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Nombre del profesor: Juan José Ojeda

Nombre del trabajo: Examen

Materia: Matemáticas Aplicada

Grado: 6° Cuatrimestre

Grupo: Recursos Humanos

1- $\int sen^2 x \, dx$

$$\int \frac{1-\cos(2x)}{2} \, dx$$

$$= \frac{1}{2} \int 1 - \cos(2x) \, dx$$

$$= \frac{1}{2} \int 1 dx - \int \cos(2x) \, dx$$

$$= \frac{1}{\cancel{2}} \left(x - \frac{sen(2x)}{2} \right)$$

$$= \frac{1}{2} x - \frac{sen(2x)}{4}$$

$$= \frac{1}{2} x - \frac{sen(2x)}{4} + C$$

2- $\int sen^3\left(\frac{x}{3}\right) dx$

$\int 3\, sen(t)^3\, dt$

$3\int sen(t)^3\, dt$

$3\int sen(t)^2\, sen(t)\, dt$

$3\int -1 + u^2\, du$

$3\left(-\int 1\, du + \int u^2\, du\right.$

$= 3\left(-u + \frac{u^3}{3}\right)$

$= 3\left(-\cos(t) + \frac{\cos(t)^3}{3}\right)$

$= 3\left(-\cos\left(\frac{x}{3}\right) + \frac{\cos\left(\frac{x}{3}\right)^3}{3}\right)$

$= -3\cos\left(\frac{x}{3}\right) + \cos\left(\frac{x}{3}\right)^3$

$= -3\cos\left(\frac{x}{3}\right) + \cos^3\left(\frac{x}{3}\right) + C$

3- $\int sen^2 x + cos^2 x \, dx$

$\int 1 \, dx$

$= x$

$= x + C$ //

4- $\int cos^3 \left(\frac{2x}{3}\right) dx$

$\int \frac{3 \cos(t)^3}{2} dt$

$\frac{3}{2} \int \cos(t)^3 \, dt$

$\frac{3}{2} \int \cos(t)^2 \cos(t) \, dt$

$\frac{3}{2} \int 1 - u^2 \, du$

$\frac{3}{2} \int 1 \, du - \int u^2 du$

$= \frac{3}{2} \left(u - \frac{u^3}{3}\right)$

$= \frac{3}{2} \left(sen(t) - \frac{sen(t)^3}{3}\right)$

$= \frac{3}{2} \left(sen\left(\frac{2x}{3}\right) - \frac{sen\left(\frac{2x}{3}\right)^3}{3}\right)$

$= \frac{3 \, sen\left(\frac{2x}{3}\right) - sen^3\left(\frac{2x}{3}\right)}{2} + C$ //

5- $\int \sec^4 2x \, dx$

$\int \frac{\sec(t)^4}{2} \, dt$

$\frac{1}{2} \int \sec(t)^4 \, dt$

$= \frac{1}{2} \left(\frac{1}{3} \sec(t)^2 \tan(t) + \frac{2}{3} \int \sec(t)^2 \, dt \right)$

$= \frac{1}{2} \left(\frac{1}{3} \sec(t)^2 \tan(t) + \frac{2}{3} \tan(t) \right)$

$= \frac{1}{2} \left(\frac{1}{3} \sec(2x)^2 \tan(2x) + \frac{2}{3} \tan(2x) \right)$

$= \frac{\operatorname{sen}(2x)}{6 \cos^3(2x)} + \frac{\operatorname{sen}(2x)}{3 \cos(2x)} + C$

6- $\int (2x^2 - 5x + 3)^3 \, dx$

$\int 8x^6 - 125x^3 + 27 - 60x^5 + 36x^4 + 150x^4 + 225x^2 + 54x^2 + 135x - 180x^3 \, dx$

$\int 8x^6 - 305x^3 + 27 - 60x^5 + 186x^4 + 279x^2 - 135x \, dx$

$\int 8x^6 dx - \int 305x^3 dx + \int 27 dx - \int 60x^5 dx + \int 186x^4 dx + \int 279x^2 dx - \int 135x \, dx$

$= \frac{8x^7}{7} - \frac{305x^4}{4} + 27x - 10x^6 + \frac{186x^5}{5} + 93x^3 - \frac{135x^2}{2} + C$

7- $\int \frac{(x^3 + 5x^2 - 4)}{x^2} \, dx$

$\int \frac{x^3}{x^2} + \frac{5x^2}{x^2} - \frac{4}{x^2} \, dx$

$\int x + 5 - \frac{4}{x^2} \, dx$

$\int x \, dx + \int 5x \, dx - \int \frac{4}{x^2} \, dx$

$= \frac{x^2}{2} + 5x + \frac{4}{x} + C$

8- $\int \frac{x^2}{4\sqrt{x^3+2}}\, dx$

$\frac{1}{4}\int \frac{x^2}{\sqrt{x^3+2}}\, dx$

$= \frac{1}{4}\left(\frac{2}{3}+\right)$

$= \frac{1}{4}\left(\frac{2}{3}\right)\left(\sqrt{x^3+2}\right)$

$= \frac{1}{6}\left(\sqrt{x^3+2}\right) + C$

10- $\int \frac{(1+x)^2}{\sqrt{x}} \, dx$

$$\int \frac{1+2x+x^2}{x^{1/2}} \, dx$$

$$\int \frac{1}{x^{1/2}} + \frac{2x}{x^{1/2}} + \frac{x^2}{x^{1/2}} \, dx$$

$$\int \frac{1}{x^{1/2}} \, dx + \int \frac{2x}{x^{1/2}} \, dx + \int \frac{x^2}{x^{1/2}} \, dx$$

$$= 2\sqrt{x} + \frac{4x\sqrt{x}}{3} + \frac{2x^2\sqrt{x}}{5} + C$$