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Practical 2
Newton-Raphson Method

AIM :- To perform the iteration of Newton Raphson Method of for the functions within an absolute convergence of 10^(-8)

```
In[1]:= NewtonRaphson[x0_, max_] := Module[{}, k = 0; p0 = N[x0];
         p1 = p0;
         While[(k ) max && Abs[f[p1]] > 0.00000001),
           p0 = p1;
            If[f'[p0] == 0, Print[" p0 is not correct "]; Exit[];,
             p1 = p0 - f[p0] / f'[p0];
             k = k + 1;];];
         Print["p after ", k, " iterations = " NumberForm [p1, 16 ]]
         Print "f p =", NumberForm f p1 , 16 ;
```

(i) f [x] = x^3 + 2 * x^2 - 3*x - 1 on the interval [1,2]

```
In[2]:= f [x_ ] := x^3 + 2 x x^2 - 3 x x - 1
        NewtonRaphson 2, 13
         p after 5 iterations =  1.19869124352843

         f p =7.59046159259924 x 10⁻¹¹

        Clear f, x
```

(ii) f [x] = Cos[x]-x on the interval [0,1]

```
In[4]:= f [x_ ]= Cos x[ ] x
        NewtonRaphson 1, 30
         p after 3 iterations =  0.739085133385284

         f p =-2.847205804457076 x 10⁻¹⁰

In[6]:= Clear f, x
```

(i) f [x] = Exp[-x]-x on the interval [0,1]

```
In[7]:= f x_ := Exp - x - x
       NewtonRaphson  1, 20
```

```
p after 3 iterations =  0.567143285989123

f p =6.927808993140161 x 10⁻⁹
```

In[9]:= **Clear f, x**

```
p after 3 iterations =  0.567143285989123

f p =6.927808993140161 x 10⁻⁹
```

In[9]:= **Clear f, x**