King Fahd University of Petroleum and Minerals
Department of Mathematics

Math 102
Recitation Midterm Version A
Term 232
Wednesday 28/February/2024

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 A

1. The estimate of the area under the graph of $f(x) = \dfrac{15}{31x^2 + 2}$ from $x = 0$ to $x = 4$, using $n = 19$ approximating rectangles with **right end-points** is:

   (a) 2.0883

   (b) 11.5489

   (c) 10.3769

   (d) 8.2123

   (e) 15.2998

2. If the acceleration of a moving particle is

   $$a(t) = 15t^2 - 31t + 2,$$

   with initial velocity $v(0) = 19$, the **total** distance traveled by the particle when $0 \le t \le 4$ is:

   (a) 81.33

   (b) 92.50

   (c) 42.75

   (d) 36.50

   (e) 74.75

3. Considering the function $f(x) = 12x^2 - 7x + 2$ on the interval $[-20, 10]$, the value(s) of c such that $f_{ave} = f(c)$ is (are):

(a) $\dfrac{7}{24} - \dfrac{\sqrt{59329}}{24}$ only.

(b) $\dfrac{7}{24} - \dfrac{\sqrt{59329}}{24}$ and $\dfrac{7}{24} + \dfrac{\sqrt{59329}}{24}$.

(c) $\dfrac{7}{24} + \dfrac{\sqrt{59329}}{24}$ only.

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

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

4. If we use an appropriate u **substitution** to evaluate the integral $I = \displaystyle\int_0^4 \dfrac{121x\,dx}{\sqrt{308x^2 + 2}}$, we get:

$$I = \int_a^b \dfrac{11\,du}{56\sqrt{u}}, \text{ where } a \text{ and } b \text{ are positive integers.}$$

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

(a) 4953.03

(b) 1881.82

(c) 3807.03

(d) 2961.82

(e) 5443.82

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

$$x = 9y^2 - 2y - 3 \quad \text{and} \quad x = 2y - 9y^2 + 3$$

is equal to:

(a) 4.877

(b) 2.413

(c) 1.315

(d) 5.324

(e) 7.907

6.   The area of the region enclosed between the curves

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

is equal to:

(a) 0.571428

(b) 2.213145

(c) 1.253127

(d) 3.542112

(e) 0.891651

7.   If $f(x) = 67134\ tan(35 - x)$, then $\int_{\frac{\pi}{4}}^{\frac{\pi}{3}} f(x)dx =$

(a) -9078.025

(b) -5378.025

(c) -2378.025

(d) -6783.025

(e) -4378.025

8.   For the function $f(x) = 12x^2 - 312x + 171$, the x-intercept(s) when $-30 \le x \le 10$ is(are) at $x =$

(a) $13 - \dfrac{\sqrt{619}}{2}$ only.

(b) $13 - \dfrac{\sqrt{619}}{2}$ and $13 + \dfrac{\sqrt{619}}{2}$.

(c) $\dfrac{31 + \sqrt{145}}{24}$ only.

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

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