Question5

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(a) 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))