Clave Sabana de Integrales

(6) $\int \frac{x^2}{x^2+4}\,dx$ hay muchas maneras...

$$\begin{array}{r|l} x^2+4 & 1 \\ \hline -x^2-4 & \\ \hline -4 & \end{array} \Rightarrow \int \left(1 - \frac{4}{x^2+4}\right) dx$$

sabiendo que... $\int \frac{dx}{x^2+a^2} = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + C$

entonces

$$= x - 4\left(\frac{1}{2}\tan^{-1}\left(\frac{x}{2}\right)\right) + C \Rightarrow \boxed{x - 2\tan^{-1}\left(\frac{x}{2}\right) + C}$$

(11) $\int \frac{(\ln x)^9}{x}\,dx$

$$\left.\begin{array}{l} u = \ln x \\ du = \frac{1}{x}\,dx \end{array}\right\} \int u^9\,du \Rightarrow \frac{1}{10}u^{10} = \boxed{\frac{(\ln x)^{10}}{10} + C}$$

(15) $\int (x+1)^3(x-2)\,dx \Rightarrow \int (x^3+3x^2+3x+1)(x-2)\,dx$

$$\Rightarrow \int (x^4 - 2x^3 + 3x^3 - 6x^2 + 3x^2 - 6x + x - 2)\,dx$$

$$\Rightarrow \int (x^4 + x^3 - 3x^2 - 5x - 2)\,dx = \boxed{\frac{1}{5}x^5 + \frac{1}{4}x^4 - x^3 - \frac{5}{2}x^2 - 2x + C}$$

(24) $\int \frac{\operatorname{sen}^3\theta}{(\cos\theta)^{3/2}}\,d\theta = \int \frac{\operatorname{sen}^2\theta \cdot \operatorname{sen}\theta}{\cos^{3/2}\theta}\,d\theta$

$\Rightarrow \int \frac{(1-\cos^2\theta)\operatorname{sen}\theta}{\cos^{3/2}\theta}\,d\theta \Rightarrow -\int \frac{(1-u^2)}{u^{3/2}}\,du$

$u = \cos\theta$

$du = -\operatorname{sen}\theta\,d\theta$

$d\theta = \frac{du}{-\operatorname{sen}\theta}$

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

$\Rightarrow \frac{2}{\sqrt{u}} + \frac{2}{3}u^{3/2} + C \Rightarrow \boxed{\frac{2}{\sqrt{\cos\theta}} + \frac{2}{3}(\cos\theta)^{3/2} + C}$

(27) $\int y\cos y\,dy \Rightarrow y\operatorname{sen} y - \int \operatorname{sen} y\,dy$

$u = y \qquad dv = \cos y\,dy$

$du = dy \qquad v = \operatorname{sen} y$

$\Rightarrow \boxed{y\operatorname{sen} y + \cos y + C}$