Unit 12 - Week 10

Assignment 10

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

Due on 2020-11-25, 23:59 IST.

1) Use five point midpoint formula to approximate $f'(2.0)$ with $h = 0.1$ for $f(x) = xe^x$. *1 point*

- 30.23
- 32.47
- 22.17
- 19.12

No, the answer is incorrect.
Score: 0
Accepted Answers:
22.17

2) Consider the following table *1 point*

x	1.8	1.9	2.0	2.1	2.2
$f(x)$	10.889365	12.703199	14.778112	17.148957	19.855030

Use the second derivative midpoint formula to approximate $f''(2.0)$ with $h = 0.1$

- 29.59
- 24.15
- 35.75
- 31.29

No, the answer is incorrect.
Score: 0
Accepted Answers:
29.59

3) A student find the numerical value of $f'(x)$ at $x = 3$ is 20.220 with $h = 0.2$. Which of the following methods did the student use to conduct the differentiation if $f(x) = e^x$? *1 point*

- Backward divided difference
- Central divided difference
- Forward divided difference
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
Central divided difference

4) The velocity of a rocket is given as a function of time as *1 point*

$t(in\ second)$	0	0.5	1.2	1.5	1.8
$v(in\ m/s)$	0	213	223	275	300

Allowed to use the forward divided difference, backward divided difference or central divided difference approximation of the first derivative, the best estimate for the acceleration in km/h^2 of the rocket at $t = 1.5$ second is

- 83.33
- 128.33
- 173.33
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
None of these

5) If we approximate $f'(x)$ at x_0 by using the given formula *1 point*

$$f'(x_0) = \frac{f(x_0 + h) - f(x_0 - h)}{2h} - \frac{h^2}{6} f'''(\xi).$$

The bound for the total error is

$$\frac{\epsilon}{h^2} + \frac{h^2}{6} M,$$

where ϵ is bounds for round off error and M is bounds for third derivative of f

- True
- False

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

6) Consider the following data *1 point*

x	0.5	0.6	0.7
$f(x)$	0.4794	0.5646	0.6442

Use the forward difference formula to compute $f'(0.6)$

- 0.7960
- 0.5131
- 0.6021
- 0.4569

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.7960

7) Consider the following data *1 point*

x	1.7	2.2	2.7
$f(x)$	27	64	125

What is the three point forward difference approximation for $f'(1.7)$?

- 50
- 45
- 55
- 60

No, the answer is incorrect.
Score: 0
Accepted Answers:
50

8) Find the a, b and c such that the approximation *1 point*

$$f'(0) \approx af(0) + bf(1) + cf(2)$$

is exact for polynomials less than or equal to 2.

- a = 0.5, b = 2, c = −0.5
- a = 1, b = 0.5, c = −1
- a = 0.75, b = 1, c = −0.75
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
None of these

9) Use the Simpson's one third rule to approximate the integral $\int_1^3 \frac{x}{x^2+4} dx$ with $n = 8$ *1 point*

- 0.75
- 0.35
- 0.48
- 0.60

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.48

10) Use the Trapezoidal rule to approximate the integral $\int_{-2}^{2} x^3 e^x dx$ with $n = 4$. *1 point*

- 31.3653
- 25.2575
- 30.1254
- 15.7564

No, the answer is incorrect.
Score: 0
Accepted Answers:
31.3653