

$$\textcircled{2} \int \cos x \sin^3 x = \text{let } u = \cos x$$

$\frac{du}{dx} = -\sin x \quad \text{then } du = -\sin x dx$

$$\int \cos x \sin^3 x = \int u \sin^2 x \frac{du}{-1 \sin x}$$

$$\int \cos x \sin^3 x = - \int u \sin^2 x dx$$
$$= - \int u(1 - \cos^2 x) du$$

$$\int \cos x \sin^3 x = - \int u(1 - u^2) du$$

$$\int \cos x \sin^3 x = - \int u - u^3 du$$
$$= - \left[\frac{u^2}{2} - \frac{u^4}{4} \right]$$

$$\int \cos x \sin^3 x = \left[\frac{u^4}{4} - \frac{u^2}{2} \right] + C$$

$$\frac{\cos^4 x}{4} - \frac{\cos^2 x}{2} + C$$