Question5

Jin-Ao Olson Zhang

z5211414

1. f’(n) = 1/n\*ln2 = 0

g’(n) = 1/10\*n^(9/10)

lim\_inf f’(n)/g’(n) = lim\_inf (10\*n^(-1/10)) / ln2 = 0

which means after a certain point f(n) will always smaller than g(n)

**so f(n) = O(g(n))**

(b)

f’(n) = n^n\*(ln(n)+1)

g’(n) = 2n^2n\*(ln(n)+1)

lim\_inf f’(n)/g’(n) = lim\_inf 1/2n^n = 0

which means after a certain point f(n) will always smaller than g(n)

**so f(n) = O(g(n))**

(c)

f(n) = n^(1+sin(pi\*n)) = n\*n^(sin(pi\*n)) since **n is a integer so sin(pi\*n) = 0**

= n\*n^0 = n\*1 = n

f(n) = g(n) = n

**so f(n) = Θ(g(n))**