举一反三

数学的学习单纯通过刷题是很难达到高水平的，需要各位同学耐心积累并且有触类旁通，举一反三的能力！只有这样才能学一道抵得上别人学十道，短期内学精！

1. $\int \frac{1}{x(x+1)}dx = \ln|x| - \ln|x+1| + c$

2. $\int \frac{\sin x}{\cos x(\cos x+1)}dx = -\int \frac{1}{\cos x(\cos x+1)}d(\cos x)$

$$= -\left(\ln|\cos x| - \ln(1+\cos x)\right) + c$$

3. $\int \frac{x}{x^2(x^2+1)}dx = \frac{1}{2}\int \frac{2x}{x^2(x^2+1)}dx = \frac{1}{2}\int \frac{1}{x^2(x^2+1)}d(x^2)$

$$= \frac{1}{2}\left[\ln x^2 - \ln(1+x^2)\right] + c$$

4. $\int \frac{x+1}{x(1+xe^x)}dx = \int \frac{e^x(x+1)}{e^x x(1+xe^x)}dx = \int \frac{(xe^x)'}{e^x x(1+xe^x)}dx$

$$= \int \frac{1}{e^x x(1+xe^x)}d(xe^x) = \ln\left|\frac{xe^x}{xe^x+1}\right| + c$$

5. $\int \frac{1+\cot x}{1+e^x\sin x}dx = \int \frac{1+\frac{\cos x}{\sin x}}{1+e^x\sin x}dx = \int \frac{\sin x+\cos x}{\sin x(1+e^x\sin x)}dx$

$$= \int \frac{e^x(\sin x+\cos x)}{e^x\sin x(1+e^x\sin x)}dx = \int \frac{(e^x\sin x)'}{e^x\sin x(1+e^x\sin x)}dx$$

$$= \int \frac{1}{e^x\sin x(1+e^x\sin x)}d(e^x\sin x)$$

$$= \ln\left|\frac{e^x\sin x}{e^x\sin x+1}\right| + c$$