1.

a) f(x) = x*x*x - 750.

b) f'(x) = 3*x*x, x_new = x + f(x)/f'(x)

x_new = x + (x*x*x - 750)/(3*x*x)

c)

x0 = 9

x1 = 9.08641975309

x2 = 9.08560303758

Since I am at my desired tolerance, we can stop

d) Since I can guess that it is between 9 and 10,
it would take 9.5, 9.25, 9.125, 9.0625, 9.0950, In tolerance
6 Iterations

e) For the Newton-Raphson method it would take 2 iterations of 5 operations each, which is 10 operations in total.

The bisection method would take 6 iterations of 6 operations each, which is 36 operations in total.

2.

a) In Code.

b) x_n+1 = x_n - f(x_n)/f'(x_n)

c) The criteria is g'(x) < 1. It is satisfied in the region of all of the roots.

d) The criteria is g'(x) < 1. It is satisfied in the region of all of the roots, however it is not satisfied when x < -2.5

e) In code.

f) If the region is divergent, the fixed-point method will produce incorrect results. There is still a chance that it will find a correct root.

3. All in the Code

4.

a) In Code.

b) After 6 iterations the error is effectively 0

c) The Convergence is more consistent of m=2 as expected since the error is decreasing nonlinearly.