**BISECTION METHOD**

**X1,X2,XM,FX1,FX2,FXM=[],[],[],[],[],[]**

**from pandas import DataFrame**

**epsilon=0.01**

**def f(x):**

**return (x\*\*3)+(7\*x\*\*2)+(14\*x)-6**

**temp=0**

**while temp==0:**

**x1=float(input("enter x1 = "))**

**if (abs(f(x1))<=epsilon):**

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

**break**

**x2=float(input("enter x2 = "))**

**if (abs(f(x2))<=epsilon):**

**print(" root is = ",x2)**

**break**

**if(f(x1)\*f(x2)<0):**

**temp=1**

**else:**

**print("root does not exist between given value of x1 and x2")**

**xm=x2**

**while (abs(f(xm))>epsilon):**

**xm=(x1+x2)/2**

**if (abs(f(xm))<=epsilon):**

**print(" root is = ",xm)**

**break**

**X1.append(x1)**

**X2.append(x2)**

**XM.append(xm)**

**FX1.append(f(x1))**

**FX2.append(f(x2))**

**FXM.append(f(xm))**

**if(f(x1)\*f(xm)<0):**

**x2=xm**

**else:**

**x1=xm**

**df = DataFrame({'x1': X1, 'x2': X2, 'xm':XM, 'f(x1)':FX1, 'f(x2)':FX2, 'f(xm)':FXM })**

**print(df)**

**print("root is = ",xm)**

**OUTPUT**

**enter x1 = 0**

**enter x2 = 1**

**x1 x2 xm f(x1) f(x2) f(xm)**

**0 0.000000 1.000000 0.500000 -6.000000 16.000000 2.875000**

**1 0.000000 0.500000 0.250000 -6.000000 2.875000 -2.046875**

**2 0.250000 0.500000 0.375000 -2.046875 2.875000 0.287109**

**3 0.250000 0.375000 0.312500 -2.046875 0.287109 -0.910889**

**4 0.312500 0.375000 0.343750 -0.910889 0.287109 -0.319733**

**5 0.343750 0.375000 0.359375 -0.319733 0.287109 -0.018284**

**6 0.359375 0.375000 0.367188 -0.018284 0.287109 0.133918**

**7 0.359375 0.367188 0.363281 -0.018284 0.133918 0.057694**

**8 0.359375 0.363281 0.361328 -0.018284 0.057694 0.019674**

**9 0.359375 0.361328 0.360352 -0.018284 0.019674 0.000687**

**root is = 0.3603515625**