Quiz #1

MATH 126-102 — Calculus II
Thursday, Aug 27, 2026

Please print your name:

Problem 1. Compute the following derivative:

$$\frac{\mathrm{d}}{\mathrm{d}x}\frac{1}{2x^3-\cos(x)}$$

Solution. Using the chain rule, we find:

$$\frac{\mathrm{d}}{\mathrm{d}x}\frac{1}{2x^3-\cos(x)} = -\frac{1}{(2x^3-\cos(x))^2}\cdot(6x^2+\sin(x))$$

Problem 2. Evaluate the following indefinite integral:

$$\int \sin^5(3t)\cos(3t)\mathrm{d}t$$

Solution. We substitute $u=\sin(3t)$. Since

$$\frac{\mathrm{d}u}{\mathrm{d}t} = 3\cos(3t),$$

we use $\cos(3t)\,\mathrm{d}t = \frac{1}{3}\mathrm{d}u$ to get

$$\int \sin^5(3t)\cos(3t)\mathrm{d}t = \frac{1}{3}\int u^5\,\mathrm{d}u = \frac{1}{18}u^6 + C = \frac{1}{18}\sin^6(3t) + C.$$

Armin Straub
straub@southalabama.edu