

**Ministry of Higher Education & Scientific Res. Subject: Numerical Methods**

**Salahaddin University- Erbil Class: 2nd**

**Collage of Science Question Bank Computer Science & IT Department**

 **Q1)**The first approximation root of The Bisection method in the interval [0 1] is=------------------

=-------------------.

**Q3)**Let A=8! and =39900 then the relative and absolute error is ------------,----------

**Q4)** Given the value of data in table below, the value of **a** in the least square approximation (Linear y=ax+b) is =----------------------

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| x | 0 | 2 | 4 | 6 | 8 | 10 | 12 |
| f(x) | -0.8 | -1 | -0.2 | 0.2 | -2 | 0.8 | -0.6 |

 **Q5)** given the value of data find

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 1 | 1.5 | 2 | 2.5 | 3 |
| f(x) | -1.5 | -2.875 | -3.5 | -2.625 | 0.5 |

 **Q6)** Evaluate I= with n=6 Simpsons’ rule.

**Q7)** Function (cosx =3x-1) using Newton Raphson method ,start with (p0=1)

The Secant method with

 **Q9)** False position formula in interval [a b] =……………

**Q10)** The result of first and second iteration for applying Bisection method to find root of the equation ………….,………….

**Q12)** Given the value of data in table below, the value of **a** in the exponential curve is =…………….

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 1 | 1.25 | 1.5 | 1.75 | 2 |
| f(x) | 5.10 | 5.79 | 6.53 | 7.45 | 8.46 |

 **Q13)** Using Newton’s backward difference formula construct an interpolating polynomial of degree three and hence find f(-1/3) given f(-0.75) = - 0.07181250, f(-0.5) =

- 0.024750, f(-0.25) = 0.33493750, f(0) = 1.10100.

 **Q14 )** The following data are taken from the steam table:

|  |  |  |  |
| --- | --- | --- | --- |
| Temp0 c : 140 150 | 160 | 170 | 180 |
| Pressure : 3.685 4.854 | 6.502 | 8.076 | 10.225 |

Find the pressure at temperature t = 1420 and at t = 1750

 **Q15) Evaluate I= with n=8 using trapezoids rule.**

 **Q16)** Find the first derivative of , at x=2, using the data x0=2, x1=3, x2=4

Secant method ,x0=0.02,x1=0.05

 using Newton Raphson method start with x0=1

 **Q19)** Using following data find the value of y at x=5

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 0 | 10 | 20 | 30 | 40 |
| f(x) | 7 | 18 | 32 | 48 | 85 |

 **Q20)** Given the value of data in table below, find the value of **b**  in the least square approximation (Linear y=ax+b)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 0 | 10 | 20 | 30 | 40 | 80 | 90 | 95 |
| f(x) | 68 | 67.1 | 66.4 | 65.6 | 64.6 | 61.8 | 61 | 60 |

**Q21)** Consider the non – linear system x2 – 2x – y +0.5 =0 and x2+4y2 – 4 = 0. Use Newton – Raphson method with the starting value (x0, y0) = (2.00, 0.25) and compute (x1, y1), (x2, y2) and (x3, y3) .

**Q22)** Fins the real root of xex – 3 = 0 by regula - falsi method.

**Q23**) Find the real root using method of false position for x3 – 2x – 5 = 0 coreect to three decimal places.

**Q24)** Obtain the interpolation quadratic polynomial for the given data by using Newton’s forward difference formula.

|  |  |  |  |
| --- | --- | --- | --- |
| X : 0 | 2 | 4 | 6 |
| Y : -3 | 5 | 21 | 45 |

**Q25)** Find the polynomial which takes the following values.

|  |  |  |
| --- | --- | --- |
| X : 0 | 1 | 2 |
| Y : 1 | 2 | 1 |

**Q26)** Using Lagranges interpolation formula find y(10) given that y(5) = 12, y(6) = 13, y(9) = 14 and y(11) = 16.

**Q27)** Find the missing term in the following table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x : 0 | 1 | 2 | 3 | 4 |
| y : 1 | 3 | 9 | - | 81 |

**Q28)** From the following table find y(1.5) and y’(1) using cubic spline.

|  |  |  |
| --- | --- | --- |
| X : 1 | 2 | 3 |
| Y : -8 | -1 | 18 |

**Q29)** Given sin 450 = 0.7071, sin 500 = 0.7660, sin 550 = 0.8192, sin 600 = 0.8660, find

sin 520 using Newton’s forward interpolating formula.

**Q30)** Given log 10 654 = 2.8156, log 10 658 = 2.8182, log 10 659 = 2.8189, log 10 661 =

2.8202, find using Lagrange’s formula the value of log 10 656.

**Q31**) Fit a Lagrangian interpolating polynomial y = f(x) and find f(5)

|  |  |  |  |
| --- | --- | --- | --- |
| x : 1 | 3 | 4 | 6 |
| y : -3 | 0 | 30 | 132 |

**Q32)** Find y(12) using Newton’ forward interpolation formula given

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x : 10 | 20 | 30 | 40 | 50 |
| y : 46 | 66 | 81 | 93 | 101 |

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