Assignment 2

Ans 8) In order to have d a unique fixed point in given interval [1,2], we need to ensure our g function is

i) $g(x) \in [a,b]$ and $g \in C[a,b]$

ii) $g'(x) < h < 1$

Our $g(x) = \ln(6 - 2^{-x} - 2\cos x)$, fulfills both of these.

$g(1) = 1.486$

$g(2) = 1.88$

$\therefore g(x) \in [1,2]$ ✓

$g'(x) = \dfrac{\ln 2 + 2\sin x}{2^x (6 - 2^{-x} - 2\cos x)}$

$g'(1) = 0.2688$

$g'(2) = 0.095$

$\therefore g'(x) < h < 1$ ✓

→ Fixed pt method involves more number of iterations (36) vs Newton's Method (9)

→ Fixed pt methods has lesser cpu time (0.049 sec) vs Newton's Method (0.137 sec)

→ Since $g(p) = p$ and $g'(p) \neq 0$ (0.118635) -- order of convergence for fixed pt & method is linear. Newton's always converges quadratically

Gossip!