

4

Indefinite Integration

- The value of $\int \frac{2dx}{1-4x^2}$ is
 (A) $\tan^{-1}(2x) + C$ (B) $\cot^{-1}(2x) + C$
 (C) $\cos^{-1}(2x) + C$ (D) $\sin^{-1}(2x) + C$
- $\int \frac{x^2}{1+x^6} dx$ is equal to
 (A) $x^2 + C$ (B) $\frac{1}{3} \tan^{-1}(x^3) + C$
 (C) $\log(1+x^3)$ (D) None of these
- $\int \frac{\cos 2x - 1}{\cos 2x + 1} dx$ is equal to
 (A) $\tan x - x + C$ (B) $x + \tan x + C$
 (C) $x - \tan x + C$ (D) $-x - \cot x + C$
- $\int e^x (1 - \cot x + \cot^2 x) dx$ is equal to
 (A) $e^x \cot x + C$ (B) $e^x \operatorname{cosec} x + C$
 (C) $-e^x \cot x + C$ (D) $-e^x \operatorname{cosec} x + C$
- What is the value of $\int \frac{\sin \sqrt{x}}{\sqrt{x}} dx$?
 (A) $\frac{\cos \sqrt{x}}{2} + C$ (B) $2 \cos \sqrt{x} + C$
 (C) $-\frac{\cos \sqrt{x}}{2} + C$ (D) $-2 \cos \sqrt{x} + C$
- $\int \frac{(x+1)^2}{x(x^2+1)} dx$ is equal to
 (A) $\log_e x + C$ (B) $\log_e x + 2 \tan^{-1} x + C$
 (C) $\log_e \frac{1}{x^2+1} + C$ (D) $\log_e \{x(x^2+1)\} + C$
- $\int \frac{\sin x dx}{3+4 \cos^2 x}$ is equal to
 (A) $\log(3+4 \cos^2 x) + C$
 (B) $\frac{1}{2\sqrt{3}} \tan^{-1} \left(\frac{\cos x}{\sqrt{3}} \right) + C$
 (C) $-\frac{1}{2\sqrt{3}} \tan^{-1} \left(\frac{2 \cos x}{\sqrt{3}} \right) + C$
 (D) $\frac{1}{2\sqrt{3}} \tan^{-1} \left(\frac{2 \cos x}{\sqrt{3}} \right) + C$
- What is the value of $\int \sin^{-1}(\cos x) dx$?
 (A) $\frac{x\pi}{2} - \frac{x^2}{2} + C$ (B) $\frac{\pi}{2} + \frac{x^2}{2} + C$
 (C) $-\frac{x\pi}{2} - \frac{x^2}{2} + C$ (D) $\frac{\pi}{2} - \frac{x^2}{2} + C$
- $\int \sqrt{1 + \sin \frac{x}{4}} dx$ is equal to
 (A) $8 \left(\sin \frac{x}{8} - \cos \frac{x}{8} \right) + C$
 (B) $\left(\sin \frac{x}{8} + \cos \frac{x}{8} \right) + C$
 (C) $\frac{1}{8} \left(\sin \frac{x}{8} - \cos \frac{x}{8} \right) + C$
 (D) $8 \left(\cos \frac{x}{8} - \sin \frac{x}{8} \right) + C$
- What is the value of $\int e^{\log x} \sin x dx$?
 (A) $e^{\log x} (\sin x - \cos x) + C$
 (B) $(\sin x - x \cos x) + C$
 (C) $(x \sin x + \cos x) + C$
 (D) $(\sin x + x \cos x) - C$
- If $I_n = \int (\log x)^n dx$, then $I_n + nI_{n-1}$ is equal to
 (A) $x(\log x)^n$ (B) $(x \log x)^n$
 (C) $(\log x)^{n-1}$ (D) $n(\log x)^n$
- $\int \frac{dx}{x(x^7+1)}$ is equal to
 (A) $\log \left(\frac{x^7}{x^7+1} \right) + C$ (B) $\frac{1}{7} \log \left(\frac{x^7}{x^7+1} \right) + C$
 (C) $\log \left(\frac{x^7+1}{x^7} \right) + C$ (D) $\frac{1}{7} \log \left(\frac{x^7+1}{x^7} \right) + C$

13. $\int \frac{dx}{x^2 + 4x + 13}$ is equal to
 (A) $\log(x^2 + 4x + 13) + C$
 (B) $\frac{1}{3} \tan^{-1}\left(\frac{x+2}{3}\right) + C$
 (C) $\log(2x + 4) + C$
 (D) $\frac{2x + 4}{(x^2 + 4x + 13)^2} + C$
14. What is the value of $\int (x^2 + 1)^{\frac{5}{2}} x dx$?
 (A) $(x^2 + 1)^{\frac{7}{2}} + C$ (B) $\frac{2}{7}(x^2 + 1)^{\frac{7}{2}} + C$
 (C) $\frac{1}{7}(x^2 + 1)^{\frac{7}{2}} + C$ (D) None of these
15. What is the value of $\int \frac{a + b \sin x}{\cos^2 x} dx$?
 (A) $a \sec x + b \tan x + C$
 (B) $a \tan x + b \sec x + C$
 (C) $a \cot x + b \operatorname{cosec} x + C$
 (D) $a \operatorname{cosec} x + b \cot x + C$
16. For any positive integer n , $\int \frac{dx}{x^{n+1} + x}$ is equal to
 (A) $\frac{1}{n} \log_e(x^n + 1) + C$
 (B) $\frac{1}{n} \log_e\left(\frac{1}{x^n + 1}\right) + C$
 (C) $\frac{1}{n} \log_e\left(\frac{x^n}{x^n + 1}\right) + C$
 (D) $\frac{1}{n+1} \log_e\left(\frac{x^n}{x^n + 1}\right) + C$
17. The value of the integral $\int \frac{dx}{x(1 + \log x)^2}$ is equal to
 (A) $-\frac{1}{1+x} + C$ (B) $-\frac{1}{1 + \log x} + C$
 (C) $\frac{1}{1 + \log x} + C$ (D) $\frac{1}{1+x^2} + C$
18. A function f is such that $f'(x) = 6 - 4 \sin 2x$ and $f(0) = 3$. What is the value of $f(x)$?
 (A) $6x + 2 \cos 2x$
 (B) $6x - 2 \cos 2x$
 (C) $6x - 2 \cos 2x + 1$
 (D) $6x + 2 \cos 2x + 1$
19. The value of $\int \frac{x^{e-1} + e^{x-1}}{x^e + e^x} dx$ is equal to
 (A) $x + C$ (B) $\log(x + e) + C$
 (C) $\log(e^x + x^e) + C$ (D) $\log(x^e + e^x) + C$
20. $\int \sin^3 x \cos x dx$ is equal to
 (A) $\frac{\cos^4 x}{4} + C$ (B) $\sin^4 x + C$
 (C) $\frac{\sin^4 x}{4} + C$ (D) $\frac{\sin 4x}{4} + C$
21. What is the value of $\int \sec x^\circ dx$?
 (A) $\log(\sec x^\circ + \tan x^\circ) + C$
 (B) $\frac{\pi \log \tan\left(\frac{\pi}{4} + \frac{\pi}{2}\right)}{180^\circ} + C$
 (C) $\frac{180^\circ \log \tan\left(\frac{\pi}{4} + \frac{\pi}{2}\right)}{\pi} + C$
 (D) $\frac{180^\circ \log \tan\left(\frac{\pi}{4} + \frac{\pi x}{360^\circ}\right)}{\pi} + C$
22. $\int \frac{dx}{1 + e^{-x}}$ is equal to
 (A) $1 + e^x + C$ (B) $\frac{1}{2} \log(1 + e^x) + C$
 (C) $\log(1 + e^x) + C$ (D) $2 \log(1 + e^x) + C$
23. What is the value of $\int (e^x + 1)^{-1} dx$
 (A) $\log(e^x + 1) + C$ (B) $\log(e^{-x} + 1) + C$
 (C) $-\log(e^{-x} + 1) + C$ (D) $-(e^x + 1) + C$
24. $\int \frac{\sin x + \cos x}{\sqrt{1 + \sin 2x}} dx$ is equal to
 (A) $\log(\sin x + \cos x) + C$
 (B) $x + C$
 (C) $\log(1 + \sin 2x) + C$
 (D) $\sin x + \cos x + C$
25. $\int e^{3 \log x} (x^4 + 1)^{-1} dx$ is equal to
 (A) $\log(x^4 + 1) + C$ (B) $\frac{1}{4} \log(x^4 + 1) + C$
 (C) $-\log(x^4 + 1) + C$ (D) None of these