1. Find the following indefinite integrals:

   (a) \( \int (3x^2 + 1) \, dx \)

   (b) \( \int (4e^x + \frac{2}{x}) \, dx \)

   (c) \( \int (\sqrt{x} - x^{-3}) \, dx \)

   (d) \( \int x^3 e^{-x^4} \, dx \)

   (e) \( \int x^2 (x^3 + 2)^9 \, dx \)

   (f) \( \int \frac{(\ln x)^3}{x} \, dx \)
2. Find the following definite integrals:

(a) \( \int_0^3 (4x^3 + 6x + 5) \, dx \)

(b) \( \int_1^2 \frac{1}{x+1} \, dx \)

(c) \( \int_0^4 xe^{x^2+1} \, dx \)

3. Find the area of the region bounded by the graphs of the functions \( f(x) = 8 - x^2 \) and \( g(x) = x \) and the vertical lines \( x = 0 \) and \( x = 2 \).

4. Find the average value of the function \( \sqrt{3x+1} \) over the interval \([0, 5]\).
5. The velocity of a car (in ft/sec) t seconds after starting from rest is given by the function $f(t) = 4t$, $0 \leq t \leq 20$. At $t = 0$, the car is at the origin. Find the car’s position at any time $t$ on the interval $[0, 20]$.

6. Suppose that an investment is expected to generate an income stream at the rate of $R(t) = 300,000$ dollars per year for the next 10 years. Find the present and future values of the income stream during the next 10 years if the interest rate is 9% per year compounded continuously.