Sol	ш	ıtı	$\sim$	n	•
20	ıu	L	u	ı	

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:

1<sup>st</sup> stage:-

Hence,

$$x0 = 2 + 3/2 = 5/2$$

$$x0 = 2.5$$

now,

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

$$f(x0) = -3.375$$

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

2<sup>nd</sup> 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):

3<sup>rd</sup> 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):

4<sup>th</sup> 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:

5<sup>th</sup> 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:

6<sup>th</sup> 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:		
7 <sup>th</sup> 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:		
8 <sup>th</sup> 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:

9<sup>th</sup> 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 Equcation:  $f(x) = x^3-2x-5=0$  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)
- 3. Find a real root of the equation  $x = e^{(-x)}$  using newton Raphson method.(R.G.P.V

May 2019)