1. (2 points) At time $t$ hours, a population of bacteria is growing at a rate of $8t + 50$ bacteria per hour. If the population is 5050 at time $t = 1$, then what is the population at time $t = 5$ hours?
2. (2 points each) Evaluate the definite integrals. Simplify your answers.

(a) \( \int_{\ln(3)/4}^{\ln(8)/4} 12e^{4t} \sqrt{e^{4t} + 1} \, dt \)

(b) \( \int_{-5}^{-2} (2x + 7)^{12} \sin (2x + 7) \, dx \)
3. (2 points each) Evaluate the indefinite integrals.

(a) \( \int \sin^2(x) \tan(x) \, dx \)

(b) \( \int \frac{27x^5}{\sqrt{3x^3 + 2}} \, dx \)