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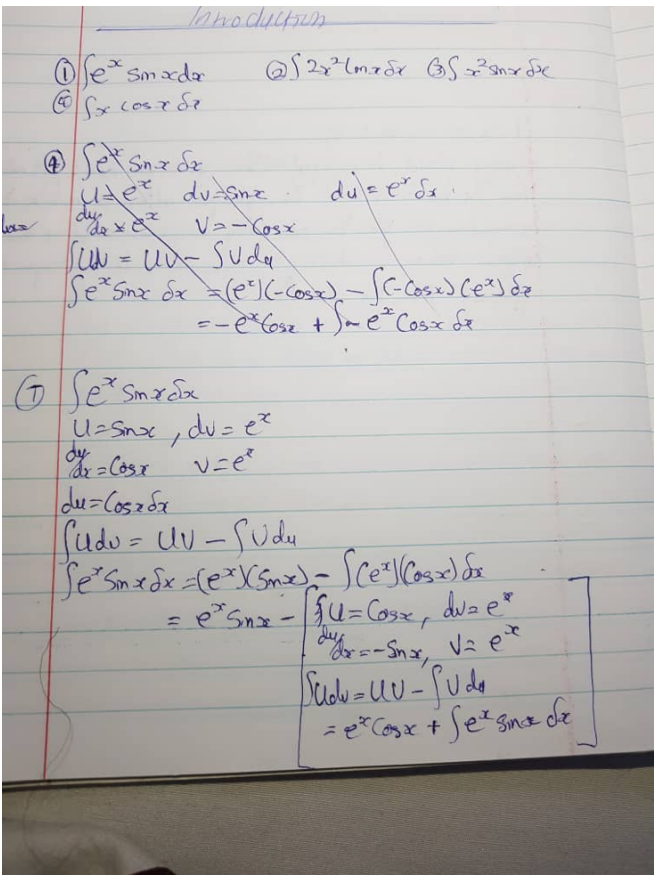
Matric: 19/SCI09/003
Assignment: Mat104
Level: 100lvl



$= e^x \sin x - e^x \cos x - \int e^x \sin x \, dx$

Let $I = e^x \sin x \, dx$

$I = e^x \sin x - e^x \cos x - I$

$\frac{2I}{2} = \frac{e^x \sin x - e^x \cos x}{2}$

Thus, $\int e^x \sin x \, dx = \frac{1}{2}[e^x \sin x - e^x \cos x] + C$

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

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

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

$du = dx$

$du = \frac{dx}{x}$

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

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

$\int 2x^2 \ln x \, dx = \frac{1}{3}(2x^3 \ln x) - \frac{2x^3}{9}$

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

LATE $= \frac{1}{3}\left[2x^3 \ln x - \frac{2x^3}{3}\right] + C$

(3)

(3) $\int x^2 \sin x \, dx$

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

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

$du = 2x \, dx$

$\int U dv = UV - \int V du$

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

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

$U = 2x, \quad dv = \cos x$

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

$= UV - \int V \, du$

$= 2x \sin x - \int (\sin x)(2 \, dx)$

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

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

LIATE

④ $\int x \cos x \, dx$

$U = x, \quad dv = \cos x$

$\frac{du}{dx} = 1, \quad V = \sin x$

$du = dx$

$\int U dv = UV - \int V du$

$\int x \cos x \, dx = x \sin x - \int \sin x \, dx$

$\int x \cos x \, dx = x \sin x + \cos x + C$