King Fahd University of Petroleum and Minerals
Department of Mathematics

Math 102
Recitation Midterm Version C
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 C

1. The estimate of the area under the graph of $f(x) = \dfrac{17}{25x^2 + 2}$ from $x = 0$ to $x = 4$, using $n = 13$ approximating rectangles with **middle points** is:

   (a) 3.5834

   (b) 2.5489

   (c) 4.3769

   (d) 5.2123

   (e) 1.2998

2. If the acceleration of a moving particle is

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

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

   (a) 324.0

   (b) 925.0

   (c) 427.5

   (d) 665.0

   (e) 745.5

3. Considering the function $f(x) = 9x^2 - 11x + 3$ on the interval $[-10, 20]$, the value(s) of c such that $f_{ave} = f(c)$ is (are):

(a) $\frac{11}{18} - \frac{\sqrt{30541}}{18}$ and $\frac{11}{18} + \frac{\sqrt{30541}}{18}$.

(b) $\frac{11}{18} + \frac{\sqrt{30541}}{18}$ only.

(c) $\frac{7}{24} + \frac{\sqrt{19329}}{24}$ 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 $I = \int_0^4 \frac{219x dx}{\sqrt{417x^2 + 2}}$, we get:

$$I = \int_a^b \frac{73du}{278\sqrt{u}}, \text{ where } a \text{ and } b \text{ are positive integers.}$$

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

(a) -6635.84

(b) -1881.32

(c) -3807.03

(d) -2961.84

(e) -5443.32

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

$$x = 14y^2 - 6y - 3 \text{ and } x = 6y - 14y^2 + 3$$

is equal to:

(a) 4.955

(b) 12.413

(c) 9.315

(d) 5.324

(e) 8.937

6. The area of the region enclosed between the curves

$$x = 11y^3 - 6y \text{ and } x = 6y - 11y^3$$

is equal to:

(a) 3.272727

(b) 4.213145

(c) 1.253127

(d) 2.542112

(e) 0.891651

7. If $f(x) = 56871\ tan(32 - x)$, then $\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} f(x)dx =$

(a) -1056.35

(b) -3456.35

(c) -2156.35

(d) -4356.35

(e) -856.35

8. For the function $f(x) = 21x^2 - 317x + 131$, the x-intercept(s) when $-20 \leq x \leq 30$ is(are) at $x =$

(a) $\frac{317 - \sqrt{89485}}{42}$ and $\frac{317 + \sqrt{89485}}{42}$.

(b) $\frac{317 - \sqrt{89485}}{42}$ only.

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

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

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