* 1. – 2b:

Code:

f = @(x) 6\*x - sin(x) + 5;

a = -15;

b = 15;

tol = 0.5\*10^-8;

fa = f(a);

fb = f(b);

if fa\*fb > 0

fprintf('No root found in this interval');

end

while (b-a)/2 > tol

xc = (a+b)/2;

fxc = f(xc);

if fxc == 0

break;

end

if fa\*fxc < 0

b = xc;

fb = fxc;

else

a = xc;

fa = fxc;

end

end

fprintf('\nRoot = %d\n', xc)

Results:

root = 0.97089893

5:

Code:

%% problem 5a

x0 = 1.1;

tol = 10^-8;

g = @(x) x^3 + 2\*x^2 - 2;

n = 1;

x1 = g(x0);

while abs(x1-x0)>tol

x0 = x1;

x1 = g(x0);

n = n + 1;

end

fprintf('\nConverged to %d after %d iterations\n', x1, n);

%% problem 5b

x0 = 1.1;

tol = 10^-8;

g = @(x) x - (x^3 + 2\*x^2 - x - 2)/(3\*x^2 + 4\*x - 1);

n = 1;

x1 = g(x0);

while abs(x1-x0)>tol

x0 = x1;

x1 = g(x0);

n = n + 1;

end

fprintf('\nConverged to %d after %d iterations\n', x1, n);

Results:

The fixed point iteration based on Newton’s method converged to 1 after 4 iterations. The fixed point method from part b did not converge. Matlab reported that it reached infinity after 9 iterations. Looking at the function, this makes sense because the derivative of the fixed point equation from part b is not less than 1 at the fixed point.