Name:_____ Student ID:_____

1. [5 marks] Consider the following fixed point function, $g(x) = \frac{4}{x2+x-4}$. For roots, -1,2 and -2 find if g(x) is a convergent or a divergent function.

2. [5 marks] Proof Newton Raphson method gives a super-linearly convergent g(x).

1. given $g(x) = \frac{4}{x^2+x-4}$

$\therefore g'(x) = \frac{-4(2x+1)}{(x^2+x-4)^2}$

for $x_* = -1$, $g'(x_*) = 0.25 < 1$ $\therefore$ Convergent

for $x_* = 2$, $g'(x_*) = 5 > 1$ $\therefore$ Divergent

for $x_* = -2$, $g'(x_*) = 3 > 1$ $\therefore$ Divergent

2. Given in the lecture notes.

Name:_____ _____Student ID:_____

1. [5 marks] Consider the following fixed point function, $g(x) = \frac{1}{9}(x^3-x^2+9)$. For roots, 1,3 and -3 find if g(x) is a convergent or a divergent function.
2. [5 marks] Proof Newton Raphson method gives a super-linearly convergent g(x).

1. given $g(x) = \frac{1}{9}(x^3-x^2+9)$

$\therefore g'(x) = \frac{3x^2-2x}{9}$

for $x_0 = -1$, $g'(x_0) = 1/9 < 1$ $\therefore$ Convergent

for $x_0 = 3$, $g'(x_0) = 3/3 > 1$ $\therefore$ Divergent

for $x_0 = -3$, $g'(x_0) = 30/3 > 1$ $\therefore$ Divergent

2. Given in the lecture notes.