Homework 8

ASHMIKA

1. $f(x) = 2x^3 - 11.7x^2 + 17.7x - 5$.

$x_0 = 3$.

$f'(x) = 6x^2 - 23.4x + 17.7$

for newton Method $\Rightarrow x_{i+1} = x_i - \frac{f(x_i)}{f'(x_i)}$

Iter	Newton
x_0	3.0000
x_1	5.1333
x_2	4.2698
x_3	3.7929
x_4	3.5998
x_5	3.5643

$f(x_5) = 2(3.5643)^3 - 11.7(3.5643)^2 + 17.7(3.5643) - 5 = \underline{0.01197}$

2. $f(x) = (4-x)e^{-0.5x} - 2$

$f'(x) = \frac{(x-6)e^{-0.5x}}{2}$

(a) $x_0 = 2$. Took 5 iterations.

$x_1 = 0.2817$, $x_2 = 0.7769$, $x_3 = 0.8817$

$x_4 = 0.8857$, $x_5 = 0.88571$

Yes, They Converged.

b) $x_0 = 6$. No Iterations as at $x_0 = 6$ $f'(x_0)$ becomes 0 which makes the final expression on

$$x_{i+1} = x_i - \frac{f(x_i)}{f'(x_i)}$$ Not defined

c) $x_0 = 8$

Iter 1 $x_1 = 121.1963$

Iter 2 $x_2 = 7.2121 \ldots e+24$

The value of x_2 becomes weird Iterations will not converge $f(x_2)$ becomes -ve.