King Fahd University of Petroleum and Minerals
Department of Mathematics

Math 102
Recitation Midterm Version B
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 B

1. The estimate of the area under the graph of $f(x) = \dfrac{23}{15x^2 + 2}$ from $x = 0$ to $x = 4$, using $n = 17$ approximating rectangles with **left end-points** is:

(a) 7.5561

(b) 2.5489

(c) 10.3769

(d) 8.2123

(e) 15.2998

2. If the acceleration of a moving particle is

$$a(t) = 43t^2 - 56t + 12,$$

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

(a) 492.0

(b) 925.0

(c) 427.5

(d) 365.0

(e) 745.5

3. Considering the function $f(x) = 13x^2 - 8x + 3$ on the interval $[-10, 20]$, the value(s) of c such that $f_{ave} = f(c)$ is (are):

(a) $\dfrac{4}{13} - \dfrac{2\sqrt{4099}}{13}$ and $\dfrac{4}{13} + \dfrac{2\sqrt{4099}}{13}$.

(b) $\dfrac{4}{13} - \dfrac{2\sqrt{4099}}{13}$ only.

(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 $I = \displaystyle\int_0^4 \dfrac{169x\,dx}{\sqrt{310x^2 + 1}}$, we get:

$$I = \int_a^b \dfrac{169\,du}{620\sqrt{u}}, \text{ where } a \text{ and } b \text{ are positive integers.}$$

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

(a) -4921.15

(b) -1881.82

(c) -3807.03

(d) -2961.82

(e) -5443.82

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

$$x = 11y^2 - 5y - 3 \quad \text{and} \quad x = 5y - 11y^2 + 3$$

is equal to:

(a) 5.419

(b) 12.413

(c) 9.315

(d) 8.324

(e) 7.907

6. The area of the region enclosed between the curves

$$x = 9y^3 - 5y \quad \text{and} \quad x = 5y - 9y^3$$

is equal to:

(a) 2.777777

(b) 4.213145

(c) 1.253127

(d) 3.542112

(e) 0.891651

7.   If $f(x) = 43171 \ tan(29 - x)$, then $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} f(x)dx =$

     (a) -1383.68

     (b) -5383.68

     (c) -2383.68

     (d) -783.68

     (e) -4383.68

8.   For the function $f(x) = 17x^2 - 309x + 151$,   the x-intercept(s) when $-30 \le x \le 10$ is(are) at $x =$

     (a) $\dfrac{309 - \sqrt{85213}}{34}$ only.

     (b) $\dfrac{309 - \sqrt{85213}}{34}$ and $\dfrac{309 + \sqrt{85213}}{34}$.

     (c) $\dfrac{311 + \sqrt{14521}}{24}$ only.

     (d) $\dfrac{-410 - \sqrt{19881}}{77}$ and $\dfrac{-410 + \sqrt{19881}}{77}$.

     (e) $\dfrac{-410 - \sqrt{19881}}{77}$ only.