Math 131 - Assignment 11

April 24, 2024

Name ____________________

Score ______________

Show all work to receive full credit. Supply explanations when necessary. Use extra paper as necessary. This assignment is due May 1.

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1. Find the function f that satisfies $f'(x) = 9x^2 - 3x + 4\sin x$ and $f(0) = 7$.

2. Let $f(x) = \sin(x)$. Use 4 subintervals of equal length and right endpoints to compute the corresponding right Riemann sum for f over the interval $[1, 2]$.

3. Let $f(x) = \dfrac{1}{x}$. Use 6 subintervals of equal length and subinterval left endpoints to compute the corresponding Riemann sum for f over the interval $[1, 4]$.

4. Use 4 subintervals of equal length and subinterval midpoints to compute a Riemann sum for $f(x) = \sin(x^2)$ on the interval $[0, 1]$.

5. Use the area concept (not a Riemann sum or antidifferentiation) to evaluate $\int_0^2 (2x + 1)\, dx$. Show your work.

6. Sketch the graph of $y = |x - 3|$ over the interval from $x = 0$ to $x = 4$. Then use area (not a Riemann sum or antidifferentiation) to determine the value of the definite integral $\int_0^4 |x - 3|\, dx$.

7. Use the fundamental theorem of calculus to evaluate each definite integral.

(a) $\int_0^{\pi/2} (x + \sin x)\, dx$

(b) $\int_1^2 \frac{1 + x}{x}\, dx$

(c) $\int_0^{\pi} \cos x\, dx$

(d) $\int_1^2 \left(\frac{1}{x} - e^x\right) dx$

8. Use a definite integral to find the area of the bounded region above the x-axis and below the graph of $y = 3x - x^2$.