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$$d) \int \frac{(x+1)^2}{x^2+1} dx = \int \left(1 + \frac{2x}{x^2+1} \right) dx = \int 1 dx + \int \frac{2x}{x^2+1} dx = x + \text{Ln} |x^2+1| + C$$

$$(x+1)^2 = x^2 + 2x + 1 \rightarrow \frac{(x+1)^2}{x^2+1} = \frac{x^2 + 2x + 1}{x^2+1} = 1 + \frac{2x}{x^2+1}$$

$x^2 + 2x + 1$	$x^2 + 1$
$-x^2 \quad -1$	1
$2x$	

Pág 331, 4 a, b, d, g

$$a) \int \text{sen}^2 x dx = \frac{1}{2}x + \frac{1}{4} \text{sen } 2x + C$$

$$\left. \begin{array}{l} 1 = \text{sen}^2 x + \cos^2 x \\ \cos 2x = \cos^2 x - \text{sen}^2 x \end{array} \right\} \rightarrow \left. \begin{array}{l} 1 = \text{sen}^2 x + \cos^2 x \\ -\cos 2x = -\cos^2 x + \text{sen}^2 x \end{array} \right\}$$

$$1 - \cos 2x = 2 \text{sen}^2 x$$

$$\text{sen}^2 x = \frac{1 - \cos 2x}{2} = \frac{1}{2} - \frac{\cos 2x}{2}$$

$$= \int \left(\frac{1}{2} - \frac{\cos 2x}{2} \right) dx = \int \frac{1}{2} dx - \int \frac{\cos 2x}{2} dx = \frac{1}{2}x - \left(-\frac{1}{4} \text{sen } 2x \right) + C =$$

$$= \left[\frac{1}{2}x + \frac{1}{4} \text{sen } 2x + C \right]$$

$$\int \frac{\cos 2x}{2} dx = \frac{1}{2} \int \cos 2x dx = \left\{ \begin{array}{l} t = 2x \\ dt = 2dx \rightarrow \frac{dt}{2} = dx \end{array} \right\} = \frac{1}{2} \int \cos t \frac{dt}{2} =$$

$$= \frac{1}{4} \int \cos t dt = -\frac{1}{4} \text{sen } t = -\frac{1}{4} \text{sen } 2x$$

$$b) \int \frac{dx}{1+9x^2} = \int \frac{dx}{1+(3x)^2} = \left\{ \begin{array}{l} t = 3x \\ dt = 3dx \rightarrow \frac{dt}{3} = dx \end{array} \right\} = \int \frac{\frac{dt}{3}}{1+t^2} = \frac{1}{3} \int \frac{dt}{1+t^2} =$$

$$= \frac{1}{3} \operatorname{arctg} t + C = \frac{1}{3} \operatorname{arctg} (3x) + C$$

$$d) \int \frac{dx}{25+9x^2} = \int \frac{\frac{1}{25}}{1+\left(\frac{3x}{5}\right)^2} dx = \frac{1}{25} \int \frac{dx}{1+\left(\frac{3x}{5}\right)^2} = \left\{ \begin{array}{l} t = \frac{3x}{5} \\ dt = \frac{3}{5} dx \rightarrow \frac{5dt}{3} = dx \end{array} \right\} =$$

$$\left\{ \frac{1}{25+9x^2} = \frac{\frac{1}{25}}{\frac{25+9x^2}{25}} = \frac{\frac{1}{25}}{1+\frac{9x^2}{25}} = \frac{\frac{1}{25}}{1+\left(\frac{3x}{5}\right)^2} \right\}$$

$$= \frac{1}{25} \int \frac{\frac{5dt}{3}}{1+t^2} = \frac{1}{25} \frac{5}{3} \int \frac{dt}{1+t^2} = \frac{1}{15} \operatorname{arctg} t + C = \frac{1}{15} \operatorname{arctg} \frac{3x}{5} + C$$

$$g) \int \frac{dx}{\sqrt{1-8x^2}} = \int \frac{dx}{\sqrt{1-(\sqrt{8} x)^2}} = \left\{ \begin{array}{l} t = \sqrt{8} x \\ dt = \sqrt{8} dx \rightarrow \frac{dt}{\sqrt{8}} = dx \end{array} \right\} =$$

$$= \int \frac{\frac{dt}{\sqrt{8}}}{\sqrt{1-t^2}} = \frac{1}{\sqrt{8}} \operatorname{arcsen} t + C = \frac{1}{\sqrt{8}} \operatorname{arcsen} (\sqrt{8} x) + C$$