

Name: Prince Abingye Brown

Matric: 19/EUGROS/002

Department: Mechatronics

mat 104

1.) $\int \sin 7x \cos 2x dx$

Solu

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

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

$$\int \sin 7x \cos 2x dx = \int \frac{1}{2} [\sin(9x) - \sin(-5x)] dx$$

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

$$= \frac{1}{2} \left[\int \sin 9x dx + \int \sin 5x dx \right]$$

$$= \frac{1}{2} \left[-\frac{1}{9} \cos 9x - \frac{1}{5} \cos 5x \right]$$

$$= \underline{\underline{-\frac{\cos(9x)}{18} - \frac{\cos 5x}{10} + C}}$$

2) $\int \cos 3x \cos x dx$

Sol

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

$$= \int \frac{1}{2} [\cos(4x) + \cos(2x)] dx$$

$$= \frac{1}{2} \int (\cos 4x + \cos 2x) dx$$

$$= \frac{1}{2} \left[\int \cos 4x dx + \int \cos 2x dx \right]$$

$$= \frac{1}{2} \left[\frac{1}{4} \sin 4x + \frac{1}{2} \sin 2x \right]$$

$$= \frac{\sin 4x}{8} + \frac{1}{4} \sin 2x + C$$

$$= \frac{2 \sin 4x + \sin 2x}{8} + C$$

$$3) \int \frac{\cos x}{\sin x} dx$$

$$u = \sin x \quad \frac{du}{dx} = \cos x \quad du = \cos x dx$$

$$= \int \frac{\cos x}{x^2} dx$$

$$= \int \frac{\cos x}{u^2} = \int \frac{1}{u^2} du$$

$$= \int u^{-2} du$$

$$= \frac{u^{-2+1}}{-1} + C$$

$$= -\frac{1}{u} + C = -\frac{1}{\sin x} + C$$

$$= -\operatorname{cosec} x + C$$