

Announcements

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Mentor

Unit 10 - Week 8

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Assignment 8

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-11-11, 23:59 IST.

1) Determine the parameters a so that S is a natural cubic spline

1 point

$$S(x) = \begin{cases} 2 + 3x + x^3 & \text{if } 0 \leq x \leq 1 \\ 6 + 6(x-1) + 3(x-1)^2 + a(x-1)^3 & \text{if } 1 \leq x \leq 2 \end{cases}$$

- $a = 2$
 $a = -2$
 $a = 3$
 $a = -1$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $a = -1$

2) Use Lagrange interpolation polynomial of degree two to approximate $f(3)$ if $f(2) = 0.5$, $f(2.75) = \frac{4}{11}$ and $f(4) = \frac{1}{4}$.

1 point

- 0.49
 0.64
 0.33
 0.40

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.33

3) For the given function $f(x) = \cos x$, let $x_0 = 0.698$, $x_1 = 0.733$, $x_2 = 0.768$ and $x_3 = 0.803$. If we construct Lagrange interpolation polynomial of degree three to approximate $f(0.750)$. Use this knowledge to find a bound for the error in the approximation.

1 point

- 4×10^{-3}
 2.1×10^{-5}
 3.7×10^{-4}
 2.5×10^{-5}

No, the answer is incorrect.
Score: 0

Accepted Answers:
 4×10^{-3}

4) For the following table

1 point

x	0.0	0.4	0.7
$f(x)$	1	3	6

Find the second divide difference involving 0.0, 0.4 and 0.7

- 7.14
 10
 5
 None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
7.14

5) Consider the following table

1 point

x	0.0	0.25	0.5	0.75
$f(x)$	1	2	3.5	y

and $P_3(x) = 1 + 4x + 4x(x-0.25) + \frac{16}{3}x(x-0.25)(x-0.5)$ be the interpolating polynomial using Newton divide difference formula for the function f . Find the value of y

- 6
 3.5
 4.5
 None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
6

6) Determine the parameters a, b, c, d and e so that S is a natural cubic spline

1 point

$$S(x) = \begin{cases} a + b(x-1) + c(x-1)^2 + d(x-1)^3 & \text{if } 0 \leq x \leq 1 \\ (x-1)^3 + ex^2 - 1 & \text{if } 1 \leq x \leq 2. \end{cases}$$

- $a = -4, b = -6, c = -3, d = -1, e = -3$
 $a = 3, b = -2, c = -1, d = -4, e = -5$
 $a = -4, b = -6, c = -3, d = -4, e = -3$
 None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $a = -4, b = -6, c = -3, d = -1, e = -3$

7) Determine the parameter a, b, c and d so that the function

1 point

$$S(x) = \begin{cases} S_0(x) = x^2 + x^3 & \text{if } 0 \leq x \leq 1 \\ S_1(x) = a + bx + cx^2 + dx^3 & \text{if } 1 \leq x \leq 2. \end{cases}$$

is a cubic spline and has the property $S_1''(x) = 12$

- $a = -2, b = 4, c = -2, d = 2$
 $a = -1, b = 3, c = -2, d = 2$
 $a = -1, b = 3, c = -3, d = 2$
 None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $a = -1, b = 3, c = -2, d = 2$

8) A clamped cubic spline S for a function f is defined by

1 point

$$S(x) = \begin{cases} 1 + Bx + 2x^2 - 2x^3 & \text{if } 0 \leq x \leq 1 \\ 1 + b(x-1) - 4(x-1)^2 - 7(x-1)^3 & \text{if } 1 \leq x \leq 2 \end{cases}$$

Find $f'(0)$ and $f'(2)$

- $f'(0) = 1, f'(2) = -32$
 $f'(0) = 0, f'(2) = -31$
 $f'(0) = 2, f'(2) = 12$
 None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $f'(0) = 0, f'(2) = -31$

9) If we construct a natural cubic spline S to approximate $f(x) = \cos \pi x$ by using the values given by f at $x = 0, 0.25, 0.5, 0.75$ and 1.0 . Find the value of $\int_0^1 S(x) dx$

1 point

- 0.2
 0.75
 0.55
 0.0

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.0

10) Given the partition $x_0 = 0, x_1 = 0.05$ and $x_2 = 0.1$ of $[0, 0.1]$. If we find the cubic spline F with clamped boundary conditions that interpolates $f(x) = e^{2x}$. Find the value of $\int_0^{0.1} F(x) dx$

1 point

- 0.34089
 1.11079
 0.55678
 0.11070

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.11070