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MATEMATICAS

FORMULARIO

Integrales de funciones trigonométricas inversas

$$\int \frac{1}{\sqrt{1-x^2}} dx = \text{arc sen } x + C$$

$$\int \frac{u'}{\sqrt{1-u^2}} dx = \text{arc sen } u + C$$

$$\int \frac{1}{1+x^2} dx = \text{arc tg } x + C$$

$$\int \frac{u'}{1+u^2} dx = \text{arc tg } u + C$$

Teorema:

- (i) $\int \frac{du}{\sqrt{a^2-u^2}} = \text{sen}^{-1} \frac{u}{a} + c, \quad a > 0$
- (ii) $\int \frac{du}{a^2+u^2} = \frac{1}{a} \text{tan}^{-1} \frac{u}{a} + c, \quad a \neq 0$
- (iii) $\int \frac{du}{u\sqrt{u^2-a^2}} = \frac{1}{a} \text{sec}^{-1} \frac{u}{a} + c, \quad a > 0$

EJERCICIOS RESUELTOS

$$1. \int \frac{9dx}{9x^2+1}$$

Solución:

$$\int \frac{9dx}{9x^2+1} = 3 \int \frac{3dx}{(3x)^2+1};$$

$$\therefore \int \frac{9dx}{9x^2+1} = 3 \tan^{-1}(3x) + c \quad \{\text{aplicando la parte (ii) del Teorema}\}.$$

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

Solución:

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

$$\Rightarrow \int \frac{dx}{x^2+x+1} = \frac{1}{\frac{\sqrt{3}}{2}} \tan^{-1} \frac{x+\frac{1}{2}}{\frac{\sqrt{3}}{2}} + c \quad \{\text{aplicando la parte (ii) del Teorema}\};$$

$$\therefore \int \frac{dx}{x^2+x+1} = \frac{2\sqrt{3}}{3} \tan^{-1} \frac{\sqrt{3}(2x+1)}{3} + c.$$