

Name _____

- You have 20 minutes
- No calculators
- Show sufficient work

1. (2 points each) Evaluate the following indefinite integrals.

(a) $\int \frac{x^5 + x^3 + 2}{x^2 + 1} dx$

(b) $\int \tan(x) \csc(2x) dx$

2. (2 points) Evaluate the following definite integral. Simplify your answer.

$$\int_1^3 2x^{-3} (x^2 + 18) dx$$

3. (2 points) Suppose $g(x) = \int_{x^6}^4 e^{\sqrt[3]{t}} dt$. Find $g'(x)$.

4. (2 points) At time t minutes, the altitude of a drone is changing at a rate of $10 \sin(t) + 20 \cos(t)$ feet per minute. If the altitude of the drone is 200 feet at time $t = \frac{\pi}{2}$ minutes, then what is its altitude at time $t = 2\pi$ minutes? Simplify your answer.