

$$\begin{aligned}
 12. \quad \int \sin^2 x \cos^4 x \, dx &= \frac{1}{8} \int (1 - \cos 2x)(1 + \cos 2x)^2 \, dx = \frac{1}{8} \int (1 - \cos^2 2x)(1 + \cos 2x) \, dx \\
 &= \frac{1}{8} \int \sin^2 2x \, dx + \frac{1}{8} \int \sin^2 2x \cos 2x \, dx = \frac{1}{16} \int (1 - \cos 4x) \, dx + \frac{1}{48} \sin^3 2x \\
 &= \frac{1}{16} x - \frac{1}{64} \sin 4x + \frac{1}{48} \sin^3 2x + C
 \end{aligned}$$

$$13. \quad \int \sin 2x \cos 3x \, dx = \frac{1}{2} \int (\sin 5x - \sin x) \, dx = -\frac{1}{10} \cos 5x + \frac{1}{2} \cos x + C$$

$$14. \quad \int \sin 3\theta \cos 2\theta \, d\theta = \frac{1}{2} \int (\sin 5\theta + \sin \theta) \, d\theta = -\frac{1}{10} \cos 5\theta - \frac{1}{2} \cos \theta + C$$

$$15. \quad \int \sin x \cos(x/2) \, dx = \frac{1}{2} \int [\sin(3x/2) + \sin(x/2)] \, dx = -\frac{1}{3} \cos(3x/2) - \cos(x/2) + C$$

$$16. \quad u = \cos x, \quad - \int u^{1/3} \, du = -\frac{3}{4} \cos^{4/3} x + C$$

$$23. \quad \frac{1}{2} \tan(2x - 1) + C$$

$$24. \quad -\frac{1}{5} \ln |\cos 5x| + C$$

$$25. \quad u = e^{-x}, \quad du = -e^{-x} \, dx; \quad - \int \tan u \, du = \ln |\cos u| + C = \ln |\cos(e^{-x})| + C$$

$$26. \quad \frac{1}{3} \ln |\sin 3x| + C$$

$$27. \quad \frac{1}{4} \ln |\sec 4x + \tan 4x| + C$$