Session #27 Antidifferentiation

1. **Specify three different functions that have as their derivative $f(x) = 6x^2+10x+5$**

2. **Specify a rule for the function F such that $F(0) = 10$ and $F'(x) = 6x^2+10x+5$.**

If $F'(x) = f(x)$ the $F(x)$ is called an *antiderivative* of f.

3. **What do we know about two functions F and G that have the same derivative?**

The collection of all antiderivatives of a function f(x) is called the *indefinite integral of f(x)* and is denoted by $\int f(x)dx$.

If we know one function F(x) for which $F'(x) = f(x)$, then $\int f(x)dx = F(x) + C$ where C is a arbitrary constant and is called the *constant of integration*.

From what we observed in 1 and 2 above, $\int (6x^2 + 10x + 5)\,dx = 2x^3 + 5x^2 + 5x + C$.

4. **Find $\int (3x^2 + 4x - 3)\,dx$**

5. **Find $\int 100e^{0.10x}\,dx$**

6. **Find the revenue function R(x) if marginal revenue is $R'(x) = 2x - 10$ and of course $R(0) = 0$.**

7. **Suppose a velocity function is given by $v(t) = s'(t) = 32t$ for $0 \leq t \leq 3$. Find the corresponding distance function s(t) if $s(0) = 0$.**