$\boxed{11}$ a) $\int x\,\text{sen}\,x\,dx = -x\cos x + \int \cos x\,dx = -x\cos x + \text{sen}\,x + C$

$u = x \longrightarrow du = dx$
$dv = \text{sen}\,x\,dx \longrightarrow v = -\cos x$

b) $\int x e^x dx = x e^x - \int e^x dx = x e^x - e^x + C$

$u = x \longrightarrow du = dx$
$dv = e^x dx \longrightarrow v = e^x$

c) $\int (x^2+1)\cos x\,dx = (x^2+1)\,\text{sen}\,x - 2\int x\,\text{sen}\,x\,dx = (x^2+1)\,\text{sen}\,x - 2\left[-x\cos x + \int \cos x\,dx\right] =$

$u = x^2+1 \longrightarrow du = 2x\,dx$
$dv = \cos x\,dx \longrightarrow v = \text{sen}\,x$

$u = x \longrightarrow du = dx$
$dv = \text{sen}\,x\,dx \longrightarrow v = -\cos x$

$= (x^2+1)\,\text{sen}\,x + 2x\cos x - 2\,\text{sen}\,x + C$

d) $\int \ln x\,dx = x\ln x - \int \frac{1}{x}\cdot x\cdot dx = x\ln x - \int 1\,dx = x\ln x - x + C$

$u = \ln x \longrightarrow du = \frac{1}{x}dx$
$dv = dx \longrightarrow v = x$

e) $\int \sqrt{x}\,\ln x\,dx = \frac{2}{3}\sqrt{x^3}\cdot\ln x - \int \frac{2}{3}x^{1/2}dx = \frac{2}{3}\sqrt{x^3}\ln x - \frac{2}{3}\cdot\frac{x^{1/2+1}}{1/2+1} =$

$u = \ln x \longrightarrow du = \frac{1}{x}dx$
$dv = \sqrt{x}\,dx \longrightarrow v = \frac{x^{1/2+1}}{1/2+1} = \frac{2}{3}x^{3/2}$

$= \frac{2}{3}\sqrt{x^3}\ln x - \frac{4}{9}\sqrt{x^3} + C$

f) $\int \text{arctg}\,x\,dx = x\,\text{arctg}\,x - \frac{1}{2}\int \frac{2x}{1+x^2}dx = x\,\text{arctg}\,x - \frac{1}{2}\ln(1+x^2) + C$

$u = \text{arctg}\,x \longrightarrow du = \frac{dx}{1+x^2}$
$dv = dx \longrightarrow v = x$

g) $\int x\,\text{arctg}\,x\,dx = \frac{x^2}{2}\text{arctg}\,x - \int \frac{1}{2}\cdot\frac{x^2+1-1}{1+x^2}\,dx = \frac{x^2}{2}\text{arctg}(x) - \frac{1}{2}\int 1 - \frac{1}{1+x^2}dx =$

$u = \text{arctg}\,x \longrightarrow du = \frac{1}{1+x^2}dx$
$dv = x\,dx \longrightarrow v = \frac{x^2}{2}$

$= \frac{x^2}{2}\text{arctg}(x) - \frac{1}{2}x - \frac{1}{2}\text{arctg}(x) + C$

h) $\int x^2\cos(3x)\,dx = \frac{x^2}{3}\text{sen}(3x) - \frac{2}{3}\int x\,\text{sen}(3x)\,dx = \frac{x^2}{3}\text{sen}(3x) - \frac{2}{3}\left[-\frac{1}{3}x\cos(3x) + \frac{1}{3}\int 3\frac{1}{3}\cos(3x)\,dx\right] =$

$u = x^2 \longrightarrow du = 2x\,dx$
$dv = \cos(3x)\,dx \longrightarrow v = \frac{1}{3}\text{sen}(3x)$

$u = x \longrightarrow du = dx$
$dv = \text{sen}(3x)\,dx \longrightarrow v = -\frac{1}{3}\cos(3x)$

$= \frac{x^2}{3}\text{sen}(3x) + \frac{2}{9}x\cos(3x) - \frac{2}{27}\text{sen}(3x) + C$

i) $\int e^x\,\text{sen}\,x\,dx = -e^x\cos x + \int e^x\cos x\,dx = -e^x\cos x + e^x\,\text{sen}\,x - \int e^x\,\text{sen}\,x\,dx$

$u = e^x \longrightarrow du = e^x dx$
$dv = \text{sen}\,x\,dx \longrightarrow v = -\cos x$

$u = e^x \longrightarrow du = e^x dx$
$dv = \cos x\,dx \longrightarrow v = \text{sen}\,x$

Es decir:

$\int e^x\,\text{sen}\,x\,dx = -e^x\cos x + e^x\,\text{sen}\,x - \int e^x\,\text{sen}\,x\,dx \Longrightarrow 2\int e^x\,\text{sen}\,x\,dx = -e^x\cos x + e^x\,\text{sen}\,x \Longrightarrow$

$\Longrightarrow \int e^x\,\text{sen}\,x\,dx = \frac{-e^x\cos x + e^x\,\text{sen}\,x}{2} + C$

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

$\left.\begin{array}{l}\cos^2 x + \text{sen}^2 x = 1\\ \cos^2 x - \text{sen}^2 x = \cos(2x)\end{array}\right\} \Longrightarrow 2\,\text{sen}^2 x = 1 - \cos(2x) \Longrightarrow \text{sen}^2 x = \frac{1-\cos 2x}{2}$

. También se puede resolver por partes, con $u = \text{sen}\,x$ $dv = \text{sen}\,x\,dx$

.. $\text{sen}(2x) = 2\,\text{sen}\,x\cos x$

k) $\int x^2 e^{-x}dx = -x^2 e^{-x} + \int 2x e^{-x}dx = -x^2e^{-x} - 2xe^{-x} + \int 2e^{-x}dx = -x^2e^{-x} - 2xe^{-x} - 2e^{-x} + C$

$u = x^2 \longrightarrow du = 2x\,dx$
$dv = e^{-x}dx \longrightarrow v = -e^{-x}$

$u = 2x \longrightarrow du = 2dx$
$dv = e^{-x}dx \longrightarrow v = -e^{-x}$