Name: Asiegbu Cynthia Ogechi
Matric No: 19/MHS01/105
Department: MBBS

1) $\int 2x^2 \ln x \, dx$

$u = \ln x \qquad dv = 2x^2$

$du = \frac{1}{x} dx \qquad v = \frac{2x^3}{3}$

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

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

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

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

2) $\int 3t e^{2t} dt$

$u = 3t \qquad dv = e^{2t}$

$du = 3 \qquad v = \frac{e^{2t}}{2}$

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

$= 3t \cdot \frac{e^{2t}}{2} - \int \frac{e^{2t}}{2} \cdot 3 \, dt$

$= \frac{3e^{2t}t}{2} - \frac{3}{2} \int e^{2t} \, dt$

$= \frac{3e^{2t}t}{2} - \frac{3e^{2t}}{4} + C$

3) $\int x^2 \sin \ldots$

$u = \sin \ldots$

$du = \ldots$

$\int u\,dv \ldots$

3) $x^2 \sin x$

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

$du = 2x\,dx$ $\quad v = -\cos x$

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

$u = 2x$ $\quad dv = \cos x$

$du = 2dx$ $\quad v = \sin x$

$\Rightarrow 2x\sin x - \int \sin x\, 2\, dx$

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

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

4 $\cos 5x \cos 6x$

$\cos A \cos B = \frac{1}{2}[\cos(A+B) + \cos(A-B)]$

$A = 5x \quad B = 6x$

$\int \cos 5x \cos 6x\, dx = \int \frac{1}{2}\left[\cos 11x - \cos x\right] dx$

$= \frac{1}{2}\left[\frac{\sin 11x}{11x} + \sin x\right]$

$= \frac{\sin 11x}{22} + \frac{\sin x}{2} + C$

5) $\sin 7x \cos 2x$.

$\sin A \cos B = \frac{1}{2}[\sin(A+B) + \sin(A-B)]$

$A = 7x \quad B = 2x$

$\int \sin 7x \cos 2x\, dx = \frac{1}{2}(\sin 9x + \sin 5x)$

$= \frac{1}{2}\;\frac{\sin 9x}{9} + \frac{\sin 5x}{5}$

$= \frac{\sin 9x}{18} + \frac{\sin 5x}{10}$