Math 220 - Calculus f. Business and Management - Worksheet 31

Worksheet 31 - Indefinite Integrals

Exercise 1:

Find the indefinite integrals of each of these functions

$$\textbf{1a}: f(x) = 3x \quad \textbf{1b}: f(x) = \sqrt{x} \quad \textbf{1c}: f(x) = x^2 + 2x + 5 \quad \textbf{1d}: f(x) = 3/\sqrt{x} \quad \textbf{1e}: f(x) = 4e^x$$

$$\textbf{1f}: f(x) = \frac{1}{3} + 3x - x^3 + \sqrt[3]{x} \quad \textbf{1g}: f(x) = \frac{1 - 3\sqrt[3]{u}}{u^2}$$

Exercise 2: Find the specific solution $F(x) = \int (2x + 3)\,dx$ that satisfies the condition $F(2) = 5$.

Exercise 3: Find $f(x)$ given that $f'(x) = 2 + 3/x$ and $f(1) = 4$.

Exercise 4: Solve the following three position/velocity/acceleration problems. Note that 4a, 4b and 4c are entirely separate problems!

The first two problems deal with a falling body. Its acceleration caused by gravity is $-9.8m/sec^2$. (Note: acceleration is negative because it is pulling the body down. Positive velocity means something is going up).

4a: If an object is thrown upward (from the ground) with a velocity of $15m/sec$, what will its velocity be after 2 seconds? Hint: acceleration is the derivative of velocity, so velocity is the integral of acceleration.

4b: Joan is on a platform 20 meters above the ground. How far above the ground will she be 2 seconds after she jumps? Hint: position is the integral of velocity.

4c: An object is moving with an initial position of $28m$ from the origin with an intial velocity of $-4m/sec$ and constant acceleration of $8m/sec^2$.

    How fast is the body moving after 2 seconds?
    What is its position 3 seconds after the start?
    When will it be $36m$ from the origin?

Exercise 5: Solve these cost/revenue/profit questions.

5a): The marginal revenue from selling item number x is $6 + 2x + 1/x^2$. The revenue from selling one item is $\$40.00$. Find the revenue function.

5b): b) The marginal cost from selling the item x is $4 + x + 2/x^3$. The cost to produce one item is $\$30.00$. Find the cost function.

5c): c) Use the information from a) and b) to find the profit function.