



CTQ - 2023

CTQ : Concept Through Questions

Year : 2023

Topic : Indefinite Integration

1. Let $f(x) = \int \frac{1}{(1+x^2)^{\frac{3}{2}}} dx$ and $f(0) = 0$, then $f(1) =$
(a) $-1/\sqrt{2}$ (b) $1/\sqrt{2}$
(c) $\sqrt{2}$ (d) None of these [Video Solution](#)
2. $\int e^{\sin \theta} [\log \sin \theta + \operatorname{cosec}^2 \theta] \cos \theta d\theta$ is equal to
(a) $e^{\sin \theta} [\log \sin \theta + \operatorname{cosec}^2 \theta] + c$ (b) $e^{\sin \theta} [\log \sin \theta + \operatorname{cosec} \theta] + c$
(c) $e^{\sin \theta} [\log \sin \theta - \operatorname{cosec} \theta] + c$ (d) $e^{\sin \theta} [\log \sin \theta - \operatorname{cosec}^2 \theta] + c$ [Video Solution](#)
3. $\int \frac{10x^9 + 10^x \log_e 10}{10^x + x^{10}} dx$ is equal to
(a) $10^x - x^{10} + c$ (b) $10^x + x^{10} + c$
(c) $(10^x - x^{10})^{-1} + c$ (d) $\log(10^x + x^{10}) + c$ [Video Solution](#)
4. $\int \frac{x-1}{(x+1)\sqrt{x^3+x^2+x}} dx$ is equal to
(a) $\tan^{-1} \frac{\sqrt{x^2+x+1}}{x} + C$ (b) $2 \tan^{-1} \frac{\sqrt{x^2+x+1}}{x}$
(c) $3 \tan^{-1} \frac{\sqrt{x^2+x+1}}{x} + C$ (d) None of these [Video Solution](#)
5. $\int (x+1)(x+2)^7(x+3) dx$ is equal to
(a) $\frac{(x+2)^{10}}{10} - \frac{(x+2)^8}{8} + c$ (b) $\frac{(x+1)^2}{2} - \frac{(x+2)^8}{8} - \frac{(x+3)^2}{2} + c$
(c) $\frac{(x+2)^{10}}{10} + c$ (d) $\frac{(x+1)^2}{2} + \frac{(x+2)^8}{8} + \frac{(x+3)^2}{2} + c$ [Video Solution](#)
6. $\int \frac{1+\tan^2 x}{1-\tan^2 x} dx$ is equal to
(a) $\log \left(\frac{1-\tan x}{1+\tan x} \right) + c$ (b) $\log \left(\frac{1+\tan x}{1-\tan x} \right) + c$
(c) $\frac{1}{2} \log \left(\frac{1-\tan x}{1+\tan x} \right) + c$ (d) $\frac{1}{2} \log \left(\frac{1+\tan x}{1-\tan x} \right) + c$ [Video Solution](#)
7. If $\int \frac{\log(x+\sqrt{1+x^2})}{\sqrt{1+x^2}} dx = g \circ f(x) + \text{constant}$, then
(a) $f(x) = \log(x + \sqrt{x^2 + 1})$ (b) $f(x) = \log(x + \sqrt{x^2 + 1})$ and $g(x) = x^2$
(c) $f(x) = \log(x + \sqrt{x^2 + 1})$ and $g(x) = \frac{x^2}{2}$ (d) $f(x) = \frac{x^2}{2}$ and $g(x) = \log(x + \sqrt{x^2 + 1})$ [Video Solution](#)
8. $\int \frac{\sin 2x}{1+\cos^2 x} dx$ is equal to
(a) $-\frac{1}{2} \log(1 + \cos^2 x) + c$ (b) $2 \log(1 + \cos^2 x) + c$
(c) $\frac{1}{2} \log(1 + \cos 2x) + c$ (d) $c - \log(1 + \cos^2 x)$ [Video Solution](#)
9. $\int \frac{x+2}{(x^2+3x+3)\sqrt{x+1}} dx$ is equal to



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(a) $\frac{1}{\sqrt{3}} \tan^{-1} \left(\frac{x}{\sqrt{3(x+1)}} \right)$

(b) $\frac{2}{\sqrt{3}} \tan^{-1} \left(\frac{x}{\sqrt{3(x+1)}} \right)$

(c) $\frac{2}{\sqrt{3}} \tan^{-1} \left(\frac{x}{\sqrt{x+1}} \right)$

(d) None of these

[Video Solution](#)

10. $\int \frac{dx}{x(x^n+1)}$ is equal to

(a) $\frac{1}{n} \log \left(\frac{x^n}{x^n+1} \right) + c$

(b) $\frac{1}{n} \log \left(\frac{x^n+1}{x^n} \right) + c$

(c) $\log \left(\frac{x^n}{x^n+1} \right) + c$

(d) None of the above

[Video Solution](#)

11. $\int \log_{10} x \, dx$ is:

(a) $x(\log_{10} x - \log_{10} e) + C$

(b) $\log_e 10 \cdot x \log_e \left(\frac{x}{e} \right) + C$

(c) $\log_{10} e \cdot x \log_e \left(\frac{x}{e} \right) + C$

(d) $\frac{1}{x} + C$

[Video Solution](#)

[NIMCET 2013]

12. $f \int \frac{xe^x}{\sqrt{1+e^x}} dx = f(x) \sqrt{1+e^x} - 2 \log \frac{\sqrt{1+e^x}-1}{\sqrt{1+e^x}+1} + C$, then $f(x)$ is

(a) $2x - 1$

(b) $2x - 4$

(c) $x + 4$

(d) $x - 4$

[Video Solution](#)

[NIMCET 2014]

13. The value of $\int \frac{(x+1)}{x(xe^x+1)} dx$ is equal to

(a) $\log \left[\frac{1+xe^x}{xe^x} \right] + C$

(b) $\log [xe^x(1+e^x)] + C$

(c) $\log \left[\frac{1}{1+xe^x} \right] + C$

(d) $\log \left| \frac{xe^x}{1+xe^x} \right| + C$

[Video Solution](#)

[NIMCET 2014]

14. The value of $\int \sqrt{x} e^{\sqrt{x}} dx$ is equal to

(a) $2\sqrt{x} - e^{\sqrt{x}} - 4\sqrt{xe^{\sqrt{x}}} + C$

(b) $(2x - 4\sqrt{x} + 4)e^{\sqrt{x}} + C$

(c) $(2x + 4\sqrt{x} + 4)e^{\sqrt{x}} + C$

(d) $(1 - 4\sqrt{x})e^{\sqrt{x}} + C$

[Video Solution](#)

[NIMCET 2014]

15. If $\int e^x(f(x) - f'(x))dx = \phi(x)$, then the value of $\int e^x f(x) dx$ is

(a) $\phi(x) + e^x f(x)$

(b) $\phi(x) - e^x f(x)$

(c) $\frac{1}{2} [\phi(x) + e^x f(x)]$

(d) $\frac{1}{2} [\phi(x) + e^x f'(x)]$

[Video Solution](#)

[NIMCET 2015]

16. $\int \left\{ \frac{\log(x-1)}{1+(\log x)^2} \right\}^2 dx$ is equal to

(a) $\frac{xe^x}{1+x^2} + C$

(b) $\frac{x}{(\log x)^2+1} + C$

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

(d) $\frac{x}{x^2+1} + C$

[Video Solution](#)

[NIMCET 2016]

17. $\int \frac{x^2-1}{x^3\sqrt{2x^4-2x^2+1}} dx$ is equal to

(a) $\frac{\sqrt{2x^4-2x^2+1}}{x^2} + C$

(b) $\frac{\sqrt{2x^4-2x^2+1}}{x^3} + C$



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(c) $\frac{\sqrt{2x^4-2x^2+1}}{x} + C$

(d) $\frac{\sqrt{2x^4-2x^2+1}}{2x^2} + C$

[Video Solution](#)

[NIMCET 2022, 2016]

18. The integral $\int \sqrt{1+2\cot x(\operatorname{cosec} x + \cot x)} dx$, ($0 < x < \pi/2$) (where C is a constant of integration) is equal to

(a) $2 \log \left(\sin \frac{x}{2} \right) + C$

(b) $2 \log \left(\cos \frac{x}{2} \right) + C$

(c) $4 \log \left(\cos \frac{x}{2} \right) + C$

(d) $4 \log \left(\sin \frac{x}{2} \right) + C$

[Video Solution](#)

[NIMCET 2019]

19. If $\int \cos x \cos 2x \cos 5x dx = A_1 \sin 2x + A_2 \sin 4x + A_3 \sin 6x + A_4 \sin 8x + c$, then the values of A_1, A_2, A_3, A_4 are

(a) $A_1 = \frac{1}{2}, A_2 = \frac{1}{4}, A_3 = \frac{1}{6}, A_4 = \frac{1}{8}$

(b) $A_1 = \frac{1}{8}, A_2 = \frac{1}{16}, A_3 = \frac{1}{24}, A_4 = \frac{1}{32}$

(c) $A_1 = \frac{1}{6}, A_2 = \frac{1}{12}, A_3 = \frac{1}{18}, A_4 = \frac{1}{24}$

(d) $A_1 = \frac{1}{4}, A_2 = \frac{1}{8}, A_3 = \frac{1}{12}, A_4 = \frac{1}{16}$

[Video Solution](#)

[NIMCET 2019]

20. Evaluate $\int e^x \left(\frac{1+\sin x \cos x}{\cos^2 x} \right) dx$

(a) $e^x \cos x + C$

(b) $e^x \sec x \tan x + C$

(c) $e^x \tan x + C$

(d) $e^x \cos^2 x - 1 + C$

[Video Solution](#)

[NIMCET 2020]

21. If $\int \sec^2 x \operatorname{cosec}^4 x dx = -\frac{1}{3} \cot^3 x + k \tan x - 2 \cot x + C$, the value of k is

(a) 1

(b) 2

(c) 3

(d) 4

[Video Solution](#)

[NIMCET 2020]

22. $\int 3^{3^{3^x}} \cdot 3^{3^x} \cdot 3^x dx$ is equal to

(a) $\frac{3^{3^x} \cdot 3^x}{(\log 3)^3} + c$

(b) $\frac{3^x}{(\log 3)^3} + c$

(c) $\frac{3^{3^x}}{(\log 3)^3} + c$

(d) $\frac{3^{3^{3^x}}}{(\log 3)^3} + c$

[Video Solution](#)

[NIMCET 2021]

23. $\int e^x (\sin hx + \cos hx) dx = ?$

(a) $e^x \operatorname{sech} x + C$

(b) $e^x \cos hx + C$

(c) $\sinh 2x + C$

(d) $\cosh 2x + C$

[Video Solution](#)

[NIMCET 2021]

24. The value of $\int \frac{(x^2-1)dx}{x^3\sqrt{2x^4-2x^2+1}}$ is

(a) $2\sqrt{2 - \frac{2}{x^2} + \frac{1}{x^4}} + C$

(b) $2\sqrt{2 + \frac{2}{x^2} + \frac{1}{x^4}} + C$

(c) $\frac{1}{2}\sqrt{2 - \frac{2}{x^2} + \frac{1}{x^4}} + C$

(d) $\frac{1}{2}\sqrt{2 + \frac{2}{x^2} - \frac{1}{x^4}} + C$

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[NIMCET 2022, 2016]



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Answer Key

Ques.	1	2	3	4	5	6	7	8	9	10
Ans.	B	C	D	D	A	D	C	D	B	A
Ques.	11	12	13	14	15	16	17	18	19	20
Ans.	A,C	B	D	B	C	B	D	A	D	C
Ques.	21	22	23	24						
Ans.	A	D	B	C						