UDS UNIVERSIDAD DEL SURESTE

"Pasión por educar"

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MATERIA:EXAMEN FINAL DE MATEMATICAS APLICADA.

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EXAMEN FINAL

1. $\int \operatorname{sen}^{-1} 3x^2\,dx = \sqrt{1-(3)^2(x^2)} + x^2 \operatorname{sen}^{-1}(3x^1) + c$

$= \frac{\sqrt{1-9x^4}}{3} + \frac{x^2}{\operatorname{sen} 3x^2}$

$= \sqrt{1/3 - 3x^4} + \frac{x^2}{\operatorname{sen} 3x^2} + c$

2. $\int \cos^{-1} 5x\,dx = x\cos^{-1}(5x) - \frac{\sqrt{1-(5)^2(x)^2}}{5} + c.$

$= \frac{x}{\cos 5x} - \frac{\sqrt{1-25x^2}}{5} + c$

$= \frac{x}{\cos 5x} - \sqrt{1/5 - 25x^2} + c$

3. $\int \tan^{-1} 1/x^2\,dx = x^2 \tan^{-1}(1/x^2) - \frac{\ln|(1)^2(x^2)^2+1|}{2(1)} + c$

$\frac{x^2}{\tan 1/x^2} - \frac{\ln|1x^4+1|}{2} + c$

4. $\int \cos^3 2x/3\, dx = \int \cos 2x/3 \times \cos^2 2/3x$ → $\sin^2 x + \cos^2 x = 1$, $\cos^2 x = 1 - \sin^2 x$

$= \int \cos 2/3\, x\,(1 - \sin^2 2/3\, x)\, dx$

$= \int \cos 2/3\, x\, dx - \int \sin 2/3\, x \cos 2/3\, x\, dx$ → $\int \cos v\, dv = \sin v$

$= 2/3 \int \cos 2/3\,(2'dx) - 2/3 \int \sin^2 2/3\, x \cos 2/3\, x\, 2dx$

→ $\int v^n\, dv = \frac{v^{n+1}}{n+1}$ $\quad v = \sin 2x$, $dv = \cos 2/3\, x\, 2dx$

$= 2/3 \sin 2x - 2/3 \frac{\sin^3 2x}{3} + C$

5. $\int \sec^4 2x\, dx = \int \sec^2 v\, dv = \tan^2 v + 1$

$\sec^2 2x \sec^2 2x\, dx$

$= \int (\tan^2 2x + 1) \sec^2 2x\, dx$

$= \int \tan^2 2x \sec^2 2x\, dx + \int \sec^2 x\, dx$ → $\int \sec^2 v\, dv = \tan v$

$v = 2x$, $dv = 2dx$, $\frac{dv}{2} = dx$

$\int v^n\, dv = \frac{v^{n+1}}{n+1}$

$v = \tan 2x$

$dv = 2 \sec^2 2x\, dx$

$\frac{dv}{2} = \sec^2 2x\, dx$

$= \int v^2 \frac{dv}{2} + \int \sec^2 v \frac{dv}{2} = 1/2 \int v^2 dv + 1/2 \int \sec^2 v\, dv$

$= 1/2 (1/3) + 1/2 \tan v + c = 1/6\, v^3 + 1/2 \tan v + c$

$= 1/6 \tan^3 2x + 1/2 \tan 2x + C.$

Norma

6. $\csc^{-1} 2x^2 dx$ $\ln|2\sqrt{(2)^2(x)^2-1}/(2x^2)| + x^2(2x^2) + C$

$= \ln|2\sqrt{4x^4-1}/2x^2| + \frac{x^2}{\csc 2x^2} + C$

$\ln|\sqrt{2x^4-1}+x^2| + \frac{x^2}{\csc 2x^2} + C$

7. $\cot^{-1}\sqrt{2}x\,dx = \ln\left|\frac{(\sqrt{2})^2(x)^2+1}{2(\sqrt{2})}\right| + x\cot^{-1}(\sqrt{2}x) + C$

$= \ln\left|\frac{2x^2+1}{2.82}\right| + \frac{x}{\cot\sqrt{2}x} + C$

8. $\int \operatorname{sen}^{-1}\sqrt{2}x^2\,dx = \sqrt{1-(\sqrt{2})^2(x^2)^2} + x^2\operatorname{sen}^{-1}(\sqrt{2}x^2) + C$

$\frac{\sqrt{1-2x^4}}{1.41} + \frac{x^2}{\operatorname{sen}\sqrt{2}x^2} + C$

9. $\int \operatorname{senh} 1/x^2\,dx$

$y = \operatorname{senh}'(x/2) + x^{1/2} = \frac{2x}{\sqrt{1+(x/2)^2}} = \frac{2x}{2\sqrt{6x^2}} = \operatorname{sen} h(x/2)$

$+\frac{x}{\sqrt{6x^2}} - \frac{x}{\sqrt{6x^2}} = \operatorname{sen} h^2(x)$

10. $\int \operatorname{senh}^2 x\,dx = \int \frac{(ex-e^{-x})}{2} dx$

$= \int \frac{(ex-e^{-x})^2}{4} dx - 1/4 \int (ex)^2 - 2 + (e^{-x})^2 dx$

$= 1/4 \int e^{2x} - 2 + e^{-2x}\,dx$

$= 1/4 (1/2\, e^2 x 2x - 1/2\, e^{-2x}) + C$

$= 1/2\, x + 1/4 \left(\frac{e^{2x}-e^{-2x}}{2}\right) + C$