**PROGRAM BCA**

**SEMESTER III**

**COURSE CODE & NAME DCA2101 -COPUTER ORIENTED NUMERICAL METHOD**

**1. Find Taylor’s series of the function f(x)= 3x^5- 2x^4+ 15x^3 + 13x^2 -12x – 5 at point c = 2.**

**Answer:**

we know that
Taylor series of $f(x)=∑\_{n=0}^{n} \frac{f^{(k)}(a)}{k!}(x-a)^{k}$
So $ f^{(0)}(x)=3x^{5}-2x^{4}+15x^{3}+13x^{2}-12x-5$
$$f^{(0)}(2)=207$$

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**2. Evaluate √12 to four decimal place by Newton’s – Raphson formula.**

**Solution**: Newton's method says that f(x) ≈l(x)=f(x0)+f'(x0)(x−x0)

√12 can be found by the function f(x) =x2−12

We know that 3<√12<4, so x0=3

f'(x)=2x

**3. Solve the system of equation by matrix inversion method**

**x+ y+ z = 1**

x+ 2y+ 3z = 6

x+ 3y+ 4z = 6

**Solution:**

x + y + z = 1

x + 2y + 3z = 6

x + 3y + 4z = 6

By matrix inversion.

I will assume you already know how to find the inverse of a matrix, and how to multiply two matrices. If you don't, post again asking how.

**SET- II**

**4. From the following table, estimate the number of those students who obtained marks between 40 and 45**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Marks** | **30 - 40** | **40 - 50** | **50 - 60** | **60 – 70**  | **70 - 80** |
| **No. of students** | **31** | **42** | **51** | **35** | **31** |

**Solution:** **Given**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Marks** | **30 - 40** | **40 - 50** | **50 - 60** | **60 – 70**  | **70 - 80** |
| **No. of students** | **31** | **42** | **51** | **35** | **31** |

**To find**

The number of students who obtained marks between 40 and 45.

**Solution**

The Newton’s Forward Difference Formula is given as,

⇒f(a+hu)=f(a)+uΔ(fa)+Δ²f(a)+...+Δⁿ(fa)

Now, we generate a forward difference table to find the maximum value i.e f(45),

x:         40  50    60      70     80

**5. The population of a certain town is shown in the following table**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year x** | **1931** | **1941** | **1951** | **1961** | **1971** |
| **Population y** | **40.62** | **60.80** | **79.95** | **103.56** | **132.65** |

Solution: **Step-by-step explanation:**

**Given=** The Population in thousand in ta tabular form

**To Find=** The rate of growth in percentage.

Explanation=

We have been given that the population of the certain town is given below. Find the rate of growth of the population in 1931,1941,1961, and 1971. Year x : 1931 1941 1951 1961 1971

**6. Using fourth order Runga – Kutta method to find y at x= 0.1, given that dy/dx = 3e^x + 2y, y(0) = 0 and h = 0.1**

**Answer:**

Given
$$\frac{dy}{dx}=3e^{x}+2y ;y(0)=0;h=0.1$$

Runga kutta method of fourth order, for given $\frac{dy}{dx}=f(x,y),y\left(x\_{0}\right)=y\_{0}$ We have

$$\begin{matrix}&y\_{1}=y\_{0}+\frac{1}{6}\left[k\_{1}+2k\_{2}+2k\_{3}+k\_{4}\right]\\ IN here k\_{1}& =hf\left(x\_{0},y\_{0}\right)\\k\_{2}& =hf\left(x\_{0}+\frac{h}{2},y\_{0}+\frac{k\_{1}}{2}\right)\\k\_{3}& =hf\left(x\_{0}+\frac{h}{2},y\_{0}+\frac{k\_{2}}{2}\right)\\k\_{4}& =hf\left(x\_{0}+h,y\_{0}+k\_{3}\right)\end{matrix}$$