

1 解. 计算可得

$$(5) \quad x \, dx = \frac{1}{2} d(x^2),$$

$$(7) \quad e^{2x} \, dx = \frac{1}{2} d(e^{2x}),$$

$$(9) \quad \sin \frac{3x}{2} \, dx = -\frac{2}{3} d\left(\cos \frac{3x}{2}\right),$$

$$(11) \quad \frac{dx}{x} = -\frac{1}{5} d(3 - 5 \ln|x|),$$

$$(14) \quad \frac{x \, dx}{\sqrt{1-x^2}} = -1 d(\sqrt{1-x^2}).$$

2.(1) 解. 计算可得

$$\int e^{5t} \, dt = \frac{1}{5} \int e^{5t} d(5t) = \frac{1}{5} e^{5t} + C.$$

2.(4) 解. 计算可得

$$\begin{aligned} \int \frac{dx}{\sqrt[3]{2-3x}} &= \int (2-3x)^{-\frac{1}{3}} dx = -\frac{1}{3} \int (2-3x)^{-\frac{1}{3}} d(2-3x) \\ &= -\frac{1}{3} \cdot \frac{3}{2} (2-3x)^{\frac{2}{3}} + C = -\frac{1}{2} (2-3x)^{\frac{2}{3}} + C. \end{aligned}$$

2.(6) 解. 计算可得

$$\int \frac{\sin \sqrt{t}}{\sqrt{t}} \, dt = 2 \int \sin \sqrt{t} \, d\sqrt{t} = -2 \cos \sqrt{t} + C.$$

2.(10) 解. 计算可得

$$\int \frac{3x^3}{1-x^4} \, dx = -\frac{3}{4} \int \frac{1}{1-x^4} d(1-x^4) = -\frac{3}{4} \ln|1-x^4| + C.$$

2.(11) 解. 计算可得

$$\int \frac{x+1}{x^2+2x+5} \, dx = \frac{1}{2} \int \frac{1}{x^2+2x+5} d(x^2+2x+5) = \frac{1}{2} \ln(x^2+2x+5) + C.$$

2.(13) 解. 计算可得

$$\begin{aligned} \int \frac{\sin x}{\cos^3 x} \, dx &= \int \cos^{-3} x \cdot \sin x \, dx = -\int \cos^{-3} x \, d\cos x \\ &= \frac{1}{2} \cos^{-2} x + C = \frac{1}{2} \sec^2 x + C. \end{aligned}$$

2.(15) 解. 计算可得

$$\int \tan^{10} x \cdot \sec^2 x \, dx = \int \tan^{10} x \, d\tan x = \frac{1}{11} \tan^{11} x + C.$$

2.(34) 解. 计算可得

$$\begin{aligned} \int \frac{dx}{(x+1)(x-2)} &= \frac{1}{3} \int \left( \frac{1}{x-2} - \frac{1}{x+1} \right) dx \\ &= \frac{1}{3} (\ln|x-2| - \ln|x+1|) + C \\ &= \frac{1}{3} \ln \left| \frac{x-2}{x+1} \right| + C. \end{aligned}$$