Section 28.1:

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general power formula:

$$\int u^n \, du = \frac{u^{n+1}}{n+1} + C \qquad \text{for } n \neq -1$$

↑
now, u can be any function of x!

examples:

① $\int \sin^4 x \cos x \, dx$

$= \int u^4 \, du$

let $u = \sin x$
$du = \cos x \, dx$

$= \frac{u^5}{5} + C$

$= \frac{\sin^5 x}{5} + C$

② $\int \frac{(\ln x)^3}{x} \, dx$

let $u = \ln x$
$du = \frac{1}{x} \, dx$

$= \int u^3 \, du$

$$= \int u^3 \, du$$

$$= \frac{u^4}{4} + C$$

$$= \frac{(\ln x)^4}{4} + C$$

(3) $\int \sec^5\theta \tan\theta \, d\theta$

let $u = \sec\theta$
$du = \sec\theta \tan\theta \, d\theta$

$$= \int \sec^4\theta \sec\theta \tan\theta \, d\theta$$

$$= \int u^4 \, du$$

$$= \frac{u^5}{5} + C = \frac{1}{5}\sec^5\theta + C$$