1. $\int (x^2 \sin x)\,dx$

$u = x^2$ $\quad dv = (\sin x)\,dx$

$du = (2x)\,dx$ $\quad v = \int \sin x\,dx$

$v = -\cos x$

"$uv - \int v\,du$"

$= x^2(-\cos x) - \int -\cos x\,(2x)\,dx$

$= -x^2\cos x + 2\int x\cos x\,dx$

$u = x$ $\quad dv = \cos x\,dx$

$du = 1\cdot dx$ $\quad v = \int \cos x\,dx$

$v = \sin x$

"$uv - \int v\,du$"

$= -x^2\cos x + 2\left[x\sin x - \int \sin x\,dx\right]$

$= -x^2\cos x + 2\left[x\sin x - (-\cos x)\right] + C$

$= -x^2\cos x + 2x\sin x + 2\cos x + C$

2. $\int (7xe^x)\,dx$

$= 7\int (xe^x)\,dx$

$u = x$ $\quad dv = e^x\,dx$

$du = 1\cdot dx$ $\quad v = \int e^x\,dx$

$v = e^x$

"$uv - \int v\,du$"

$= 7\left[xe^x - \int e^x\,dx\right]$

$= 7\left[xe^x - e^x\right] + C$

$= 7e^x[x-1] + C$