

Math 131 - Quiz 12

December 3, 2025

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due December 8.

1. (3 points) Evaluate each limit.

(a) $\lim_{t \rightarrow 0} \left(\frac{t \sin t}{1 - \cos t} \right)$

(b) $\lim_{x \rightarrow \infty} x^2 e^{-x}$

(c) $\lim_{x \rightarrow 0^+} \left(\frac{3x + 1}{x} - \frac{1}{\sin x} \right)$

2. (1 point) Find the function f that satisfies $f'(x) = \frac{8}{1 + x^2} + \sec^2 x$, $f(0) = 1$.

Turn over.

3. (3 points) Evaluate each indefinite integral.

(a) $\int (x^2 + x^3 + x^{\sqrt{3}}) dx$

(b) $\int (\sqrt[5]{x} + \sqrt{x} - 5 \sin x) dx$

(c) $\int \left(\frac{1}{x} + \frac{1}{x^2} \right) dx$

4. (1.5 points) Let $f(x) = \sin(\pi x)$. Use 4 subintervals of equal length and subinterval midpoints to compute a Riemann sum for f on $[1, 3]$.

5. (1.5 points) Let $f(x) = e^x$. Use 5 subintervals of equal length and subinterval left endpoints to compute a Riemann sum for f on $[0, 1]$.