

King Fahd University of Petroleum and Minerals
Department of Mathematics

Math 102
Recitation Midterm Version 2
Term 231
Wednesday 25/October/2023

EXAM COVER

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

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Net Time Allowed: 50 minutes

MATH 102 MIDTERM

Version 2

1. The estimate of the area under the graph of $f(x) = \frac{37}{23x^2+1}$ from $x = 0$ to $x = 3$, using $n = 15$ approximating rectangles with **left end-points** is:

(a) 15.2998

(b) 7.9354

(c) 11.5489

(d) 10.3769

(e) 8.2123

2. If the acceleration of a moving particle is

$$a(t) = 19t^2 - 33t + 21,$$

with initial velocity $v(0) = 8$, the **total** distance traveled by the particle when $0 \leq t \leq 11$ is:

(a) 17219.58

(b) 92251.50

(c) 42410.75

(d) 36129.50

(e) $74380/75$

3. Considering the function $f(x) = 13x^2 - 7x - 6$ on the interval $[-10, 40]$, the value(s) of c such that $f_{ave} = f(c)$ is (are):

(a) $\frac{7}{26} + \frac{\sqrt{2587701}}{78}$ only.

(b) $\frac{7}{26} - \frac{\sqrt{2587701}}{78}$ and $\frac{7}{26} + \frac{\sqrt{2587701}}{78}$.

(c) $\frac{7}{26} - \frac{\sqrt{2587701}}{78}$ only.

(d) $\frac{4}{19} - 3\frac{\sqrt{41387}}{19}$ and $\frac{4}{19} + 3\frac{\sqrt{41387}}{19}$.

(e) $\frac{4}{19} + 3\frac{\sqrt{41387}}{19}$ only.

4. If we use an appropriate u **substitution** to evaluate the integral $I = \int_0^3 \frac{111x dx}{\sqrt{243x^2 + 1}}$, we get:

$$I = \int_a^b \frac{37du}{162\sqrt{u}}, \text{ where } a \text{ and } b \text{ are positive integers.}$$

The exact value of $I - a + 2b =$

- (a) 4395.91
(b) 6583.91
(c) 8771.91
(d) 2207.91
(e) 10959.91

5. The area of the region enclosed between the curves:

$$x = 6y^2 - 2y \quad \text{and} \quad x = 2y - 6y^2$$

is equal to:

- (a) 0.07407
 - (b) 0.04127
 - (c) 0.03156
 - (d) 0.05324
 - (e) 0.09273
6. If $f(x) = 5239 \cosh^{-1}(4x)$, then $\int_{\frac{1}{3}}^{\frac{1}{2}} f(x) dx =$
- (a) 947.3353
 - (b) 1341.1122
 - (c) 2763.4451
 - (d) 2891.3428
 - (e) 675.7861

7. The area of the region enclosed between the curves

$$x = 3y^3 - 2y \text{ and } x = 2y - 3y^3$$

is equal to:

- (a) 1.33
 - (b) 0.25
 - (c) 0.50
 - (d) 2.50
 - (e) 1.00
8. The volume of the solid obtained by rotating the region bounded by the curve $4x = 3y^2$, $x = 0$ and $y = 2$ about the y-axis is given by:

- (a) $\frac{18\pi}{5}$
- (b) $\frac{33\pi}{5}$
- (c) $\frac{21\pi}{5}$
- (d) $\frac{24\pi}{5}$
- (e) $\frac{12\pi}{5}$