1. Let \( E = f(t) \) represent the emissions of nitrogen oxides in millions of metric tons per year in the US. Let \( t \) be the number of years since 1940. What are the units and meaning of \( \int_0^{50} f(t) \, dt \)?

2. Suppose you know that \( \int_a^b f(x) \, dx = 6 \), \( \int_a^b g(x) \, dx = -3 \), \( \int_a^b (f(x))^2 \, dx = 8 \), and \( \int_a^b (g(x))^2 \, dx = 2 \). Find the following definite integrals.
   a. \( \int_a^b (f(x) + g(x)) \, dx \)
   b. \( \int_a^b (f(x))^2 \, dx \)
   c. \( (\int_a^b f(x) \, dx)^2 \)
   d. \( \int_a^b (cg(x))^2 \, dx \) (\( c \) is a constant)

3. Given the values of the derivative \( f'(x) \) in the table and \( f(0) = 100 \), estimate \( f(x) \) for \( x = 2, 4, 6 \). (That is, estimate \( f(2), f(4), f(6) \).)

   \[
   \begin{array}{c|c|c|c|c}
   x & 0 & 2 & 4 & 6 \\
   \hline
   f'(x) & 10 & 18 & 23 & 25 \\
   \end{array}
   \]

4. Find the following indefinite integrals (that is, find the most general antiderivative for each given function).
   a. \( \int (\frac{1}{x} + \frac{3}{x}) \, dz \)
   b. \( \int (e^t + \pi \sin t) \, dt \)