Indefinite Integrals Ex 19.7 Q1

Let $I = \int \sin 4x \cos 7x dx$. Then,

$$I = \frac{1}{2}\int 2\sin 4x \times \cos 7x dx$$
$$= \frac{1}{2}\int \left(\sin 11x + \sin(-3x)\right)dx$$
$$= \frac{1}{2}\int \sin 11x dx - \frac{1}{2}\int \sin 3x dx$$
$$= \frac{-1}{2\times 11}\times \cos 11x + \frac{1}{2\times 3}\cos 3x + c$$
$$= -\frac{1}{22}\times \cos 11x + \frac{1}{6}\times \cos 3x + c$$

$$\therefore \quad I = \frac{-1}{22}\times \cos 11x + \frac{1}{6}\times \cos 3x + c.$$

Indefinite Integrals Ex 19.7 Q2

Let $I = \int \cos 3x \cos 4x dx$. Then,

$$I = \frac{1}{2}\int (2\cos 3x \cos 4x)\times dx$$
$$= \frac{1}{2}\int \left(\cos 7x + \cos(-x)\right)dx$$
$$= \frac{1}{2}\int \cos 7x + \frac{1}{2}\int \cos dx \qquad [\because \cos(-0) = \cos 0]$$
$$= \frac{\sin 7x}{2\times 7} + \frac{\sin x}{2} + c$$
$$= \frac{1}{14}\times \sin 7x + \frac{1}{2}\sin x + c$$

$$\therefore \quad I = \frac{1}{14}\times \sin 7x + \frac{1}{2}\times \sin x + c.$$

Indefinite Integrals Ex 19.7 Q3

Let $I = \int \cos mx \cos nx \ dx \ \ m \neq n$. Then,

$$I = \frac{1}{2}\int 2\cos mx \cos nx \ dx$$
$$= \frac{1}{2}\int \left[\cos(m+n)x + \cos(m-n)x\right]dx$$
$$= \frac{1}{2}\times \frac{\sin(m+n)x}{m+n} + \frac{1}{2}\times \frac{\sin(m-n)x}{m-n} + c$$

$$\therefore \quad I = \frac{1}{2}\left[\frac{\sin(m+n)x}{m+n} + \frac{\sin(m-n)x}{m-n}\right] + c.$$

Indefinite Integrals Ex 19.7 Q4

We have,

$$\int \sin mx \cos nx \, dx, \; m \neq n$$

$$= \frac{1}{2}\int 2\sin mx \cos nx \, dx$$

$$= \frac{1}{2}\int \left[\sin(m+n)x + \sin(m-n)x\right]dx$$

$$= \frac{1}{2} \times \left[\frac{-\cos(m+n)}{m+n} - \frac{\cos(m-n)}{m-n}\right] + c$$

$$\therefore \quad \int \sin mx \cos nx = \frac{1}{2}\left[\frac{-\cos(m+n)x}{m+n} - \frac{\cos(m-n)x}{m-n}\right] + c.$$

********** END **********