

King Fahd University of Petroleum and Minerals
Information Technology Center
Computing Services Section

Dept. of: Math

Course: math371

First Major Exam

Semester: 242

Thursday, February 20, 2025

		Raw Score	% Score
Total no. of Students:	48	Course Mean: 54.48	77.83
Course Std. Dev. :	11.5	Max. Score: 70	100
		Min. Score: 10	14.29

Average (%) of each question

1.0000	77.0833
2.0000	87.5000
3.0000	85.4167
4.0000	87.5000
5.0000	70.8333
6.0000	72.9167
7.0000	66.6667
8.0000	91.6667
9.0000	75.0000
10.0000	77.0833
11.0000	85.4167
12.0000	75.0000
13.0000	72.9167
14.0000	64.5833

Question with highest average
Q8

Question with lowest average
Q7 and Q14

1. Given $f(x) = \sqrt{x+1}$. Using second Taylor Polynomial $P_2(x)$ about $x_0 = 0$, then $\int_0^{0.5} f(x) dx \approx$

(a) 0.5573 _____(correct)

(b) 0.5663

(c) 0.5763

(d) 0.5583

(e) 0.8513

no students = 48
Average = 77.0833 %

2. Let $f(x) = \frac{x^3}{5x+e}$ by using two-digits chopping arithmetic $f(\pi) \approx$

(a) 1.7 _____(correct)

(b) 1.6

(c) 1.8

(d) 1.5

(e) 1.4

no students = 48
Average = 87.5000 %

3. Suppose p^* must approximate $\sqrt{2}$ with relative error at most 10^{-3} , then the largest interval in which p^* must lie is

- (a) $[1.4128, 1.4156]$ _____(correct)
- (b) $[1.4328, 1.5156]$
- (c) $(1.3731, 1.4371)$
- (d) $(1.2541, 1.4156)$
- (e) $(1.5128, 1.6128)$

no students = 48
Average = 85.4167 %

4. Let $x = \tan x$. Using the Bisection method on the interval $[1.5, 2]$ then $p_3 =$

- (a) 1.5625 _____(correct)
- (b) 1.7325
- (c) 1.6256
- (d) 1
- (e) 1.8252

no students = 48
Average = 87.5000 %

5. Use a fixed-point method to determine a solutions accurate to within 10^{-2} for $x^3 - x - 1 = 0$ on $[1, 2]$.

Use $p_0 = 1$ and $g(x) = \sqrt{1 + \frac{1}{x}}$, then the solution is

(a) 1.3239 _____(correct)

(b) 1.3066

(c) 1.3271

(d) 1.4230

(e) 1.3139

no students = 48

Average = 70.8333 %

6. Let $g(x) = 2^{-x}$ on the interval $\left[\frac{1}{3}, 1\right]$ and $p_0 = 1$, the minimum number of iteration required to achieve 10^{-4} by fixed-point method is:

(a) 15 _____(correct)

(b) 18

(c) 16

(d) 19

(e) 17

no students = 48

Average = 72.9167 %

7. If the Secant method used to approximate the solution for the equation $\sin x = e^{-x}$ with $p_0 = 0$ and $p_1 = 0.5$, then $p_3 =$

(a) 0.5880 _____(correct)

(b) 0.5780

(c) 0.5680

(d) 0.8680

(e) 0.1302

no students = 48

Average = 66.6667 %

8. By using Newton's method with $p_0 = 2$ and polynomial with lowest degree to approximate $\sqrt{1 + \sqrt{3}}$, then $p_2 =$

(a) 1.6631 _____(correct)

(b) 1.8831

(c) 1.2631

(d) 1.6881

(e) 1.7331

no students = 48

Average = 91.6667 %

9. Let $f(x) = \sqrt[3]{x-1}$, and $p_2(x)$ be the interpolation polynomial of degree two and $x_0 = 1$, $x_1 = 1.5$, $x_2 = 2$, then $p_2(1.8) =$

(a) 0.9880 _____(correct)

(b) 0.8980

(c) 0.7980

(d) 0.9180

(e) 0.9080

no students = 48
Average = 75.0000 %

10. Let $S(x)$ be a natural cubic spline that passes through the points $(1, 1)$, $(2, 3)$ and $(4, 5)$ then $S(3) =$

(a) 4.2500 _____(correct)

(b) 4.4500

(c) 4.8500

(d) 4.7500

(e) 4.6500

no students = 48
Average = 77.0833 %

11. Given the following data: $f(2.1) = 3.4321$, $f(2.3) = 4.3210$, $f(2.5) = 5.3210$ and $f(2.6) = 6.3215$.

Using the three point formula to approximate $f'(2.5)$

(a) 5.2778 _____(correct)

(b) 4.2778

(c) 5.8778

(d) 5.7878

(e) 4.8778

no students = 48

Average = 85.4167 %

12. Given the following data:

x	2.1	2.2	2.3	2.4	2.5
$f(x)$	3.1450	4.2351	m	6.3210	7.4321

If the composite Simpson's rule gives $\int_{2.1}^{2.5} f(x) dx = 8.3215$, then $m \approx$

(a) 98.4215 _____(correct)

(b) 97.4215

(c) 96.4135

(d) 99.0210

(e) 1

no students = 48

Average = 75.0000 %

13. The value of n and h required to approximate $\int_3^5 \sqrt{1+x} dx$ to within 10^{-3}
Use Composite Trapezoidel rule

- (a) $n = 5, h = 0.4$ _____(correct)
(b) $n = 4, h = 0.25$
(c) $n = 6, h = 0.660$
(d) $n = 5, h = 0.61$
(e) $n = 6, h = 0.4$

no students = 48
Average = 72.9167 %

14. The equation $x^2 - \ln x = x$, which of the following initial guess, Newton's Method will not work?

- (a) $p_0 = 1$ _____(correct)
(b) $p_0 = 1.5$
(c) $p_0 = 2$
(d) $p_0 = 2.5$
(e) $p_0 = 1.7$

no students = 48
Average = 64.5833 %

Q	MASTER	CODE01	CODE02	CODE03	CODE04
1	A	D ₈	D ₁₀	A ₈	D ₁₄
2	A	B ₁₁	A ₈	B ₆	B ₉
3	A	C ₁₃	A ₉	C ₁₀	C ₁
4	A	A ₁₄	A ₃	A ₉	D ₁₃
5	A	A ₉	E ₁₄	D ₃	D ₈
6	A	B ₂	A ₄	A ₁₂	B ₆
7	A	D ₄	D ₁	B ₁₄	D ₁₀
8	A	A ₅	A ₅	B ₇	D ₁₁
9	A	D ₁	C ₁₁	C ₄	C ₃
10	A	B ₁₀	D ₁₃	C ₁₁	B ₅
11	A	C ₇	B ₂	A ₅	B ₂
12	A	E ₆	B ₆	E ₁	A ₁₂
13	A	E ₃	B ₁₂	C ₁₃	B ₄
14	A	D ₁₂	D ₇	C ₂	C ₇

Averages for each Question

1.0000 77.0833
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 3.0000 85.4167
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 13.0000 72.9167
 14.0000 64.5833

Answer Counts

V	A	B	C	D	E
1	3	3	2	4	2
2	5	3	1	4	1
3	4	3	5	1	1
4	1	5	3	5	0