M3210 Assignment 2 (last two problems dropped on Monday 1/23/06): Due 1/25/06

Instructions: In order to be graded your assignment must be done neatly and legibly on 8 1/2by 11 paper and all papers that are turned in must be stapled. You may discuss the problems with others in the class but you must turn in your own independent write-up. Completed assignments are due at the beginning of class on the date specified and as stated on the syllabus, late assignments will not be accepted.

1. Give the negation of each of the following statements:

i. All dogs bark

ii. There is a mammal that lives in the ocean.

iii. For every positive number M there is a positive number N such that N < 1/M.

iv. For every real x and for every real y, if x < y, then $x^2 < y^2$.

2. Determine the truth value of each of the following statements, assuming that x, y, z are real numbers.

i. $\forall x \exists y \ni xy = 1$

ii. $\exists y \ni \forall x, \exists z \ni xz = y$.

iii. $\forall x \exists y \ni \forall z, z > y \Rightarrow z > x + y$

3. Consider the definition of an increasing function given below. Rewrite the defining condition using the symbols we have introduced in class. Then write the negation of this condition using symbols. Finally, translate the negation into words.

Definition: A function f is increasing if and only if for every x and for every y, if x < y, then f(x) ≤ f(y).

4. Given sets A, B, C, prove that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.

5 - 6: Exercise Set 1.1 in Text: 3, 6.