Lesson 18 Non Linear Algebraic Equation – Newton-Rapshon Method

Exercise 1: Find the root for the following equation

$$f(x) = (x^2 - 9)$$

Using Newton-Rapshon Technique.

MATLAB Code

```
function [root,ea,iter]=newtraph(func,dfunc,xr,es,maxit,varargin)
% newraph: Newton - Rapshon root location zeroes
% [root,ea,iter]=newtraph(func,dfunc,xr,es,maxit,p1,p2,...): Uses Newton
% Rapshon method to find the root of function
% Input:
% func = function name
% dfunc = name of derivative of function
% xr = initial guess
% es = desired relative error (default = 0.0001%)
%maxit = maximum allowable iterations (default = 50)
% p1,p2,...=additional parameters used by the function
% varargin = variable argument input
% Output:
% root = real root
% ea = approximate relative error
% iter = number of iterations
% nargin = number of input arguments
if nargin<3, error ('atleast 3 input arguments required'),end
if nargin<4 |isempty(es),es = 0.0001;end
if nargin<5 |isempty(maxit),maxit = 50;end
iter = 0;
while(1)
    xrold = xr;
    xr = xr-func(xr)/dfunc(xr);
    iter = iter + 1;
    if xr~=0, ea=abs((xr-xrold)/xr)*100;end
    if ea<= es | iter >= maxit, break, end
end
root = xr;
```

Solution

```
>> newtraph(@(x)x^2-9,@(x)2*x,5)

ans =

    3
```