1. Find each indefinite integral

(a) \( \int (x^2 + x + 1 + x^{-1} + x^{-2}) \, dx \)  

(b) \( \int \left( 10\sqrt{t^2} + \frac{2}{\sqrt{t^2}} \right) \, dt \)

(c) \( \int (5e^{0.02t} - 2e^{0.001t}) \, dt \)

2. A colony of bacteria is of size \( S(t) = 300e^{0.1t} \) after \( t \) hours. Find the average size during the first 12 hours (that is, from \( t = 0 \) to \( t = 12 \)).
3. A real estate investment, originally worth $5000, grows at the rate of \(4000e^{0.05t}\) dollars per year, where \(t\) is the number of years since the investment was made.

a. Find a formula for the value of the investment after \(t\) years.

b. Use your formula to find the value of the investment after 20 years.

4. Evaluate each integral

(a) \(\int_{-1}^{1} 5e^{-x} \, dx\)

(b) \(\int_{1}^{e} 2x^{-1} \, dx\)
6. Find the area bounded by the curves $y = x^2 - 4$ and $y = 8 - 2x^2$.

7. If the demand function is $d(x) = 200e^{-0.01x}$, find the consumers’ surplus at the demand level $x = 100$.