

高数上第 5 次周测题

- 已知 $f'(e^x) = 2x$, 则 $f(x) =$ []
A. $x^2 + c$ B. $e^x + c$
C. $2x \ln x - 2x + c$ D. $\ln(e^x + 1) + c$
- 已知 $\int f(x) dx = x^2 + c$, 则 $\int 2xf(1+x^2)dx =$ []
A. $2(1+x^2)^2 + c$ B. $(1+x^2) + c$
C. $(1+x^2)^2 + c$ D. $x^2 + c$
- 已知 $f(x)$ 是 $e^x + \sin x$ 的一个原函数, 且 $f(0) = 0$, 则 $\int f(x) dx =$ []
A. $e^x + \sin x + c$ B. $e^x + \cos x + c$
C. $e^x - \sin x + c$ D. $e^x - \cos x + c$
- 已知 $f(\frac{1}{x}) = \frac{1}{x+1}$, 则 $\int f(x) dx =$ []
A. $x - \ln(x+1) + c$ B. $\frac{1}{x} + c$
C. $\frac{1}{x} - \ln(\frac{1}{x} + 1) + c$ D. $\ln(\frac{1}{x} + 1) + c$
- 若 $\int df(x) = \int dg(x)$, 则下列结论错误的是 []
A. $f'(x) = g'(x)$ B. $df(x) = dg(x)$
C. $f(x) = g(x)$ D. $d\int f'(x)dx = d\int g'(x)dx$
- 设 $f(x)$ 的一个原函数为 $\frac{\sin x}{x}$, 则 $\int xf'(x)dx =$ []
A. $\frac{x \cos x + \sin x}{x} + C$ B. $\frac{x \cos x - \sin x}{x} + C$
C. $\frac{x \cos x + 2 \sin x}{x} + C$ D. $\frac{x \cos x - 2 \sin x}{x} + C$
- 若 $f''(x)$ 连续, $\int xf''(x)dx$ 为 []
A. $xf'(x) - \int f(x)dx$ B. $xf'(x) - f'(x) + c$
C. $xf'(x) - f(x) + c$ D. $f(x) - xf'(x) + c$
- 设 $F(x)$ 是 $f(x)$ 的一个原函数, 则 $\int f(1-2x)dx =$ []
A. $-\frac{1}{2}F(x) + C$ B. $-\frac{1}{2}F(1-2x) + C$
C. $-F(1-2x) + C$ D. $F(1-2x) + C$
- $d(\int \frac{\sin x}{x} dx) =$ []
A. $\frac{\sin x}{x} + C$ B. $\frac{\sin x}{x}$ C. $\frac{x \cos x - \sin x}{x^2} dx$ D. $\frac{\sin x}{x} dx$
- 若 $\int f(x)dx = 3e^{\frac{x}{3}} - x + C$, 则 $\lim_{x \rightarrow 0} \frac{f(x)}{x}$ 等于 []
A. 3 B. -3 C. $\frac{1}{3}$ D. $-\frac{1}{3}$
- $\int \frac{dx}{x(1+x^5)} =$ []
A. $-\frac{1}{5}\ln\left(1+\frac{1}{x^5}\right) + C$ B. $\ln\left(1+\frac{1}{x^5}\right) + C$

- C. $-\frac{1}{5}\ln(1+x^5)+C$ D. $-\frac{1}{5}\tan\left(1+\frac{1}{x^5}\right)+C$
12. $\int \frac{xdx}{\sqrt{a^2-x^2}} =$ []
- A. $\sqrt{a^2-x^2}+C$ B. $-\sqrt{a^2-x^2}+C$
 C. $-\frac{1}{2}\sqrt{a^2-x^2}+C$ D. $-2\sqrt{a^2-x^2}+C$
13. $\int \frac{\sin x \cos x}{1+\sin^4 x} dx =$ []
- A. $\arctan(\sin^2 x)+C$ B. $\frac{1}{2}\arctan(\cos^2 x)+C$
 C. $\frac{1}{2}\arctan(\sin^2 x)+C$ D. $\frac{1}{2}\arctan(\cos^2 x)+C$
14. $\int e^x \sin x dx =$ []
- A. $\frac{e^x(\sin x + \cos x)}{2} + C$ B. $e^x(\sin x - \cos x) + C$
 C. $\frac{e^x(\cos x - \sin x)}{2} + C$ D. $\frac{e^x(\sin x - \cos x)}{2} + C$
15. $\int \frac{1+\cos x}{x+\sin x} dx =$ []
- A. $\ln(1+\sin x)+c$ B. $\ln(1+\cos x)+c$
 C. $\ln(x+\cos x)+c$ D. $\ln(x+\sin x)+c$
16. $\int \frac{dx}{1+e^x} =$ []
- A. $x - \ln(1+e^x) + c$ B. $\ln(1+e^x) + c$
 C. $x + \ln(1+e^x) + c$ D. $1 - \ln(1+e^x) + c$
17. $\int x \arctan x dx =$ []
- A. $x^2 \arctan x - x + \arctan x + c$ B. $\frac{1}{2}(x^2 \arctan x - x + \arctan x) + c$
 C. $\frac{1}{2}(x^2 \arctan x + \arctan x) + c$ D. $\frac{1}{2}(x^2 \arctan x + x + \arctan x) + c$
18. $\int \frac{1}{\sqrt{4-9x^2}} dx =$ []
- A. $\frac{1}{3}\arcsin \frac{3}{2}x + c$ B. $\frac{1}{2}\arcsin \frac{3}{2}x + c$
 C. $\frac{2}{3}\arcsin \frac{3}{2}x + c$ D. $\frac{3}{2}\arcsin \frac{3}{2}x + c$
19. $\int \frac{dx}{x(x^{10}+1)} =$ []
- A. $\ln \frac{x^{10}}{x^{10}+1} + c$ B. $\frac{1}{10}(\ln x^{10}+1) + c$
 C. $\frac{1}{10}\ln \frac{x^{10}}{x^{10}+1} + c$ D. $\frac{1}{10}\ln \frac{x^{10}+1}{x^{10}} + c$
20. $\int x^2 \cos x dx =$ []
- A. $x^2 \sin x - 2x \cos x - 2 \sin x + c$ B. $x^2 \sin x + 2x \cos x - 2 \sin x + c$
 C. $x^2 \sin x + 2x \cos x + 2 \sin x + c$ D. $x^2 \sin x - 2x \cos x + 2 \sin x + c$

答案：CBCAC DCBDC ABCDD ABACB