CSE 232- Numerical Analysis Laboritory
Lab 4

1. Root finding using fixed point iteration

```
% solution 1
% f(x)=   x² − 4x − 2
% f(x) = x.^2-4*x-2
%    x = (x²−2)/4    g(x) =    x = (x²−2)/4
% g(x) = (x.^2-2)./4

clear all
g(1) = 1;
for n = 1:20
        g(n+1) = (g(n)^2-2)/4;
end
g(n)
```

```
%............solution 2.................................................
clear all
clc

%function in the form of g(x)
g = @(x) 1-1./2*x.^2;

x0= 1.0;

for i= 1: 100
 x1 = g(x0);

x0 = x1;
end

x1
```

2. Root finding using Newton Raphson Method

$$ \%\quad f(x)=x^3-6x-2, \frac{d}{dx}=3x^2-6, x_{n+1}=x_n-\frac{f(x)}{f'(x)} $$

```
clear all;
clc;
close all;
%f(x)=x^3-6x+4'
%df(x) = 3x^2-6
x(1) = 1;
for n = 1 : 30
x(n+1) = x(n) - (x(n)^3-6*x(n)+4)/(3*x(n)^2-6);
end
x(30)
```

%...........solution 2 ....
%Root finding using Newton_Raphson method

```
clear all;
clc;
f = @(x) x.^2-5*x+4;
%fplot(f,[-2,8])
df = @(x) 2*x-5;


x= 0;
for i = 0:5
 y=x;
x = y - f(x)./df(x);
if(x==y)
  break
end
end

fprintf('The root is %f', x);
```

3. Root finding using Secant method

```
clear all;
clc;
close all;
f=@(x) 4*x+sin(x) - 7;
x(1)=1;
x(2)=2;
for i=3:7
        x(i) = x(i-1) - (f(x(i-1)))*((x(i-1) - x(i-2))/(f(x(i-1)) - f(x(i-2))));
end
root=x(7)
```