

Math 1552, Integral Calculus

Review of Derivative/Anti-derivative Formulas

1. Find the derivative of each function below. DO NOT SIMPLIFY YOUR ANSWER.

(a) $s(t) = t^2 \csc^3(5t) \sec^5(8t)$

(b) $g(x) = \frac{3x^{1/4}e^{1/x}}{(x^4 - \frac{1}{3x})^5(3x^2 + 2)^4}$

2. Find an antiderivative for the function $f(x) = 3 \cos x + \frac{1}{4x^2}$.

3. A particle travels with a velocity given by $v(t) = -\frac{1}{3}t^2 + 4t + 2$, where position is measured in meters and time in seconds.

(a) Find the acceleration of the particle when $t = 1$ second.

(b) If the initial position is 4 m, find the position of the particle at $t = 1$ second.

Answers

1.

(a) $s'(t) = 2t \csc^3(5t) \sec^5(8t) - 15t^2 \csc^3(5t) \cot(5t) \sec^5(8t) + 40t^2 \csc^3(5t) \sec^5(8t) \tan(8t)$

(b) $g'(x) = \frac{3x^{1/4} e^{1/x}}{(x^4 - \frac{1}{3x})^5 (3x^2 + 2)^4} \left[\frac{1}{4x} - \frac{1}{x^2} - \frac{5(4x^3 + \frac{1}{3x^2})}{x^4 - \frac{1}{3x}} - \frac{24x}{3x^2 + 2} \right]$

2. $F(x) = 3 \sin x - \frac{1}{4x}$

3. (a) $\frac{10}{3} \text{ m/s}^2$, (b) $7\frac{8}{9} \text{ m}$