Find the real root of the Equation: f(x) =x^3-4x-9=0 by using bisection method/ Bolzano method upto 3 decimal places ?

Solution:

Let,

F(x)=x^3-4x-9=0

Now,

Put x=0:- 0^(3)-4*0-9= -9 (-ve)

Put x=1:- 1^(3)-4*1-9= -13 (-ve)

Put x=2:- 2^(3)-4*2-9= -9 (-ve)

Put x=3:- 3^(3)-4*3-9= 6 (+v)

Therefore the roots lie between 2 and 3:

1st stage:-

Hence,

x0= 2+3/2= 5/2

x0=2.5

now,

Find the real root of the Equcation: f(x) =x^3-4x-9=0 by using bisection method/ Bolzano method upto 3 decimal places ?

f(x0)=2.5^(3)- 4*2.5 -9=0

f(x0)= -3.375

So, the roots lie between x0 and 2(x0 which is 2.5):

2nd stage:-

Hence,

x1= 2.5+3/2=

x1=2.75

now,

f(x1)=2.75^(3)-4*2.75-9

f(x1)= 0.796

So, the roots lie between x0 and x1(which is 2.5 and 2.75):

3rd stage:-

Hence,

x2= 2.5+2.75/2

x2= 2.625

now,

f(x2)= 2.625^(3) – 4*2.625 – 9=

f(x2)=-1.412

So, the roots lie between x1 and x2(which is 2.75 and 2.625):

4th stage:-

Hence,

x3= 2.75+2.625/2=2.6875

x3=2.6875

now,

f(x3)=2.6875^(3) – 4*2.6875 – 9=

f(x3)= -0.347

here, the roots lie between x1 and x3:

5th stage:-

Hence,

x4= 2.75+2.06875/2

x4= 2.718

now,

f(x4)= 2.718^(3) – 4*2.718 – 9=

f(x4)= 0.207

here, the roots lie between x1 and x3:

6th stage:-

Hence,

X5= 2.6875+2.718/2

X5= 2.702

now,

f(x5)= 2.702^(3) – 4*2.702 – 9=

f(x5)= -0.081

here, the roots lie between x4 and x5:

7th stage:-

Hence,

X6= 2.702+2.718/2

X6= 2.71

now,

f(x6)= 2.71^(3) – 4*2.71 – 9=

f(x6)= 0.062

here, the roots lie between x5 and x6:

8th stage:-

Hence,

X7= 2.702+2.71/2

x7= 2.706

now,

f(x7)= 2.706^(3) – 4*2.706 – 9=

f(x7)= -0.009

here, the roots lie between x5 and x7:

9th stage:-

Hence,

X8= 2.702+2.706/2

X8= 2.706

now,

f(x8)= 2.706^(3) – 4*2.706 – 9=

f(x8)= -0.009

Hence, the roots lie between x8= 2.706 upto three decimal number.

Related posts:

1. Find the real root of the Equation: f(x) =x^3-2x-5=0 by using bisection method/ Bolzano method in Five stage ?
2. By using Newton Raphson Method, x^4-x-10=0 which is nearest to 2, find real root correct to three decimal places? (R.G.P.V. 2022 NOV)

Find the real root of the Equcation: f(x) =x^3-4x-9=0 by using bisection method/ Bolzano method upto 3 decimal places ?

3. Find a real root of the equation x= e ^ (-x) using newton Raphson method.(R.G.P.V May 2019)