NAME: EKANEM, ENOABASI NKEREUWEM

COURSE: MAT 104

MATRIC NUMBER: 19/MHS01/146

DEPARTMENT: MBBS

DATE: 23rd, MAY 2020

Q' ANSWER TO ASSIGNMENT ON INTEGRATION.

1. $\sin 7x \cos 2x$

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

$\sin A \cos B = \frac{1}{2}[\sin(7x+2x) + \sin(7x-2x)]$

$\frac{1}{2}(\sin 9x + \sin 5x)$

2. $\cos 5x \cos 6x$

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

$\frac{1}{2}(\cos 11x - \cos x)$

3. $\int 3te^{2t}$

$u = 3t \quad du/dx = 3$

$v = \int e^{2t} dx \quad dv = e^{2t}$

$v = \frac{1}{2}e^{2t}$

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

$\int udv = 3t\left(\frac{1}{2}e^{2t}\right) - \int \frac{3}{2}e^{2t}\,dx$

$\frac{3}{2}\int e^{2t} dx$

$3/2\left(\frac{e^{2t}}{2}\right) + C$

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

4. $x^2 \sin x$

$u = x^2 \quad \frac{du}{dx} = 2x$

$dv = \sin x \quad v = \int \sin x \, dx = -\cos x$

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

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

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

~~$-x^2\cos x + \int$~~

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

$$\therefore \int u\,dv = -x^2\cos x + 2x\sin x + 2\cos x$$

5. $2x^2 \ln x$

Solution

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

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

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

$$(\ln x)\left(\tfrac{2}{3}x^3\right) - \int \tfrac{2}{3}x^3\left(\tfrac{1}{x}\right) dx$$

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

$$\frac{2}{3}x^3\left(\ln x - \frac{2}{3}\right) + C$$