Clase 9 **Fecha:24/11/2020**

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Plan.

Integral Por partes

Revisión de notas + Proyecto

Integración por Partes

$$\int u\,dv = uv - \int v\,du$$

Donde **u** y **v** son funciones continuas

Ejemplo $\int xe^{2x}\,dx$

$u = x \qquad dv = e^{2x}$

$x = dx \qquad v = \frac{e^{2x}}{2}$

$$\int u\,dv = u\cdot v - \int \frac{e^{2x}}{2}\,dx$$

$$xe^{2x} = \frac{xe^{2x}}{2} - \int \frac{e^{2x}}{2}\,dx$$

$$xe^{2x} = \frac{1}{2}xe^{2x} - \frac{1}{4}e^{2x} + c$$

derivar $u = x$ $\quad du = dx$

Integrar $dv = \sec^2(x)$ $\quad v = \tan(x)$

$$\int x\sec^2(x)\,dx$$

$$\int u\,dv = uv - \int v\,du$$

$$\sec^2(x)\,dx = x\tan(x) - \int \tan(x)\,dx$$

$$\sec^2|x|\,dx = x\tan(x) - \ln|\sec(x)| + c$$

$$\int \frac{x^2 e^{2x}}{2} dx$$

$$x^2 \; e^{2x} dx$$

$$x\left(x^2 \frac{e^{2x}}{2} - \int \frac{e^{2x}}{2} 2x \, dx\right)$$

$$\left(x^2 \frac{e^{2x}}{2} - \int x e^{2x} dx\right)$$

$$\left(x^2 \frac{e^{2x}}{2} - \left(x \frac{e^{2x}}{2} - \int \frac{e^{2x}}{2} dx\right)\right.$$

$$\frac{1}{2}\left(x^6 \frac{e^{2x}}{2} - \left(x \frac{e^{2x}}{2} \cdot \frac{1}{2} \cdot \frac{1}{1} e^{2x}\right)\right.$$

$$\frac{x^2 e^{2x} - x e^{2x}}{4} + \frac{e^{2x}}{8}$$

$$\int e^x \cos(x) \, dx$$

$$\int e^x \cos(x) dx = e^x \operatorname{sen}(x) - \left(-e^x \cos(x) - \left(-\int e^x \cos(x) dx\right)\right)$$

$$= \int \frac{e^x \operatorname{sen}(x)}{2} + \frac{e^x \cos(x)}{2}$$

$$= \int \frac{e^x \operatorname{sen}(x)}{2} + \frac{e^x \cos(x)}{2} + c$$

$$\int \sec^3(x) dx = \int \sec^2(x) \sec(x) dx$$

$$\frac{1}{2}\sec(x)\tan(x) + \frac{1}{2}\ln|\tan(x) + \sec(x)| + c = \int \sec^2(x)\sec(x) dx$$

$$\frac{1}{2}\sec(x)\tan(x) + \frac{1}{2}\ln|\tan(x) + \sec| + c =$$

$$= \left(\frac{1}{2}\sec(x)\tan(x) + \frac{1}{2}\ln|\tan(x) + \sec(x)| + c\right)$$