MATH 112, DERIVATIVES AND INTEGRALS

How to take Derivatives in Math 112

Step 0: Expand, simplify, rewrite powers.

Step 1: Use the three basic derivative rules we have used are:

$$(x^n)' = nx^{n-1},\ (e^x)' = e^x,\ (\ln(x))' = \frac{1}{x}$$

For terms that are more complicated and/or combinations of these rules, we do the following…

Step 1: Identify PRODUCT, QUOTIENT or CHAIN

Product: $(F(x)S(x))' = F(x)S'(x) + F'(x)S(x)$

Quotient: $\left(\frac{N(x)}{D(x)}\right)' = \frac{D(x)N'(x) - N(x)D'(x)}{\left(D(x)\right)^2}$

Chain: $\left(f\left(g(x)\right)\right)' = f'\left(g(x)\right)g'(x)$

If it helps, there are three version of the chain rule in this course:

$$\left(\left(g(x)\right)^n\right)' = n\left(g(x)\right)^{n-1} \cdot g'(x)$$

$$\left(e^{g(x)}\right)' = e^{g(x)} \cdot g'(x)$$

$$\left(\ln\left(g(x)\right)\right)' = \frac{1}{g(x)} \cdot g'(x)$$

Integrate in Math 112

Step 0: Expand, simplify, rewrite powers.

Step 1: Identify the following:

$$\int x^n\,dx = \frac{1}{n+1}x^{n+1} + C \quad (n \neq -1)$$

$$\int \frac{1}{x}\,dx = \ln(x) + C$$

$$\int e^{ax}\,dx = \frac{1}{a}e^{ax} + C$$

$$\int k\,dx = kx + C$$

Step 2: Check by differentiating. Done!!