

代入法複習練習題

一. 試求下列各項不定積分.

$$1. \int \frac{2t}{(3t+5)^2} dt$$

$$\text{解. } \frac{2}{9} \left[\ln |3t+5| + \frac{5}{3t+5} \right] + C$$

$$2. \int \frac{12x+2}{3x^2+x} dx$$

$$\text{解. } 2 \ln |3x^2+x| + C$$

$$3. \int \frac{1}{\sqrt{5x+1}} dx$$

$$\text{解. } \frac{2}{5} \sqrt{5x+1} + C$$

$$4. \int \frac{1}{1-e^{-3x}} dx$$

$$\text{解. } \frac{1}{3} \ln |e^{3x}-1| + C$$

$$5. \int \frac{2x}{e^{3x^2}} dx$$

$$\text{解. } -\frac{1}{3} e^{-3x^2} + C$$

$$6. \int \frac{e^{\sqrt{x+1}}}{\sqrt{x+1}} dx$$

$$\text{解. } 2e^{\sqrt{x+1}} + C$$

$$7. \int \frac{x^2}{x-1} dx \quad \text{解. } \frac{1}{2}x^2 + x + \ln|x-1| + C$$

$$8. \int \frac{x}{(3x-1)^2} dx$$

解. $\frac{1}{9} \left[\ln|3x-1| - \frac{1}{3x-1} \right] + C$

$$9. \int \frac{1}{\sqrt{t}-1} dt \quad \text{解. } 2[\sqrt{t} + \ln|\sqrt{t}-1|] + C$$

$$10. \int t^2 \sqrt{1-t} dt$$

解. $-\frac{2}{7}(1-t)^{\frac{7}{2}} + \frac{4}{5}(1-t)^{\frac{5}{2}} - \frac{2}{3}(1-t)^{\frac{3}{2}} + C$

二. 試求下列各項定積分.

$$1. \int_0^2 x \sqrt{4x+1} dx \quad \text{解. } \frac{149}{30}$$

$$2. \int_0^4 \frac{x}{(x+4)^2} dx \quad \text{解. } \ln 2 - \frac{1}{2}$$

$$3. \int_0^{0.5} x(1-x)^3 dx \quad \text{解. } \frac{13}{320}$$

$$4. \int_4^5 x \sqrt[3]{5-x} dx \quad \text{解. } \frac{93}{28}$$