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

Using integration by part

$u\,dv = uv - \int v\,du$

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

$\frac{du}{dx} = 2x \quad du = 2x\,dx$

$v = \int dv$

$v = -\cos x$

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

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

$= x^2 \times (-\cos x) - 1 \times (-2) \times \int \cos x\,dx$

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

Substitute $du = 1dx$ and $v = \sin x$

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

$= (-\cos x) + 2(x \times \sin x - (-\cos x))$

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

$= -x^2 \cos x + 2x \sin x + 2\cos x + C,\ C \in R$

(2) $3 \times \int x e^{2x} dx$

using integration by part

$\int u dv = uv - \int v du$

$u = x, dv = e^{2x} dx$

$du = 1 dx$

$v = \frac{e^{2x}}{2}$

$= 3\left(x \times \frac{e^{2x}}{2} - \int \frac{e^{2x}}{2} dx\right)$

$= 3\left(x \times \frac{e^{2x}}{2} - \frac{1}{2} \times \int e^{2x} dx\right)$

$= 3\left(x \times \frac{e^{2x}}{2} - \frac{1}{2} \times \frac{1}{2} e^{2x}\right)$

$= \frac{3xe^{2x}}{2} - \frac{3e^{2x}}{4}$

$= \frac{3xe^{2x}}{2} - \frac{3e^{2x}}{4} + c, c \in R$

(3) $\int \frac{(2x-3x^2)}{1-x}\,dx$

$= \int \frac{2x}{1-x} - \frac{3x^2}{1-x}\,dx$

$\cancel{= \int 2-2x-2\ln(1-2x) - \int \frac{3x^2}{1-x}\,dx}$

$= \int \frac{2x}{1-x}\,dx - \int \frac{3x^2}{1-x}\,dx$

$= 2-2x-2\ln(1-x) - \int \frac{3x^2}{1-x}\,dx$

$\cancel{= 2-2x-2\ln(1-x)+ \text{[illegible]}}$

$= 2-2x-2\ln(1-x) - \frac{4+6x+3x^2}{2} + 3\ln(1-x$

$= -\frac{5+2x+3x^2}{2} + \ln(1-x)$

$= -\frac{5+2x+3x^2}{2} + \ln(1-x) + C,\ C \in \mathbb{R}$