key.

- (i) Everyone is mortal
- (ii) Only rational beings are featherless bipeds
- (iii) No bankers are generous
- (iv) None but corrupt politicians were elected
- (v) Invariably, a wealthy logician is a textbook author
- (vi) Any logician who is a textbook author is wealthy
- (vii) If everyone at the party is happy, then so is Mary
- (viii) If Howard wins the election, everyone will be surprised

2. For each of the following formulae, find a logically equivalent formula in which the existential quantifier symbol does not occur.

- (i) $\exists xHx$
- (ii) $\neg\exists x(Hx\wedge Rx)$
- (iii) $\exists xHx\rightarrow\exists xRx$

3. Translate the following arguments into the language of predicate logic. Provide a key to your translation.

- (i) All whales are mammals. No fish are mammals. So no whales are fish.
- (ii) All cats are animals. Some animals have tails. So some cats have tails.
- (iii) Only the brave deserve freedom. Some who deserve freedom are Christians. All Christians are blessed in the sight of God. Therefore, some of the brave are blessed in the sight of God.