# Question 5

## a)

f(n) =

g(n) = =

g(n) > f(n) for all n > 0;

So f(n) = O(g(n))

## b)

f(n) =

g(n) =

then

then )

then

then we take c = 2 so 10 \*

then using L’Hˆopital’s to compute the limit

we can get = 0

Since it is 0, for suﬃciently large n we will have < 1

We said g(n) = O(f(n)).

## C)

It is easy to prove there are

So

When n is odd when 1 for all n > 0.

When n is even when for all n > 0.

Therefore we can said that f(n) = Θ(g(n)).