MATHS

BOOKS - NCERT MATHS (ENGLISH)

INTEGRALS

Short Answer

1. verify that $\int \frac{2x-1}{2x+3} dx = x - \log\left|(2x+3)^2\right| + C$

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2. Verify that $\int \frac{2x+3}{x^2+3x} dx = \log\left|x^2+3x\right| + c$

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

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4. $\int \frac{e^{6\log x} - e^{5\log x}}{e^{4\log x} - e^{3\log x}} dx$

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

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6. $\int \frac{dx}{1+\cos x}$

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7. $\int \tan^2 x \sec^4 x dx$

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8. $\int \frac{\sin x + \cos x}{\sqrt{1 + \sin 2x}} dx$

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9. $\int \sqrt{1 + \sin x} dx$

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10. $\int \frac{x}{\sqrt{x} + 1} dx$

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11. $\int \sqrt{\frac{a+x}{a-x}} dx$

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12. Evaluate: $\int \frac{x^{1/2}}{1+x^{3/4}} dx$

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13. $\int \frac{\sqrt{1+x^2}}{x^4} dx$

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14. $\int \frac{dx}{\sqrt{16-9x^2}}$

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15. $\int \frac{dt}{\sqrt{3t - 2t^2}}$

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16. $\int \frac{3x - 1}{\sqrt{x^2 + 9}} dx$

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17. $\int \sqrt{5 - 2x + x^2} dx$

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18. $\int \frac{x}{x^4 - 1} dx$

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19. $\int \frac{x^2}{1-x^4} dx$

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20. Evaluate: $\int \sqrt{2ax - x^2}\, dx$

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21. $\int \frac{\sin^{-1} x}{(1-x^2)^{\frac{3}{2}}} dx$

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22. $\int \frac{\cos 5x + \cos 4x}{1 - 2\cos 3x} dx$

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23. $\int \frac{\sin^6 x + \cos^6 x}{\sin^2 x \cos^2 x} dx$

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24. Find $\int \frac{\sqrt{x}}{\sqrt{a^3 - x^3}} dx$

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25. $\int \frac{\cos x - \cos 2x}{1 - \cos x} dx$

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26. $\int \frac{1}{x\sqrt{x^4 - 1}} dx$

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27. Evaluate $\int_0^2 \left(x^2+3\right)dx$ as limit of sums.

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28. $\int_0^2 e^x\,dx$

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29. $\int_0^1 \frac{dx}{e^x+e^{-x}}$

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30. $\int_0^{\pi/2} \frac{\tan x}{1+m^2\tan^2 x}\,dx$

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31. Evaluate the following definite integrals (1-58):

$$\int_1^2 \frac{1}{\sqrt{(x-1)(2-x)}}dx$$

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32. $\int_0^1 \frac{x}{\sqrt{1+x^2}}dx$

A. $-\sqrt{2}-1$

B. $\sqrt{2}+1$

C. $-\sqrt{2}+1$

D. $\sqrt{2}-1$

Answer: D

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33. $\int_0^{\pi} x \sin x \cos^2 x \, dx$

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34. Evaluate: $\int_0^{1/2} \frac{1}{(1+x^2)\sqrt{1-x^2}}$

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Long Answer

1. Evaluate: $\int \frac{x^2}{x^4 - x^2 - 12} \, dx$

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2. Evaluate: $\int \frac{x^2}{(x^2+a^2)(x^2+b^2)}dx$

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3. If $\int_{\frac{\pi}{4}}^{\frac{3\pi}{4}} \frac{x}{1+\sin x}dx = k\left(\sqrt{2}-1\right)$, then k= (A) 0 (B) π (C) 2π (D) none of these

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4. Evaluate: $\int \frac{2x-1}{(x-1)(x+2)(x-3)}dx$

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5. $\int e^{\tan^{-1}x}\left(1+\frac{x}{1+x^2}\right)dx$

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6. $\int \sin^{-1} \sqrt{\frac{x}{a+x}} dx$

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7. $\int_{\pi/3}^{\pi/2} \frac{\sqrt{1+\cos x}}{(1-\cos x)^{5/2}} dx$

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8. $\int e^{-3x} \cos^3 x dx$

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9. $\int \sqrt{\tan x}. dx$

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10. Evaluate: $\int_0^{\pi/2} \frac{1}{\left(a^2\cos^2 x + b^2\sin^2 x\right)^2} dx$

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11. Evaluate : $\int_0^1 x\log(1+2x)dx$

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12. $\int_0^{\pi} x\log\sin x\ dx$

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13. Prove that $\int_{-\pi/4}^{\pi/4} \log(\sin x + \cos x)\ dx = -\frac{\pi}{4}\log 2.$

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Objective Type

1. Evaluate: $\int \frac{\cos 2x - \cos 2\theta}{\cos x - \cos \theta} dx$

A. $2(\sin x + x \cos \theta) + C$

B. $2(\sin x - x \cos \theta) + C$

C. $2(\sin x + 2x \cos \theta) + C$

D. $2(\sin x - 2x \cos \theta) + C$

Answer: A

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2. Evaluate: $\int \frac{1}{\sin(x-a)s \in (x-b)} dx$

A. $\sin(b-a)\log\left|\frac{\sin(x-b)}{\sin(x-a)}\right|+C$

B. $\cos ec(b-a)\log\left|\frac{\sin(x-a)}{\sin(x-b)}\right|+C$

C. $\cos ec(b-a)\log\left|\frac{\sin(x-b)}{\sin(x-a)}\right|+C$

D. $\sin(b-a)\log\left|\frac{\sin(x-a)}{\sin(x-b)}\right|+C$

Answer: A

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3. $\int \tan^{-1}\sqrt{x}\,dx$ is equal to

A. $(x+1)\tan^{-1}\sqrt{x}-\sqrt{x}+C$

B. $x\tan^{-1}\sqrt{x}-\sqrt{x}+C$

C. $\sqrt{x}-x\tan^{-1}\sqrt{x}+C$

D. $\sqrt{x}-(x+1)\tan^{-1}\sqrt{x}+C$

Answer: A

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4. $\int \frac{x^9}{(4x^2+1)^6} dx$ is equal to

A. $\frac{1}{5x}\left(4+\frac{1}{x^2}\right)^{-5}+C$

B. $\frac{1}{5}\left(4+\frac{1}{x^2}\right)^{-5}+C$

C. $\frac{1}{10x}(1+4x)^{-5}+C$

D. $\frac{1}{10}\left(\frac{1}{x^2}+4\right)^{-5}+C$

Answer: D

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5. If

$$\int \frac{dx}{(x+2)(x^2+1)} = a\ln(1+x^2) + b\tan^{-1}x + \frac{1}{5}\ln|x+2| + C.$$

Then

A. $a = \frac{-1}{10}, b = \frac{-2}{5}$

B. $a = \frac{1}{10}, b = -\frac{2}{5}$

C. $a = \frac{-1}{10}, b = \frac{2}{5}$

D. $a = \frac{1}{10}, b = \frac{2}{5}$

Answer: A

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6. $\int \frac{x^3}{x+1} dx$ is equal to:

A. $x + \frac{x^2}{2} + \frac{x^3}{3} - \log|1-x| + C$

B. $x + \frac{x^2}{2} - \frac{x^3}{3} - \log|1 - x| + C$

C. $x - \frac{x^2}{2} - \frac{x^3}{3} - \log|1 + x| + C$

D. $x - \frac{x^2}{2} + \frac{x^3}{3} - \log|1 + x| + C$

Answer: A

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7. Evaluate $\int \frac{x - \sin x}{1 - \cos x} dx.$

A. $\log|1 + \cos x| + C$

B. $\log|x + \sin x| + C$

C. $x - \tan' \frac{x}{2} + C$

D. $x. \tan' \frac{x}{2} + C$

Answer: A

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8. $\int \frac{x^3}{\sqrt{1+x^2}}\,dx = a\left(1+x^2\right)^{3\backslash 2} + b\sqrt{1+x^2} + C$, then

(a) $a = \frac{1}{3},\ b = 1$

(b) $a = -\frac{1}{3},\ b = 1$

(c) $a = -\frac{1}{3},\ b = -1$

(d) $a = \frac{1}{3},\ b = -1$

A. $a = \frac{1}{3}, b = 1$

B. $a = \frac{-1}{3}, b = 1$

C. $a = \frac{-1}{3}, b = -1$

D. $a = \frac{1}{3}, b = -1$

Answer: A

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9. Then integral $\int_{\pi/4}^{\frac{3\pi}{4}} \frac{dx}{1+\cos x}$ is equal to

A. 1

B. 2

C. 3

D. 4

Answer: A

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10. Prove that : $\int_0^{\frac{\pi}{2}} \sqrt{1-\sin 2x}dx = 2\left(\sqrt{2}-1\right)$

A. $2\sqrt{2}$

B. $2\left(2+\sqrt{2}\right)$

C. 2

D. $2\left(\sqrt{2}-1\right)$

Answer: A

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11. $\int_0^{\pi/2} \cos x \, e^{\sin x} \, dx$ is equal to

A. $e+1$

B. $e-1$

C. e

D. $-e$

Answer: b

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12. $\int \frac{x+3}{(x+4)^2} e^x \, dx$ is equal to

A. $e^x \left(\frac{1}{x+4} \right) + C$

B. $e^{-x} \left(\frac{1}{x+4} \right) + C$

C. $e^{-x} \left(\frac{1}{x-4} \right) + C$

D. $e^{2x} \left(\frac{1}{x-4} \right) + C$

Answer: A

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Fillers

1. If $\int_0^a \frac{1}{1+4x^2} dx = \frac{\pi}{8}$, then $a =$

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2. $\int \frac{\sin x}{3+4\cos^2 x} dx$

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3. The value of $\int_{-\pi}^{\pi} \sin^3 x \cos^2 x dx$ is

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