NOMBRE DEL ALUMNO: CARLOS ANDRES AGUILAR AGUILAR

GRADO:6 TO GRUPO: A

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TEMA: INTEGRALES

MATEMATICAS APLICADA

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EXAMEN

06/JULIO/2020

CARLOS ANDRÉS AGUILAR AGUILAR

1o $\int \operatorname{SEN}^{-1} 3x^2 \, dx \longrightarrow \int x^a dx = \frac{x^{a+1}}{a+1} = a \neq -1$

$= \operatorname{ARCSEN} 3 \int x^2 dx$

$\operatorname{ARCSEN} 3 \; \frac{x^{2+1}}{2+1} = \boxed{\frac{1}{3} \operatorname{ARCSEN} 3x^3 + C}$

2o $\int \operatorname{COS}^{-1} 5x \, dx$

$\operatorname{ARCCOS} 5x - \int \frac{-5x}{\sqrt{1-25x^2}} dx$

$\longrightarrow \int \frac{-5x}{\sqrt{1-25x^2}} dx = \frac{1}{5}\sqrt{1-25x^2}$

$= \boxed{\operatorname{ARCCOS} 5x - \frac{1}{5}\sqrt{1-25x^2} + C}$

3.- $\int \tan^{-1} \frac{1}{x^2}\, dx$

$u = \arctan \frac{1}{x^2}$, $v = 1$

$= x\arctan\left(\frac{1}{x^2}\right) - \int \frac{-2x^2}{1+x^4}\, dx$

$\longrightarrow \int \frac{-2x^2}{1+x^4}\, dx = -2\Big[-\frac{1}{4\sqrt{2}}\Big(\ln\Big(\ln 2x^2$

$+ 2\sqrt{2x}+2\Big| - 2\arctan(\sqrt{2}x+1)$

$+ \frac{1}{4\sqrt{2}}$ = Simplifico

$\int \arctan\left(\frac{1}{x^2}\right) dx = x\arctan\left(\frac{1}{x^2}\right) + 2\Big(-\frac{1}{4\sqrt{2}}\Big(\ln|2x^2$

$+ 2\sqrt{2x}+2| - 2\arctan(\sqrt{2x}+1) + \frac{1}{4\sqrt{2}}$

$\Big(\ln|2x^2 - 2\sqrt{2x}+2| + 2\arctan(\sqrt{2x}-1)\Big) + C$

$4.\int \frac{\cos^3 2x}{3}\, dx$

$\frac{1}{3}\int \frac{\cos^3 2x}{3}\, dx = \frac{1}{3}\int \cos^3 2x\, dx = u = 2x$

$\frac{1}{3}\int \cos^3 \frac{1}{2} u\, du = \frac{1}{3}\cdot\frac{1}{2}\int \cos^3 \frac{1}{2} u\, du$

$\frac{1}{6}\int \cos^2 u \cos u\, du$

IDENTIDAD TAM: $\cos^2 x = 1 - \operatorname{sen}^2 x \quad u = \operatorname{sen} u$

$\frac{1}{6}\left(\operatorname{sen} 2x - \frac{\operatorname{sen}^3 2x}{3}\right)$

$\frac{1}{6}\left(\operatorname{sen} 2x - \frac{\operatorname{sen}^3 2x}{3}\right) + C$

$5.\int \sec^4 2x\, dx \qquad u = 2x$

$\int \sec^4 u \frac{1}{2}\, du = \frac{1}{2}\int \sec^4 u\, du$

$\int \sec^4 u\, du = \int \operatorname{sen}^2 u \sec^2 u\, du$

7. $\int \cot^{-1}\sqrt{2}\,x\,dx$ $\quad u = \text{arccot}\sqrt{2}x$

$v = 1$

$\text{arccot}\sqrt{2}x - \int -\frac{\sqrt{2}x}{2x^2+1}$

$\int \frac{-\sqrt{2}x}{2x^2+1}\,dx = \frac{1}{2\sqrt{2}}\ln|2x^2+1|$

$\text{arccot}(2x) - \left(-\frac{1}{2\sqrt{2}}\ln|2x^2+1|\right)$

$\text{arccot}\sqrt{2}x + \frac{1}{2\sqrt{2}}\ln|2x^2+1| + C$

8. $\int \text{sen}^{-1}\sqrt{2}\,x^2\,dx$

$\text{arcsen}(\sqrt{2})x^2\,dx \longrightarrow \text{arcsen}\sqrt{2}x\int x^2$

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

9. $\int \frac{\operatorname{Senh} 1}{x^2}\, dx$

$\operatorname{Senh}(1) \cdot \int \frac{1}{x^2}\, dx \quad \operatorname{Senh}(1) = \frac{-1+e^2}{2e}$

$\operatorname{Senh}(1) = \frac{-1+e^2}{2e} \cdot \int x^{-2}\, dx$

$= \left\{ \frac{-1+e^2}{2ex} + C \right\}$

10. $\int \operatorname{Senh}^2 x\, dx \longrightarrow \operatorname{Senh}^2(x) =$

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

$\frac{1}{2} \cdot \int -1 + \cosh(2x)\, dx$

$\frac{1}{2}\left(-1\, dx + \int \cosh(2x)\, dx \right)$

$$\int \cosh(2x)\,dx = \frac{1}{2}\,\text{Senh}(2x)$$

$$\frac{1}{2}\left(-x + \frac{1}{2}\,\text{Senh}(2x)\right) + C$$