King Fahd University of Petroleum and Minerals
Department of Mathematics

Math 102
Recitation Midterm Version 1
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 1

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

   (a) 7.9354

   (b) 11.5489

   (c) 10.3769

   (d) 8.2123

   (e) 15.2998

2. If the acceleration of a moving particle is

$$a(t) = 29t^2 - 43t + 11,$$

   with initial velocity $v(0) = 7$, the **total** distance traveled by the particle when $0 \leq t \leq 13$ is:

   (a) 54297.75

   (b) 92251.50

   (c) 42410.75

   (d) 36129.50

   (e) 74380.75

3. Considering the function $f(x) = 7x^2 - 8x - 1$ on the interval $[-10, 20]$, the value(s) of c such that $f_{ave} = f(c)$ is (are):

(a) $\frac{4}{7} - 2\frac{\sqrt{1159}}{7}$ and $\frac{4}{7} + 2\frac{\sqrt{1159}}{7}$

(b) $\frac{4}{7} - 2\frac{\sqrt{1159}}{7}$ only.

(c) $\frac{4}{7} + 2\frac{\sqrt{1159}}{7}$ only.

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

(e) $-\frac{7}{13} + 4\frac{\sqrt{53732}}{13}$ only.

4. If we use an appropriate u **substitution** to evaluate the integral $I = \int_0^5 \frac{111x dx}{\sqrt{317x^2 + 1}}$, we get:

$$I = \int_a^b \frac{111 du}{634\sqrt{u}}, \text{ where } a \text{ and } b \text{ are positive integers.}$$

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

(a) 7954.82

(b) 15881.82

(c) 23807.82

(d) 25961.82

(e) 3543.82

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

$$x = 7y^2 - 3y \quad \text{and} \quad x = 3y - 7y^2$$

is equal to:

(a) 0.18367

(b) 0.24127

(c) 0.13156

(d) 0.15324

(e) 0.19073

6. If $f(x) = 23415\ cosh^{-1}(3x)$, then $\int_{\frac{1}{3}}^{\frac{2}{3}} f(x)dx =$

(a) 7039.0562

(b) 3541.1121

(c) 1795.4452

(d) 2391.3429

(e) 1875.4726

7. The area of the region enclosed between the curves

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

is equal to:

(a) 0.50

(b) 2.25

(c) 1.25

(d) 3.50

(e) 0.75

8. The volume of the solid obtained by rotating the region bounded by the curvea $3x = 12y^2$, $x = 0$ and $y = 2$ about the y-axis is given by:

(a) $\frac{512\pi}{5}$

(b) $\frac{321\pi}{5}$

(c) $\frac{132\pi}{5}$

(d) $\frac{127\pi}{5}$

(e) $\frac{237\pi}{5}$