**NEWTON RAPHSON METHOD**

**import math**

**import sympy**

**from sympy import Symbol**

**from numpy import e**

**from sympy import diff**

**r=Symbol('r')**

**err=0.0000001**

**x0=float(input("enter initial guess "))**

**def f(x):**

**return math.exp(-x)-x**

**if abs(f(x0))<err:**

**print("Root is = ",x0)**

**def fd(x):**

**z=diff(e\*\*(-r)-r)**

**return z.subs(r,x)**

**x1=x0**

**print("x0, f(x0), x1, f(x1) ")**

**print("=======================================")**

**while (abs(f(x1))>err):**

**x1=x0-f(x0)/(fd(x0))**

**print(round(x0,10), round(f(x0),10), round(x1,10), round(f(x1),15))**

**if (abs(f(x1))<err):**

**print("========================================")**

**print("Root is = ",x1)**

**else:**

**x0=x1**

**OUTPUT**

**enter initial guess 0**

**x0, f(x0), x1, f(x1)**

**=======================================**

**0.0 1.0 0.5 0.10653**

**0.5 0.1065 0.5663 0.00130**

**0.5663 0.00130 0.5671 1.9648e-07**

**0.5671 1.965e-07 0.5671 4e-15**

**========================================**

**Root is = 0.567143290409781**