Unit 11 - Week 9

Assignment 9

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

Due on 2020-11-18, 23:59 IST.

1) If S is a natural cubic spline that passes through the points $(1,2),(2,3)$ and $(3,5)$. The value of $\frac{dS}{dx}$ at $x = 1.5$ most nearly is — *1 point*

- 2.5
- 1.2
- 0.94
- 0.50

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.94

2) What form does the truncation error take for the difference formula $f'(x) \approx \frac{f(x+h)-f(x-h)}{2h}$? — *1 point*

- $O(1)$
- $O(h)$
- $O(2h)$
- $O(h^2)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$O(h^2)$

3) Suppose that — *1 point*

$$S(x) = \begin{cases} 1 + ax + x^2 - x^3 & \text{if } 0 \le x \le 1 \\ 1 + b(x-1) - 2(x-1)^2 + (x-1)^3 & \text{if } 1 \le x \le 2, \end{cases}$$

is a clamped cubic spline. What are the clamped end point slopes ?

- $S'(0) = 0,\ S'(2) = -1$
- $S'(0) = 1,\ S'(2) = -2$
- $S'(0) = 0,\ S'(2) = -2$
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
$S'(0) = 0,\ S'(2) = -2$

4) Use the Backward-difference formula to approximate the derivative of $f(x) = \sin x$ at $x_0 = 0.6$ with $h = 0.1$ — *1 point*

- 0.7520
- 0.8520
- 0.6530
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.8520

5) If we are using forward difference formula to approximate the derivative of $f(x) = \ln x$ at $x_0 = 1.8$ using $h = 0.1$. Determine bounds for the approximation error. — *1 point*

- 0.12758
- 0.01067
- 0.01543
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.01543

6) Find the least squares line approximating the following data — *1 point*

x	1	2	3	4	5	6	7	8	9	10
y	1.3	3.5	4.2	5.0	7.0	8.8	10.1	12.5	13.0	15.6

- $1.538x - 0.360$
- $1.2x - 1.7$
- $2.2x - 0.75$
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
$1.538x - 0.360$

7) If we fit the following data with least squares polynomial of degree two. — *1 point*

x	0	0.25	0.5	0.75	1
y	1	1.2840	1.6487	2.1170	2.7183

What is the total error E?

- 0.000274
- 0.00156
- 0.01375
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.000274

8) Find the least squares approximating polynomial of degree two for the function $f(x) = \sin \pi x$ on the interval $[0, 1]$. — *1 point*

- $3x^2 + 2.5x - 0.5$
- $-4.1225x^2 + 4.12251x - 0.050465$
- $5.7521x^2 + 3.2375x - 0.4$
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
$-4.1225x^2 + 4.12251x - 0.050465$

For Q9-10: Consider the following table

x	4	4.2	4.5	4.7	5.2	5.5	5.9	6.3	6.8	7.1
y	102.56	113.18	130.11	142.05	167.53	195.14	224.87	256.73	299.50	326.72

9) Construct the least squares approximation of the form be^{ax} — *1 point*

- $y = 12.43e^{0.5x}$
- $y = 24.26e^{0.3724x}$
- $y = 15.67e^{0.75x}$
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
$y = 24.26e^{0.3724x}$

10) Construct the least squares approximation of the form bx^a — *1 point*

- $y = 7.5x^{3.54}$
- $y = 2.3x^{4.76}$
- $y = 6.24x^{2.02}$
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
$y = 6.24x^{2.02}$