

$$1. \quad \int \sin x \, dx = -\cos x + C$$

$$2. \quad \int \sin^2 x \, dx = \int \left(\frac{1}{2} - \frac{1}{2} \cos 2x\right) dx = \frac{1}{2}x - \frac{1}{4} \sin 2x + C$$

$$3. \quad \int \cos^2 x \, dx = \int \left(\frac{1}{2} + \frac{1}{2} \cos 2x\right) dx = \frac{1}{2}x + \frac{1}{4} \sin 2x + C$$

$$4. \quad \int \sin^3 x \, dx \qquad u = \sin^2 x \qquad dv = \sin x \, dx$$

$$\qquad \qquad \qquad du = 2\sin x \cos x \, dx \qquad v = -\cos x$$

$$= -\sin^2 x \cos x + 2 \int \sin x \cos^2 x \, dx + C$$

$$= -\sin^2 x \cos x - \frac{2}{3} \cos^3 x + C$$

$$5. \quad \int \sec x \, dx = \ln(\sec x + \tan x) + C$$

$$6. \quad \int \sec^2 x \, dx = \tan x + C$$

$$7. \quad \int \sec^3 x \, dx \qquad u = \sec x \qquad dv = \sec^2 x \, dx$$

$$du = \sec x \tan x \, dx \qquad v = \tan x$$

$$= \sec x \tan x - \int \sec x \tan^2 x \, dx = \sec x \tan x - \int \sec x (\sec^2 x - 1) \, dx$$

$$= \sec x \tan x - \int \sec^3 x \, dx + \int \sec x \, dx$$

$$2 \int \sec^3 x \, dx = \sec x \tan x - \int \sec x \, dx$$

$$\int \sec^3 x \, dx = \frac{1}{2} \sec x \tan x + \frac{1}{2} \ln(\sec x + \tan x) + C$$

$$8. \quad \int \sin x \cos^n x \, dx = \frac{-1}{n+1} \cos^{n+1} x + C$$

$$9. \quad \int \sec^2 x \tan^n x \, dx = \frac{1}{n+1} \tan^{n+1} x + C$$

$$10. \quad \int (\sec x \tan x) \sec^n x \, dx = \frac{1}{n+1} \sec^{n+1} x + C$$

$$11. \quad \int (\sin mx + \sin nx) \, dx = \frac{1}{2} \cos[(m-n)x] - \frac{1}{2} \cos(m+n)x + C$$