

(3) $\int \cos n \sin^3 n \cdot n \cos n \, dn = \int (1 - \sin^2 n)^{1/2} \sin n \cdot n \cos n \, dn$

$$\sin n \cdot n \cos n \cdot n \cos n \, dn$$

$$u = \sin n$$

$$\frac{du}{dn} = \cos n \quad dn = \frac{du}{\cos n}$$

$$\int u^3 \cdot \frac{du}{\cos n}$$

$$\int \cos n \cdot u^3 \cdot \frac{du}{\cos n}$$

$$\int u^3 \cdot du$$

$$u^4 + C$$

$$\underline{F}$$

$$\int \cos n \sin^3 n \cdot dn = \underline{\sin^4 n + C}$$

$$\text{Let } \sin^6 n = \frac{1}{32} [10 - 15\cos 2n + 6\cos 4n - \cos 6n] dn.$$

$$\begin{aligned}\sin^6 n &= \frac{1}{32} \left[\frac{10n}{1} - \frac{15 \sin 2n}{2} + \frac{6 \cos 4n}{4} - \frac{\cos 6n}{6} \right] \\ &= \frac{10n}{32} - \frac{15 \sin 2n}{64} + \frac{6 \cos 4n}{128} - \frac{\cos 6n}{192} + C\end{aligned}$$

$$(2) \cos^4 n \sin^3 n .$$

$$\int \cos^4 n \sin^3 n dn . \quad \sin^2 n = (1 - \cos^2 n)$$

$$u = \cos n$$

$$du/dn = -\sin n .$$

$$du = -\sin n dn .$$

$$dn = \frac{-du}{\sin n}$$

$$\int u^4 (1-u^2) du .$$

$$\begin{aligned}& - \int (u^4 - u^6) du . \\ & \left[\frac{u^5}{5} - \frac{u^7}{7} \right] = \frac{u^7}{7} - \frac{u^5}{5} + C .\end{aligned}$$

$$\cos^4 n \sin^3 n dn = \frac{\cos^7 n}{7} - \frac{\cos^5 n}{5} + C$$

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$$\textcircled{1} \sin^6 n \, dn.$$

$$\begin{aligned}\sin^6 n &= (\sin^2 n)^2 (\sin^2 n) \\ &= \left[1 - \frac{\cos 2n}{2} \right]^2 \left[1 - \frac{\cos 2n}{2} \right].\end{aligned}$$

$$\frac{1}{8} [(1 - 2\cos 2n + \cos^2 2n)(1 - \cos 2n)]$$

$$= \frac{1}{8} (1 - 2\cos 2n + \frac{1 + \cos 4n}{2})(1 - \cos 2n)$$

$$= \frac{1}{16} (2 - 4\cos 2n + 1 + \cos 4n)(1 - \cos 2n)$$

$$\frac{1}{16} (3 - 4\cos 2n + \cos 4n)(1 - \cos 2n)$$

$$\frac{1}{16} (3 - 4\cos 2n + \cos 4n - 3\cos 2n + 4\cos^2 2n - \cos 4n)$$

$$= \frac{1}{16} [3 - 7\cos 2n + \cos 4n + 2\cos^2 2n] - \frac{1}{2} \cos 4n \cos 2n$$

$$\frac{1}{16} [3 - 7\cos 2n + \cos 4n + 2(1 + \cos 4n)] - \frac{1}{2} \cos 6n + \cos 2n$$

$$\frac{1}{16} [3 - 7\cos 2n + \cos 4n + 2 + 2\cos 4n - \frac{1}{2} \cos 6n + \cos 2n]$$

$$\frac{1}{32} [6 - 14\cos 2n + 2\cos 4n + 4 + 4\cos 4n - \cos 6n] - \cos 2n$$

$$= \frac{1}{32} [10 - 15\cos 2n + 6\cos 4n - \cos 6n]$$

Let $\sin^6 n =$

$\sin^6 n$

\textcircled{2} $\cos^4 n$
 $\cdot \cos^4$

$u =$
 du
 du