

06/09/xx

Class-XII (MATHS) K. Kanhaiya

Integrate:-

Find (i) $\int \cos^2 x dx$

$\therefore \cos 2x = 2 \cos^2 x - 1$, which gives

$$\cos^2 x = \frac{1 + \cos 2x}{2}$$

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

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

$$= \frac{1}{2} x + \frac{1}{2} \frac{\sin 2x}{2} + c$$

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

(ii) $\int \sin 2x \cos 3x dx$

$$\frac{1}{2} \int (\sin 5x - \sin x) dx$$

$$\frac{1}{2} \int \sin 5x dx - \frac{1}{2} \int \sin x dx$$

$$- \frac{1}{2} \frac{\cos 5x}{5} + \frac{1}{2} \cos x + C$$

$$- \frac{1}{10} \cos 5x + \frac{1}{2} \cos x + C$$

$$(iii) \int \sin^3 x dx$$

$$\int \frac{3 \sin x - \sin 3x}{4} dx$$

$$\frac{3}{4} \int \sin x dx - \frac{1}{4} \int \sin 3x dx$$

$$-\frac{3}{4} \cos x + \frac{1}{12} \cos 3x + C$$

Do yourself \Rightarrow

$$1) \int \sin^2(2x+5) dx$$

$$2) \int \sin 3x \cos 4x dx$$

$$3) \int \sin^3(2x+1) dx$$

$$4) \int \sin^3 x \cos^3 x dx$$

$$5) \int \sin x \sin 2x \sin 3x dx$$

$$6) \int \frac{\cos x}{1 + \cos 2x} dx$$