高数上第 5 次周测题

1. 己知
$$f'(e^x) = 2x$$
,则 $f(x) = [$]

$$A. \quad x^2 + c$$

$$B. \quad e^x + c$$

C.
$$2x \ln x - 2x + c$$
 D. $\ln(e^x + 1) + c$

$$D. \ln(e^x+1)+c$$

2. 已知
$$\int f(x)dx = x^2 + c$$
,则 $\int 2xf(1+x^2)dx = [$]

A.
$$2(1+x^2)^2+c$$

B.
$$(1+x^2)+c$$
D. x^2+c

C.
$$(1+x^2)^2+c$$

$$D. \quad x^2 + c$$

3. 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.
$$e^x + \sin x + c$$

A.
$$e^x + \sin x + c$$
 B. $e^x + \cos x + c$
C. $e^x - \sin x + c$ D. $e^x - \cos x + c$

C.
$$e^x - \sin x + c$$

$$D. e^x - \cos x + c$$

4. 己知
$$f(\frac{1}{x}) = \frac{1}{x+1}$$
,则 $\int f(x)dx = [$]

$$A. \quad x - \ln(x+1) + c$$

B.
$$\frac{1}{x} + c$$

C.
$$\frac{1}{x} - \ln(\frac{1}{x} + 1) + c$$
 D. $\ln(\frac{1}{x} + 1) + c$

$$D. \quad \ln(\frac{1}{x}+1)+c$$

5. 若
$$\int df(x) = \int dg(x)$$
,则下列结论错误的是 []

A.
$$f'(x) = g'(x)$$
 B. $df(x) = dg(x)$

B.
$$df(x) = dg(x)$$

$$C. \quad f(x) = g(x)$$

$$D. \quad d \int f'(x) dx = d \int g'(x) dx$$

6. 设
$$f(x)$$
 的一个原函数为 $\frac{\sin x}{x}$, 则 $\int x f'(x) dx = [$]

A.
$$\frac{x\cos x + \sin x}{x} + C$$

A.
$$\frac{x\cos x + \sin x}{x} + C$$
 B. $\frac{x\cos x - \sin x}{x} + C$

$$C. \quad \frac{x\cos x + 2\sin x}{x} + C$$

C.
$$\frac{x\cos x + 2\sin x}{x} + C$$
 D.
$$\frac{x\cos x - 2\sin x}{x} + C$$

7. 若
$$f''(x)$$
连续, $\int x f''(x) dx$ 为 []

A.
$$xf'(x) - \int f(x)dx$$
 B. $xf'(x) - f'(x) + c$

B.
$$xf'(x) - f'(x) + c$$

$$C. \quad xf'(x) - f(x) + c$$

C.
$$xf'(x) - f(x) + c$$
 D. $f(x) - xf'(x) + c$

8. 设
$$F(x)$$
是 $f(x)$ 的一个原函数,则 $\int f(1-2x)dx = [$]

$$A. \quad -\frac{1}{2}F(x) + C$$

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.
$$F(1-2x)+C$$

$$9. d(\int \frac{\sin x}{x} dx) = []$$

A.
$$\frac{\sin x}{x} + C$$

B.
$$\frac{\sin x}{x}$$

A.
$$\frac{\sin x}{x} + C$$
 B. $\frac{\sin x}{x}$ C. $\frac{x \cos x - \sin x}{x^2} dx$ D. $\frac{\sin x}{x} dx$

D.
$$\frac{\sin x}{x} dx$$

10. 若
$$\int f(x)dx = 3e^{\frac{x}{3}} - x + C$$
,则 $\lim_{x \to 0} \frac{f(x)}{x}$ 等于

c.
$$\frac{1}{3}$$

B.
$$-3$$
 C. $\frac{1}{3}$ D. $-\frac{1}{3}$

$$11. \quad \int \frac{dx}{x(1+x^5)} = \qquad [$$

A.
$$-\frac{1}{5}\ln\left(1+\frac{1}{x^5}\right)+C$$
 B. $\ln\left(1+\frac{1}{x^5}\right)+C$

B.
$$\ln\left(1+\frac{1}{x^5}\right)+C$$

C.
$$-\frac{1}{5}\ln(1+x^5)+C$$
 D. $-\frac{1}{5}\tan(1+\frac{1}{x^5})+C$

$$D. \quad -\frac{1}{5}\tan\left(1+\frac{1}{x^5}\right) + C$$

$$12. \int \frac{xdx}{\sqrt{a^2 - x^2}} =$$

A.
$$\sqrt{a^2 - x^2} + C$$

B.
$$-\sqrt{a^2-x^2}+C$$

A.
$$\sqrt{a^2 - x^2} + C$$
 B. $-\sqrt{a^2 - x^2} + C$ B. $-\sqrt{a^2 - x^2} + C$

D.
$$-2\sqrt{a^2-x^2}+C$$

$$13. \int \frac{\sin x \cos x}{1 + \sin^4 x} dx = \begin{bmatrix} \end{bmatrix}$$

A.
$$\arctan(\sin^2 x) + C$$

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. $\frac{1}{2}\arctan(\cos^2 x) + C$

D.
$$\frac{1}{2}\arctan(\cos^2 x) + C$$

$$14. \int e^x \sin x dx = []$$

$$A. \quad \frac{e^x \left(\sin x + \cos x\right)}{2} + C$$

$$B. \quad e^x (\sin x - \cos x) + C$$

$$C. \quad \frac{e^x(\cos x - \sin x)}{2} + C$$

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.
$$\ln(1+\cos x)+c$$

A.
$$\ln(1+\sin x) + c$$
 B. $\ln(1+\cos x) + c$ C. $\ln(x+\cos x) + c$ D. $\ln(x+\sin x) + c$

D.
$$\ln(x + \sin x) + c$$

$$16. \int \frac{dx}{1+e^x} =$$

A.
$$x - \ln(1 + e^x) + c$$
 B. $\ln(1 + e^x) + c$

B.
$$\ln(1+e^{x})+c$$

C.
$$x + \ln(1 + e^x) + a$$

C.
$$x + \ln(1 + e^x) + c$$
 D. $1 - \ln(1 + e^x) + c$

17.
$$\int x \arctan x dx =$$

A.
$$x^2 \arctan x - x + \arctan x + c$$

A.
$$x^2 \arctan x - x + \arctan x + c$$
 B. $\frac{1}{2}(x^2 \arctan x - x + \arctan x) + c$

C.
$$\frac{1}{2}(x^2 \arctan x + \arctan x) + c$$

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. $\frac{1}{2}\arcsin\frac{3}{2}x+c$

$$B. \quad \frac{1}{2}\arcsin\frac{3}{2}x + c$$

C.
$$\frac{2}{3}\arcsin\frac{3}{2}x+c$$
 D. $\frac{3}{2}\arcsin\frac{3}{2}x+c$

D.
$$\frac{3}{2}\arcsin\frac{3}{2}x + c$$

19.
$$\int \frac{dx}{x(x^{10}+1)} =$$

A.
$$\ln \frac{x^{10}}{x^{10} + 1} + c$$

A.
$$\ln \frac{x^{10}}{x^{10}+1} + c$$
 B. $\frac{1}{10} (\ln x^{10} + 1) + c$

C.
$$\frac{1}{10} \ln \frac{x^{10}}{x^{10} + 1} + \alpha$$

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. $x^2 \sin x + 2x \cos x - 2 \sin x + c$

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. $x^2 \sin x - 2x \cos x + 2\sin x + c$

$$D. \quad x^2 \sin x - 2x \cos x + 2 \sin x + \alpha$$