① RELACIÓN INTEGRALES

a) $\int\left(\frac{3}{\sqrt{x}}-\frac{x\sqrt{x}}{4}\right)dx = \int\left(3x^{-1/2}-\frac{1}{4}\cdot x\cdot x^{1/2}\right)dx = 3\int x^{-1/2}dx - \frac{1}{4}\int x^{3/2}dx = 3\cdot\frac{x^{1/2}}{1/2} - \frac{1}{4}\frac{x^{5/2}}{5/2}+k =$

$= 6\sqrt{x} - \frac{2}{4\cdot 5}\sqrt{x^5}+k = 6\sqrt{x} - \frac{1}{10}x^2\sqrt{x}+k$

b) $\int\frac{\ln x}{x}dx = \begin{pmatrix} u=\ln x & du=\frac{dx}{x} \\ dv=\frac{1}{x}dx & v=\ln|x| \end{pmatrix} = (\ln x)^2 - \int \ln|x|\cdot\frac{dx}{x}$

$2\int\frac{\ln x}{x}dx = \ln^2 x \Rightarrow \int\frac{\ln x}{x}dx = \frac{\ln^2 x}{2}+k$

c) $\int\frac{1}{\cos^2 7x}dx = \frac{tg\,7x}{7}+k$

d) $\int tg\,2x\,dx = \int\frac{sen\,2x}{\cos 2x}dx = \begin{pmatrix} t=\cos 2x \\ dt=-sen\,2x\cdot 2\,dx \\ dx=\frac{dt}{-2sen\,2x} \end{pmatrix} = \frac{1}{2}\int\frac{\cancel{sen\,2x}}{t}\cdot\frac{dt}{-\cancel{sen\,2x}} =$

$= -\frac{\ln|t|}{2} = -\frac{\ln|\cos 2x|}{2}+k$

e) $\int\frac{x}{\sqrt{2x^2+3}}dx = \begin{pmatrix} t=2x^2+3 \\ dt=4x\,dx \\ dx=\frac{dt}{4x} \end{pmatrix} = \int\frac{\cancel{x}}{\sqrt{t}}\cdot\frac{dt}{4\cancel{x}} = \frac{1}{4}\int t^{-1/2}dt = \frac{1}{4}\frac{t^{1/2}}{1/2} = \frac{1}{2}\sqrt{2x^2+3}+k$

f) $\int\frac{tg\,x}{\cos^2 x}dx = \begin{pmatrix} \cancel{t=\frac{1}{\cos^2 x}} & t=tg\,x \\ \cancel{dt=} & dt=\frac{1}{\cos^2 x}dx \\ & dx=\cos^2 x\,dt \end{pmatrix} = \int\frac{t}{\cancel{\cos^2 x}}\cdot\cancel{\cos^2 x}\,dt = \frac{t^2}{2} =$

$= \frac{tg^2 x}{2}+k$

②

a) $\int x\sec^2 x\,dx = \begin{pmatrix} u=x & du=dx \\ dv=\sec^2 x\,dx & v=tg\,x \end{pmatrix} = x\cdot tg\,x - \int tg\,x\,dx =$

$= x\,tg\,x - \int\frac{sen\,x}{\cos x}dx = x\,tg\,x + \ln|\cos x|+k$

b) $\int x^2 sen\,x\,dx = \begin{pmatrix} u=x^2 & du=2x\,dx \\ dv=sen\,x\,dx & v=-\cos x \end{pmatrix} = -x^2\cos x + \int 2x\cos x\,dx =$

$= \begin{pmatrix} u=2x & du=2dx \\ dv=\cos x\,dx & v=sen\,x \end{pmatrix} = -x^2\cos x + 2x\,sen\,x - \int 2\,sen\,x\,dx =$

$= -x^2\cos x + 2x\,sen\,x + 2\cos x + k$

c) $\int(x^2-2x+5)e^{-x}dx = \begin{pmatrix} u=x^2-2x+5 & du=(2x-2)dx \\ dv=e^{-x}dx & v=-e^{-x} \end{pmatrix} = -(x^2-2x+5)e^{-x}+$

$+\int e^{-x}\cdot(2x-2)dx = \begin{pmatrix} u=2x-2 & du=2dx \\ dv=e^{-x}dx & v=-e^{-x} \end{pmatrix} = -(x^2-2x+5)e^{-x}-$

$-(2x-2)e^{-x}+\int 2e^{-x}dx = -(x^2-2x+5)e^{-x}-(2x-2)e^{-x}-2e^{-x}+k =$

$= (-x^2+\cancel{2x}-5-\cancel{2x}+\cancel{2}-\cancel{2})e^{-x} = (-x^2-5)e^{-x}+k$

d) $\int\frac{x\,dx}{e^x} = \begin{pmatrix} u=x & du=dx \\ dv=e^{-x}dx & v=-e^{-x} \end{pmatrix} = -xe^{-x}+\int e^{-x}dx = -xe^{-x}-e^{-x}+k$

$-e^{-x}(x+1)+k$