

King Fahd University of Petroleum and Minerals
Department of Mathematics

Math 102
Sample Recitation Midterm
Term 231
xxxxxx xx/xx/2023

EXAM COVER

Number of questions: 8
Number of Answers: 5 per question

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Math 102
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Net Time Allowed: 50 minutes

SAMPLE MIDTERM

1. For the function $f(x) = 41x^2 + 63x + 12$, the x-intercept(s) when $-10 \leq x \leq 30$ is(are) at $x =$

(a) $\frac{-63 - \sqrt{2001}}{82}$ and $\frac{-63 + \sqrt{2001}}{82}$.

(b) $\frac{-63 - \sqrt{2001}}{82}$ only.

(c) $\frac{-41 + \sqrt{1988}}{77}$ only.

(d) $\frac{-41 - \sqrt{1988}}{77}$ and $\frac{-41 + \sqrt{1988}}{77}$.

(e) $\frac{-41 - \sqrt{1988}}{77}$ only.

2. The estimate of the area under the graph of $f(x) = \frac{31}{27x^2+1}$ from $x = 0$ to $x = 4$, using $n = 13$ approximating rectangles with **midpoints** is:

(a) 8.72350.

(b) 14.2180.

(c) 4.70157.

(d) 12.13769.

(e) 13.32127.

3. If the acceleration of a moving particle is

$$a(t) = 32t^2 - 47t + 12,$$

with initial velocity $v(0) = 5$, the **total distance** traveled by the particle when $0 \leq t \leq 10$ is:

- (a) $58450/3$.
- (b) $39225/6$.
- (c) $24410/7$.
- (d) $63129/4$.
- (e) $47380/5$.
4. Considering the function $f(x) = 11x^2 - 8x - 3$ on the interval $[-20, 30]$, the value(s) of c such that $f_{ave} = f(c)$ is(are):

- (a) $\frac{4}{11} - 2\frac{\sqrt{62571}}{33}$ and $\frac{4}{11} + 2\frac{\sqrt{62571}}{33}$
- (b) $\frac{4}{11} + 2\frac{\sqrt{62571}}{33}$ only.
- (c) $-\frac{3}{23} - 3\frac{\sqrt{41387}}{23}$ only.
- (d) $-\frac{3}{23} - 3\frac{\sqrt{41387}}{23}$ and $-\frac{3}{23} + 3\frac{\sqrt{41387}}{23}$
- (e) $-\frac{7}{13} + 4\frac{\sqrt{53732}}{13}$ only.

5. If we use a substitution $u = f(x)$ to evaluate the integral

$$\int_0^4 \frac{101x dx}{\sqrt{237x^2 + 1}},$$

we get:

(a) $-\frac{101}{237} + \frac{101\sqrt{3793}}{237}$ with $\int_1^{3793} \frac{101dx}{474\sqrt{u}}$.

(b) $-\frac{121}{239} + \frac{121\sqrt{3583}}{239}$ with $\int_1^{3793} \frac{101dx}{474\sqrt{u}}$.

(c) $-\frac{101}{237} - \frac{101\sqrt{3793}}{237}$ with $\int_1^{3913} \frac{101dx}{474\sqrt{u}}$.

(d) $-\frac{101}{237} + \frac{101\sqrt{3793}}{237}$ with $\int_1^{3913} \frac{101dx}{474\sqrt{u}}$.

(e) $-\frac{121}{239} - \frac{121\sqrt{3583}}{239}$ with $\int_1^{3793} \frac{101dx}{474\sqrt{u}}$.

6. The area of the region enclosed between the curves

$$x = 10y^2 - 4y \quad \text{and} \quad x = 3y - 11y^2$$

is equal to:

(a) 0.129629

(b) 0.141278

(c) 0.131567

(d) 0.111111

(e) 0.098989

7. If $f(x) = 23415 \cot(3x)$, then $\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} f(x)dx =$

(a) $7805 \ln(\sqrt{2}/2)$

(b) $7805 \ln(\sqrt{3}/2)$

(c) $7805 \ln(1/2)$

(d) $-7805 \ln(\sqrt{3}/2)$

(e) 0

8. If $f(x) = 12357 \sinh^{-1}(5x)$, then $\int_{\frac{1}{2}}^{\frac{1}{3}} f(x)dx =$

(a) -3038.55332

(b) -4541.11221

(c) 1765.44521

(d) 2391.34298

(e) 1675.78761