

Name _____

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

1. (2 points) Evaluate the following definite integral. Simplify your answer.

$$\int_0^2 (6t^2 + 5e^t + 2) dt$$

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

(a) $\int \left(\frac{6x\sqrt{x} - \sqrt{x}}{2x} \right)^2 dx$

(b) $\int \frac{4 \sin^5 x - 3 \cos^2 x + 3}{\sin^4 x} dx$

3. (2 points) Suppose $H(x) = \int_{\sqrt{x}}^{10} 6 \sec^9(t^4) dt$. Find $H'(x)$.

4. (2 points) A bacteria population is 2000 at time $t = 0$. At time t hours, the population is growing at a rate of $50t + 100$ bacteria per hour. What is the population at time $t = 2$ hours?