

Section 5.4: Indefinite Integrals & the Net Change Theorem

Problem 1. Find the general indefinite integrals and evaluate the definite integral.

$$(a) \int (2 + 3^x) dx, \quad (b) \int \left(\frac{1+r}{r} \right)^2 dr, \quad (c) \int_0^{1/\sqrt{3}} \frac{t^2 - 1}{t^4 - 1} dt.$$

Problem 2. The velocity function in (m/s) for a particle moving along a line is given by

$$v(t) = t^2 - 2t - 3.$$

- (a) Find the displacement of the particle during the given time interval.
- (b) Find the distance traveled by the particle during the given time interval.

Problem 3. A bacterial population is 4000 at time $t = 0$ and its rate of growth is $1000 \cdot 2^t$ bacteria per hour after t hours. What is the population after one hour?