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Dept MBBS

Matric no 19/MHSD1/437

Course MAT104

1) $\int \sin^b x$
 $\int \sin^b x dx$

$$\int \sin^n(x) dx = \frac{n-1}{n} \int \sin^{n-2}(x) dx - \frac{\cos x \sin^{n-1}(x)}{n}$$

$$\int \sin^6 x dx = -\frac{\cos(x) \sin^5(x)}{6} + \frac{5}{6} \int \sin^4(x) dx$$

$$\int \sin^4 x dx = -\frac{\cos x \sin^3 x}{4} + \frac{3}{4} \int \sin^2(x) dx$$

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

$$= -\frac{\cos(x) \sin(x)}{2} + \frac{1}{2} x$$

$$-\int \sin^4(x) dx = \frac{\cos(x) \sin^3 x}{4} - \frac{3}{8} \cos x \sin x + \frac{3x}{8}$$

$$\int \sin^6 x dx = \frac{\cos x \sin^5 x}{6} - \frac{5}{24} \cos x \sin^3 x$$

$$-\frac{5 \cos x \sin x}{16} + \frac{5x}{16} + C$$

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

$$\int \cos^4 x (\sin^2 x) \sin x dx$$

$$\int \cos^4 x (1 - \cos^2 x) \sin x dx$$

$$\cos x = t$$

$$\sin x dx = -dt$$

$$= \int t^4 (1 - t^2) dt$$

$$= \int (t^4 - t^6) dt$$

$$= \frac{t^5}{5} - \frac{t^7}{7} + C$$

$$= \frac{\cos^5 x}{5} - \frac{\cos^7 x}{7} + C$$

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

$$\sin^3 x = 3 \cos^2 x \sin x - \sin^5 x$$

$$\sin^2(x) = 1 - \cos^2 x$$

$$= \int (3 \cos^3 x - 4 \cos^5 x) \sin x dx$$

$$\cos x = u$$

$$-\sin x dx = du$$

$$= - \int (4u^3 - 3u^5) du$$

$$= - \int (4u^3 - 3u^5) du$$

$$= - \left(\frac{4u^4}{4} - \frac{3u^6}{6} \right) + C$$

$$= - \left(\frac{\cos^4 x}{1} - \frac{\cos^6 x}{2} \right) + C$$