

CISC 301
Homework 5
Due on Tuesday, October 18, 2004
No Late Submissions

In answering these questions, do not use any other function, constant or predicate symbols than the ones mentioned in the questions. Clearly parenthesize your formulae, especially to ensure that there is no ambiguity about the scope of the quantifiers.

1 (3 x 5 = 15 points)

Using predicate symbols D , F , and G for the **unary** predicates “is dragon”, “can fly”, “is green” respectively, and the predicate symbol C for the binary predicate “is a child of”, translate the following two sentences

- (i) Every dragon is happy if all its children can fly.
- (ii) Green dragons can fly.
- (iii) A dragon is green if it is the child of at least one green dragon.

Apart from the 4 predicate symbols D , F , G and C , the two formulae should not use any other predicate symbol nor should it include constant and function symbols.

2 (2 x 5 = 10 points)

Translate the following two sentences into formulae:

- i. Every barber shaves all persons who do not shave themselves.
- ii. No barber shaves any any person who shaves himself.

For this part, use $S(x, y)$ to stand for x shaves y and $B(x)$ to correspond to x is a barber.

3 (3 x 5 = 15 points) Translate the three sentences: 2 through 4 of “A” from the “Translating English Sentences – Sample Questions” document on the course page.