MATH 110 Lecture 4.4

Indefinite Integrals and the Net Change Theorem

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Examples and Exercises

Examples

1. Find the general indefinite integral.
   1.1 $\int (u+2)(3u+1)\,du$
   1.2 $\int \frac{\sin 2x}{\sin x}\,dx$
2. Evaluate the integral.
   2.1 $\int_1^2 \left(\frac{1}{x^2} - \frac{4}{x^3}\right)\,dx$
   2.2 $\int_0^{\pi/3} \frac{\sin\theta + \sin\theta \tan^2\theta}{\sec^2\theta}\,d\theta$
3. The current in a wire at any time is defined as the derivative of the charge with respect to time: $I(t) = Q'(t)$. What does $\int_a^b I(t)\,dt$ represent?
4. The velocity function of a particle moving on a line is $v(t) = t^2 - 2t - 3$, $2 \leq t \leq 4$. Find the displacement and the distance travelled by the particle in the given time interval.

Exercises

Now you should work on Problem Set 4.4. After you have finished it, you should try the following additional exercises from Section 4.4:

4.4 C-level: 1–42, 47–58
B-level: 45–46, 59–60
A-level: 61–68