

## Section 2.2 Fixed-Point Iterations –MATLAB code

1.

- One way to define function in the command window is:

```
>> f=@(x)x.^3+4*x.^2-10  
f =  
    @(x)x.^3+4*x.^2-10
```

To evaluate function value at a point:

```
>> f(2)  
ans =  
    14
```

or

```
>> feval(f,2)  
ans =  
    14
```

- `abs(X)` returns the absolute value. If `X` is complex, `abs(X)` returns the complex magnitude.

```
>> x=-3  
x =  
    -3  
>> abs(x)  
ans =  
     3  
>> y=1-2i  
y =  
    1.0000 - 2.0000i  
>> abs(y)  
ans =  
    2.2361
```

- For 'fprintf', please see 'doc fprintf' for different options
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2. Matlab Code: (in MATLAB editor)  
 (you may adjust some of the variables according to the given problem)

```
function [ iter ] = myfixed2(g, x0, tol,n)
%UNTITLED3 Summary of this function goes here
% Detailed explanation goes here
iter=0;
u=feval(g, x0);
err=1; % It just set up a big number
disp('-----')
disp('iter      x          g(x)          |xn+11-xn|')
disp('-----')
fprintf('%2.0f  %12.6f  %12.6f\n', iter, x0,u)
while (err>tol)&(iter<=n)
    x1=u;
    err=abs(x1-x0);
    x0=x1;
    u=feval(g, x0);
    iter=iter+1;
fprintf('%2.0f  %12.6f  %12.6f %12.8f\n', iter,x0,u,err)
end
if(iter>n)
    display('Method failed to converge')
end

end
```

For example.

```
>> f2
f2 =
    @(x)x-(x.^3+4*x.^2-10)/(3*x.^2+8*x)
>> myfixed2(f2,2.5,10^(-6),100)
-----
iter    x          g(x)          |xn+11-xn|
-----
0    2.500000    1.709677
1    1.70967742    1.41166231    0.79032258
2    1.41166231    1.36625216    0.29801511
3    1.36625216    1.36523053    0.04541015
4    1.36523053    1.36523001    0.00102164
5    1.36523001    1.36523001    0.00000051
ans =
    5
```