Section 3.2

1. Determine whether each of these functions is O(x).

b) f (x) = 3x + 7

|3x + 7| |4x + 1| = 4|x|, ∀ x > 7

C = 4, K = 7

c) f (x) = x2 + x + 1

|x2 + x + 1| C|x|, ∀ x

Constant C does not exist.

Section 3.3

3. Give a big-O estimate for the number of operations, where an operation is a comparison or a multiplication, used in this segment of an algorithm (ignoring comparisons used to test the conditions in the for loops, where a1, a2, ..., an are positive real numbers).

m := 0

for i := 1 to n

for j := i + 1 to n

m := max(ai aj, m)

n(n – 1) / 2 \* 2 = n2 – n

f(n) = n2 – n

n2 – n = n2, ∀ n > 1

C = 1, K = 1

O(n2)

19. How much time does an algorithm using 250 operations

need if each operation takes these amounts of time?

a) 10−6 s