

CPUCalle Mercado # 555
Teléfono 3 -366191

Integrales Trigonométricas

$$\int \text{sen}^{\text{par}} x \, dx \Rightarrow \text{sen}^2 x = \frac{1 - \cos 2x}{2}$$

$$\int \text{cos}^{\text{par}} x \, dx \Rightarrow \text{cos}^2 x = \frac{1 + \cos 2x}{2}$$

$$\int \text{sen}^{\text{impar}} x \, dx = \int \text{sen}^{\text{par}} x \cdot \text{sen} x \, dx \Rightarrow \begin{cases} \text{sen}^2 x = 1 - \text{cos}^2 x \\ u = \text{cos} x \\ -du = \text{sen} x \, dx \end{cases}$$

$$\int \text{cos}^{\text{impar}} x \, dx = \int \text{cos}^{\text{par}} x \cdot \text{cos} x \, dx \Rightarrow \begin{cases} \text{cos}^2 x = 1 - \text{sen}^2 x \\ u = \text{sen} x \\ du = \text{cos} x \, dx \end{cases}$$

$$\int \text{tan}^{\text{par}} x \, dx = \int \text{tan}^{2n} x \cdot \text{tan}^2 x \, dx = \int \text{tan}^{2n} x \cdot (\text{sec}^2 x - 1) \, dx \\ = \int \text{tan}^{2n} x \cdot \text{sec}^2 x \, dx - \int \text{tan}^{2n} x \, dx \\ \begin{matrix} u = \text{tan} x \\ du = \text{sec}^2 x \, dx \end{matrix}$$

$$\int \text{cot}^{\text{par}} x \, dx = \int \text{cot}^{2n} x \cdot \text{cot}^2 x \, dx = \int \text{cot}^{2n} x \cdot (\text{csc}^2 x - 1) \, dx \\ = \int \text{cot}^{2n} x \cdot \text{csc}^2 x \, dx - \int \text{cot}^{2n} x \, dx \\ \begin{matrix} u = \text{cot} x \\ du = -\text{csc}^2 x \, dx \end{matrix}$$

$$\int \text{tan}^{\text{impar}} x \, dx = \int \text{tan}^{2n} x \cdot \text{tan} x \, dx = \int (\text{sec}^2 x - 1)^n \cdot \text{tan} x \, dx \\ \begin{matrix} u = \text{sec} x \\ du = \text{sec} x \cdot \text{tan} x \, dx \end{matrix}$$

$$\int \text{cot}^{\text{impar}} x \, dx = \int \text{cot}^{2n} x \cdot \text{cot} x \, dx = \int (\text{csc}^2 x - 1)^n \cdot \text{cot} x \, dx \\ \begin{matrix} u = \text{csc} x \\ du = -\text{csc} x \cdot \text{cot} x \, dx \end{matrix}$$

$$\int \text{sec}^{\text{impar}} x \, dx = \int \underbrace{\text{sec}^n x}_u \cdot \underbrace{\text{sec}^2 x}_{dv} \, dx \Rightarrow \text{integrar por partes}$$

$$\int \text{csc}^{\text{impar}} x \, dx = \int \underbrace{\text{csc}^n x}_u \cdot \underbrace{\text{csc}^2 x}_{dv} \, dx \Rightarrow \text{integrar por partes}$$

$$\int \text{sec}^{\text{par}} x \, dx = \int \text{sec}^{2n} x \cdot \text{sec}^2 x \, dx = \int (1 + \text{tan}^2 x)^n \cdot \text{sec}^2 x \, dx \\ \begin{matrix} u = \text{tan} x \quad \wedge \quad du = \text{sec}^2 x \, dx \end{matrix}$$

$$\int \text{csc}^{\text{par}} x \, dx = \int \text{csc}^{2n} x \cdot \text{sec}^2 x \, dx = \int (1 + \text{cot}^2 x)^n \cdot \text{csc}^2 x \, dx \\ \begin{matrix} u = \text{cot} x \quad \wedge \quad du = -\text{csc}^2 x \, dx \end{matrix}$$

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$$\int (\text{sen}^{\text{par}} x) \cdot (\text{cos}^{\text{impar}} x) \, dx \Rightarrow \begin{cases} u = \text{sen} x \\ du = \text{cos} x \, dx \\ \text{cos}^2 x = 1 - \text{sen}^2 x \end{cases}$$

$$\int (\text{sen}^{\text{impar}} x) \cdot (\text{cos}^{\text{par}} x) \, dx \Rightarrow \begin{cases} u = \text{cos} x \\ -du = \text{sen} x \, dx \\ \text{sen}^2 x = 1 - \text{cos}^2 x \end{cases}$$

$$\int (\text{sen}^{\text{impar}} x) \cdot (\text{cos}^{\text{impar}} x) \, dx \Rightarrow \text{Cualquiera}$$

$$\int (\text{sen}^{\text{par}} x) \cdot (\text{cos}^{\text{par}} x) \, dx \Rightarrow \begin{cases} \text{sen}^2 x = \frac{1 - \cos 2x}{2} \\ \text{cos}^2 x = \frac{1 + \cos 2x}{2} \end{cases}$$

$$\int \text{cot}^{\text{impar}} x \cdot \text{csc}^{\text{par}} x \, dx \Rightarrow \begin{cases} u = \text{cot} x \\ du = -\text{csc}^2 x \, dx \\ \text{csc}^2 x = \text{cot}^2 x + 1 \end{cases}$$

$$\int \text{cot}^{\text{par}} x \cdot \text{csc}^{\text{par}} x \, dx \Rightarrow \begin{cases} u = \text{csc} x \\ du = -\text{csc} x \cdot \text{cot} x \, dx \end{cases}$$

$$\int \text{cot}^{\text{par}} x \cdot \text{csc}^{\text{par}} x \, dx \Rightarrow \begin{cases} \text{cot}^2 x = \text{csc}^2 x - 1 \\ \text{Integrar por partes} \end{cases}$$

alternativo

$$\text{cuando "cot}^{\text{impar}} x" \Rightarrow \begin{cases} \text{cot} x = \frac{\text{cos} x}{\text{sen} x} \\ \text{csc} x = \frac{1}{\text{sen} x} \end{cases}$$

$$\int \text{sen} ax \cdot \text{cos} bx \, dx = \frac{1}{2} \int [\text{sen}(ax + bx) + \text{sen}(ax - bx)]$$

$$\int \text{sen} ax \cdot \text{sen} bx \, dx = \frac{1}{2} \int [\text{cos}(ax - bx) - \text{cos}(ax + bx)]$$

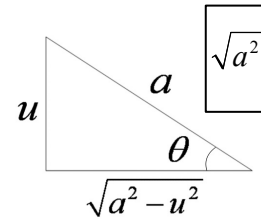
$$\int \text{cos} ax \cdot \text{cos} bx \, dx = \frac{1}{2} \int [\text{sen}(ax - bx) + \text{sen}(ax + bx)]$$

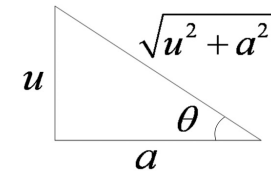
$$\int \text{tan}^{\text{impar}} x \cdot \text{sec}^{\text{par}} x \, dx \Rightarrow \begin{cases} u = \text{tan} x \\ du = \text{sec}^2 x \, dx \\ \text{sec}^2 x = \text{tan}^2 x + 1 \end{cases}$$

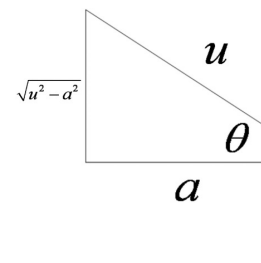
$$\int \text{tan}^{\text{impar}} x \cdot \text{sec}^{\text{impar}} x \, dx \Rightarrow \begin{cases} u = \text{sec} x \\ du = \text{sec} x \cdot \text{tan} x \, dx \end{cases}$$

$$\int \text{tan}^{\text{par}} x \cdot \text{sec}^{\text{impar}} x \, dx \Rightarrow \begin{cases} \text{tan}^2 x = \text{sec}^2 x - 1 \\ \text{Integrar por partes} \end{cases}$$

Sustituciones Trigonométricas


$$\sqrt{a^2 - u^2} \Rightarrow \begin{cases} \sqrt{a^2 - u^2} = a \cos \theta \\ u = a \text{sen} \theta \end{cases}$$


$$\sqrt{u^2 + a^2}$$


$$\sqrt{u^2 - a^2} \Rightarrow \begin{cases} \sqrt{u^2 - a^2} = a \tan \theta \\ u = a \text{sec} \theta \end{cases}$$

$$\sqrt{a^2 + u^2} \Rightarrow \begin{cases} \sqrt{a^2 + u^2} = a \text{sec} \theta \\ u = a \tan \theta \end{cases}$$