Unit 13 - Week 11

Assignment 11

The due date for submitting this assignment has passed. Due on 2020-04-15, 23:59 IST. As per our records you have not submitted this assignment.

1) Interpolation is a process for
   a) extracting feasible data set from a given set of data
   b) finding a value between two points on a line or curve.
   c) removing unnecessary points from a curve
   d) all of the mentioned

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   b) finding a value between two points on a line or curve.

2) Given two data points \((a, f(a))\) and \((b, f(b))\), the linear Lagrange polynomial \(f(x)\) that passes through these two points are given as

   a) \(f(x) = \frac{x-b}{a-b} f(a) + \frac{x-a}{a-b} f(b)\)
   b) \(f(x) = \frac{x}{a-b} f(a) + \frac{x}{b-a} f(b)\)
   c) \(f(x) = f(a) + \frac{f(b)-f(a)}{b-a} f(b)\)
Problem solving through Programming In C - Unit 13 - Week 11

1) A Lagrange polynomial passes through three data points as given below

<table>
<thead>
<tr>
<th>x</th>
<th>5</th>
<th>10</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>15.35</td>
<td>9.63</td>
<td>3.74</td>
</tr>
</tbody>
</table>

The polynomial is determined as 

\[ f(x) = L_0(x). (15.35) + L_1(x). (9.63) + L_2(x). (3.74) \]

The value of \( f(x) \) at \( x = 7 \) is

- a) 12.78
- b) 13.08
- c) 14.12
- d) 11.36

No, the answer is incorrect.
Score: 0
Accepted Answers:
- b) 13.08

4) The value of \( \int_0^{1.5} xe^{2x} \, dx \) by using one segment trapezoidal rule is (upto four decimal places)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 22.5962

5) Accuracy of the trapezoidal rule increases when

- a) integration is carried out for sufficiently large range
- b) instead of trapezoid, we take rectangular approximation function
- c) number of segments are increased
- d) integration is performed for only integer range

No, the answer is incorrect.
Score: 0
Accepted Answers:
c) number of segments are increased
6) Solve the ordinary differential equation below using Runge-Kutta 4th order method.
Step size h=0.2.
\[ 5 \frac{dy}{dx} + xy^3 = \cos(x), \quad y(0) = 3 \]
The value of y(0.2) is (upto two decimal points)
- a) 2.86
- b) 2.93
- c) 3.13
- d) 3.08
No, the answer is incorrect.
Score: 0
Accepted Answers:
- b) 2.93

7) Which of the following cannot be a structure member?
- a) another structure
- b) function
- c) array
- d) none of the above
No, the answer is incorrect.
Score: 0
Accepted Answers:
- b) function

8) Match the following
A. Newton Method
B. Lagrange Polynomial
C. Trapezoidal Method
D. Runge Kutta Method

A. Integration
B. Root finding
C. Differential Equation
D. Interpolation

- a) A-2, B-4, C-1, D-3
- b) A-3, B-1, C-2, D-4
- c) A-1, B-4, C-3, D-2
- d) A-2, B-3, C-4, D-1
No, the answer is incorrect.
Score: 0
Accepted Answers:
- a) A-2, B-4, C-1, D-3
The value of ∫₁³ e^x(ln x)dx calculated using the Trapezoidal rule with five subintervals is
(* range is given in output rather than single value to avoid approximation error)

- a) 12.56 to 12.92
- b) 13.12 to 13.66
- c) 14.24 to 14.58
- d) 15.13 to 15.45

No, the answer is incorrect.
Score: 0
Accepted Answers:
- c) 14.24 to 14.58

10) Consider the same recursive C function that takes two arguments

unsigned int func(unsigned int n, unsigned int r)
{
    if (n > 0) return (n%r + func(n/r, r));
    else return 0;
}

What is the return value of the function func when it is called as func(513, 2)?

- a) 9
- b) 8
- c) 5
- d) 2

No, the answer is incorrect.
Score: 0
Accepted Answers:
- d) 2