MATHS

BOOKS - NDA PREVIOUS YEARS

INDEFINITE INTEGRATION

Mcq

1. If $f(x) = \ln\left(x - \sqrt{1 + x^2}\right)$, then what is $\int f''(x) \, dx$ equal to ?

A. $\dfrac{1}{\left(x - \sqrt{1 + x^2}\right)} + c$

B. $-\dfrac{1}{\sqrt{1+x^2}} + c$

C. $-\sqrt{1+x^2} + c$

D. $\ln\left(x - \sqrt{1+x^2}\right) + c$

Answer: B

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2. If $\displaystyle\int \sec x \cosec x\, dx = \log|g(x)| + c$, then what is g(x) equal to ?

A. $\sin x \cos x$

B. $\sec^2 x$

C. $\tan x$

D. $\log|\tan x|$

Answer: C

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3. What is the value of $\displaystyle\int \frac{dx}{(x^2 + a^2)(x^2 + b^2)}$?

A.

$$\int \frac{[\{\tan^{-1}(x/a)\}/a - \{\tan^{-1}(x/b)\}/b]}{(a^2 + b^2)} + c$$

B.

$$\int \frac{[\{\tan^{-1}(x/a)\}/a + \{\tan^{-1}(x/b)\}/b]}{(a^2 + b^2)} + c$$

C.

$$\int \frac{[\{\tan^{-1}(x/a)\}/a + \{\tan^{-1}(x/b)\}/b]}{(b^2 - a^2)} + c$$

D.

$$\int \frac{[\{\tan^{-1}(x/a)\}/a + \{\tan^{-1}(x/b)\}/b]}{(b^2 - a^2)} + c$$

Answer: D

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4. What is the value of $\int (\sqrt{x} + x)^{-1} dx$?

A. $\ln(x + \sqrt{x}) + c$

B. $2\ln(1 + \sqrt{x}) + c$

C. $2\ln(x + \sqrt{x}) + c$

D. $2\ln(x - \sqrt{x}) + c$

Answer: B

5. Evaluate: (i) $\int \dfrac{\sin\sqrt{x}}{\sqrt{x}}\,dx$ (ii) $\int \dfrac{(x+1)e^x}{\sin^2(x\,e^x)}\,dx$

A. $-e^x \cot x + c$

B. $\cos^2(xe^x) + c$

C. $\log\sin(xe^x) + c$

D. $-\cot(xe^x) + c$

Answer: D

6. What is $\int \log(x + 1). \, dx$ equal to?

A. $x \log(x + 1) - x + c$

B. $(x + 1)\log(x + 1) - x + c$

C. $\dfrac{1}{x + 1} + c$

D. $\dfrac{\log(x + 1)}{x + 1} + c$

Answer: B

7. If $\int \dfrac{dx}{f(x)} = \log\{f(x)\}^2 + c$, then what is f(x) equal to ?

A. $2x + \alpha$

B. $x + \alpha$

C. $\dfrac{x}{2} + \alpha$

D. $x^2 + \alpha$

Answer: C

8. What is $\int (e^x + 1)^{-1} dx$ equal to?

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

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

C. $-l(e^{-x} + 1) + c$

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

Answer: C

9. What is $\displaystyle\int \dfrac{d\theta}{\sin^2\theta + 2\cos^2\theta - 1}$ equal to ?

A. $\tan\theta + c$

B. $\cot\theta + c$

C. $\dfrac{1}{2}\tan\theta + c$

D. $\dfrac{1}{2}\cot\theta + c$

Answer: A

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10. What is $\displaystyle\int \sin x \, \log(\tan x)\,dx$ equal to ?

A. $\cos x \log \tan x + \log \tan(x/2) + c$

B. $- \cos x \log \tan x + \log \tan(x/2) + c$

C. $\cos x \log \tan x + \log \cot(x/2) + c$

D. $- \cos x \log \tan x + \log \cot(x/2) + c$

Answer: B

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11. Assertion (A) :
$$\int \frac{e^x}{x}(1 + x \log x)dx = e^x \log x + c.$$ Reason (R) :
$$\int e^x[f(x) + f'(x)]dx = e^x f(x) + c$$

A. Both A and R are true and R is the correct

explanation of A

B. Both A and R are true but R is not the

correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: B

12. What is $\int \tan^2 x \sec^4 x \, dx$ equal to ?

A. $\dfrac{\sec^5 x}{5} + \dfrac{\sec^3 x}{3} + c$

B. $\dfrac{\tan^5 x}{5} + \dfrac{\tan^3 x}{3} + c$

C. $\dfrac{\tan^5 x}{5} + \dfrac{\sec^3 x}{3} + c$

D. $\dfrac{\sec^5 x}{5} + \dfrac{\tan^3 x}{3} + c$

Answer: B

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13. What $\displaystyle\int \sec x^\circ \, dx$ is equal to ?

A. $\log(\sec x^\circ + \tan x^\circ) + c$

B. $\dfrac{\pi \log \tan\left(\frac{\pi}{4} + \frac{\pi}{2}\right)}{180°} + c$

C. $\dfrac{180° \log \tan\left(\frac{\pi}{4} + \frac{x}{2}\right)}{\pi} + c$

D. $\dfrac{180° \log \tan\left(\frac{\pi}{4} + \frac{x}{360°}\right)}{\pi} + c$

Answer: A

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14. What is $\displaystyle\int \dfrac{a + b \sin x}{\cos^2 x}\,dx$ **equal to ?**

A. $a \sec x + b \tan x + c$

B. $a \tan x + b \sec x + c$

C. $a \cot x + b \mathrm{cosec} x + c$

D. $a \mathrm{cosec} x + b \cot x + c$

Answer: B

15. What is $\int \dfrac{\log x}{(1 + \log x)^2} dx$ equal to?

where c is a constant

A. $\dfrac{1}{(1 + \log x)^3} + c$

B. $\dfrac{1}{(1 + \log x)^2} + c$

C. $\dfrac{x}{(1 + \log x)} + c$

D. $\dfrac{x}{(1 + \log x)^2} + c$

Answer: C

16. What is $\displaystyle\int e^{\ln x} \sin x \, dx$ equal to ?

Where 'c' is a constant of integration

A. $e^{\ln x}(\sin x - \cos x) + c$

B. $(\sin x - x \cos x) + c$

C. $(x \sin x + \cos x) + c$

D. $(\sin x + x \cos x) - c$

Answer: B

17. What is $\int \dfrac{x^4 + 1}{x^2 + 1} dx$ equal to ?

Where 'c' is a constant of integration

A. $\dfrac{x^3}{3} - x + 4\tan^{-1} x + c$

B. $\dfrac{x^3}{3} + x + 4\tan^{-1} x + c$

C. $\dfrac{x^3}{3} - x + 2\tan^{-1} x + c$

D. $\dfrac{x^3}{3} - x - 4\tan^{-1} x + c$

Answer: C

18. If $\int x^2 \ln x\, dx = \dfrac{x^3}{m}\ln x + \dfrac{x^3}{n} + c,$ then what

are the values of m and n respectively ?

where c is a constant od intergration

A. $\dfrac{1}{3} - \dfrac{1}{9}$

B. $3, \ -9$

C. $3, 9$

D. $3, 3$

Answer: B

19. What is $\int \dfrac{1}{1+e^x} dx$ equal to ?

where c is a constant of integration

A. $x - \log x + c$

B. $x - \log(\tan x) + c$

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

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

Answer: C

20. What is $\int \sqrt{x} e^{\sqrt{x}} dx$ equal to ?

Where 'c' is a constant of integration

A. $2e^{\sqrt{x}} \left(x - 2\sqrt{x} + 2 \right) + c$

B. $2e^{\sqrt{x}} \left(x + 2\sqrt{x} + 2 \right) + c$

C. $2e^{\sqrt{x}} \left(x + 2\sqrt{x} - 2 \right) + c$

D. $2e^{\sqrt{x}} \left(x - 2\sqrt{-2} \right) + c$

Answer: A

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21. What is $\int \sec^n x \tan x \, dx$ equal to ?

Where 'c' is a constant of integration

A. $\dfrac{\sec^n x}{n} + c$

B. $\dfrac{\sec^{n-1} x}{n-1} + c$

C. $\dfrac{\tan^n x}{n} + c$

D. $\dfrac{\tan^{n-1} x}{n-1} + c$

Answer: A

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22. What is $\displaystyle\int \frac{e^x(1+x)}{\cos^2(xe^x)}dx$ equal to ?

where c is a constant of integration

A. $xe^x + c$

B. $\cos(xe^x) + c$

C. $\tan(xe^x) + c$

D. $c\cosec(xe^x) + c$

Answer: C

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23. What is $\int e^x \left(\sqrt{x} + \dfrac{1}{2\sqrt{x}} \right) dx$ equal to

(where C is a constant of integration)

A. $xe^x + C$

B. $e^x \left(\sqrt{x} \right) + C$

C. $2e^x \left(\sqrt{x} \right) + C$

D. $2xe^x + C$

Answer: B

24. What is $\int \dfrac{\sin \sqrt{x}}{\sqrt{x}} dx$ equal to ?

A. $\dfrac{\cos \sqrt{x}}{2} + C$

B. $2 \cos \sqrt{x} + C$

C. $\dfrac{-\cos \sqrt{x}}{2} + C$

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

Answer: D

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25. What is $\int \sin^{-1}(\cos x)dx$ equal to ?

Where K is a constant of integration

A. $\dfrac{x\pi}{2} - \dfrac{x^2}{2} + K$

B. $\dfrac{\pi}{2} + \dfrac{x^2}{2} + K$

C. $-\dfrac{x\pi}{2} - \dfrac{x^2}{2} + K$

D. $\dfrac{\pi}{2} - \dfrac{x^2}{2} + K$

Answer: A

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26. What is $\int \dfrac{dx}{\sin^2 x \cos^2 x}$ equal to ?

where c is the constant of integration

    A. $\tan x + \cot x + c$

    B. $\tan x - \cot x + c$

    C. $\left(\tan x + \cot x\right)^2 + c$

    D. $\left(\tan x - \cot x\right)^2 + c$

Answer: B

27. Consider the following :

1. $\int ln10\,dx = x + c$ 2. $\int 10^x\,dx = 10^x + c$

where c is the constant of integration. Which of the above is/are correct ?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: D

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28. What is $\int (x^2 + 1)^{\frac{5}{2}} x\,dx$ equal to ?

where c is a constant of integration

A. $(x^2 + 1)^{\frac{7}{2}} + C$

B. $\dfrac{2}{7}(x^2 + 1)^{\frac{7}{2}} + c$

C. $\dfrac{1}{7}(x^2 + 1)^{\frac{7}{2}} + c$

D. None of the above

Answer: C

29. What is $\int a^x e^x \, dx$ equal to ?

where c is the constant of integration

A. $\dfrac{a^x e^x}{lna} + c$

B. $a^x e^x + c$

C. $\dfrac{a^x e^x}{ln(ae)} + c$

D. None of the above

Answer: C

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30. What is $\int \frac{lnx}{x} dx$ equal to ?

A. $\frac{(lnx)^2}{2} + c$

B. $\frac{(lnx)}{2} + c$

C. $(lnx)^2 + c$

D. None of the above

Answer: A

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31. What is $\int \left(\dfrac{1}{\cos^2 x} - \dfrac{1}{\sin^x x} \right) dx$ equal to ?

where c is the constant of integration

A. $2\cosec 2x + c$

B. $-2 \cot 2x + c$

C. $2 \sec 2x + c$

D. $-2 \tan 2x + c$

Answer: A

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32. What is $\int e^{lnx}\,dx$ equal to ?

where c is constant of integration

A. $xe^{lnx} + c$

B. $-xe^{-lnx} + c$

C. $x + c$

D. $\dfrac{x^2}{2} + c$

Answer: D

33. What is $\int \dfrac{dx}{x \ln x}$ equal to ?

A. $ln(\ln x) + c$

B. $lnx + c$

C. $(lnx)^2 + c$

D. None of the above

Answer: A

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34. What is $\int \dfrac{dx}{\sqrt{4 + x^2}}$ equal to ?

A. $ln\left|\sqrt{4+x^2} + x\right| + c$

B. $ln\left|\sqrt{4+x^2} - x\right| + c$

C. $\sin^{-1}\left(\dfrac{x}{2}\right) + c$

D. None of these

Answer: A

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35. What is $\displaystyle\int \sin^2 x\,dx + \int \cos^2 x\,dx$ equal to ?

Where c is an arbitary constant

A. $x + c$

B. $\dfrac{x^2}{2} + c$

C. $x^2 + c$

D. None of these

Answer: A

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36. What is $\displaystyle\int e^{e^x} e^x dx$ equal to ?

A. $e^{e^x} + c$

B. $2e^{e^x} + c$

C. $e^{e^x} e^x + c$

D. $2e^{e^x}e^x + c$

Answer: A

37. What is $\int (x\cos x + \sin x)dx$ equal to ?

Where c is an arbitrary constant

A. $x\sin x + c$

B. $x\cos x + c$

C. $-x\sin x + c$

D. $-x\cos x + c$

Answer: A

38. What is the equation of a curve passing through (0, 1) and whose differential equation is given by $dy = y \tan x \, dx$?

A. $y = \cos x$

B. $y = \sin x$

C. $y = \sec x$

D. $y = \text{cosec} x$

Answer: C

39. Consider

$$\int x \tan^{-1} x\, dx = A(x^2 + 1)\tan^{-1} x + Bx + C,$$

where C is the constant of integration

What is the value of A ?

A. 1

B. $1/2$

C. $-1/2$

D. $1/4$

Answer: B

40. Consider

$$\int x \tan^{-1} x dx = A(x^2 + 1)\tan^{-1} x + Bx + C,$$

where C is the constant of integration

What is the value of B ?

A. 1

B. $1/2$

C. $-1/2$

D. $1/4$

41. Consider the function f ''(x) = sec^4 (x) + 4 with

f(0) = 0 and f'(0) = 0 $f'(x)$ equal to ?

A. $\tan x - \dfrac{\tan^3 x}{3} + 4x$

B. $\tan x + \dfrac{\tan^3 x}{3} + 4x$

C. $\tan x - \dfrac{\sec^3 x}{3} + 4x$

D. $-\tan x - \dfrac{\tan^3 x}{3} + 4x$

Answer: B

42. Consider the function

$$f''(x) = \sec^4 x + 4 \quad \text{with} \quad f(0) = 0 \text{ and } f'(0) = 0$$

What is $f(x)$ equal to ?

A. $\dfrac{2\ln \sec x}{3} + \dfrac{\tan^2 x}{6} + 2x^2$

B. $\dfrac{3\ln \sec x}{2} + \dfrac{\cot^2 x}{6} + 2x^2$

C. $\dfrac{4\ln \sec x}{3} + \dfrac{\sec^2 x}{6} + 2x^2$

D. $\ln \sec x + \dfrac{\tan^4 x}{12} + 2x^2$

Answer: A

43. $\int \dfrac{xe^x}{(1+x)^2} dx$ is equal to

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

B. $(x+1)e^x + c$

C. $\dfrac{e^x}{x+1} + c$

D. $\dfrac{e^x}{(x+1)^2} + c$

Answer: C

44. The integral $\int \dfrac{dx}{a\cos x + b\sin x}$ is of the form $\dfrac{1}{r}$ $\text{In}\left[\tan\left(\dfrac{x+\alpha}{2}\right)\right]$

What is r equal to ?

A. $a^2 + b^2$

B. $\sqrt{a^2 + b^2}$

C. $a + b$

D. $\sqrt{a^2 + b^2}$

Answer: B

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45. The integral $\displaystyle\int \frac{dx}{a\cos x + b\sin x}$ is of the form $\dfrac{1}{r}\, \text{In}\left[\tan\left(\dfrac{x + \alpha}{2}\right)\right]$

What is α equal to ?

    A. $\tan^{-1}\left(\dfrac{a}{b}\right)$

    B. $\tan^{-1}\left(\dfrac{b}{a}\right)$

    C. $\tan^{-1}\left(\dfrac{a + b}{a - b}\right)$

    D. $\tan^{-1}\left(\dfrac{a - b}{a + b}\right)$

Answer: A

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46. What is $\int \dfrac{dx}{\sqrt{x^2 + a^2}}$ equal to ?

A. $\ln \left| \dfrac{x + \sqrt{x^2 + a^2}}{a} \right| + c$

B. $\ln \left| \dfrac{x - \sqrt{x^2 + a^2}}{a} \right| + c$

C. $\ln \left| \dfrac{x^2 + \sqrt{x^2 + a^2}}{a} \right| + c$

D. None of these

Answer: A

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47. $\int \dfrac{(x^4 - 1)\, dx}{x^2 \sqrt{x^4 + x^2 + 1}}$

A. $\sqrt{\dfrac{x^4 + x^2 + 1}{x}} + c$

B. $\sqrt{x^4 + 2 - \dfrac{1}{x^2}} + c$

C. $\sqrt{x^2 + \dfrac{1}{x^2} + 1} + c$

D. $\sqrt{\dfrac{x^4 - x^2 + 1}{x}} + c$

Answer: C

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48. $\displaystyle\int \dfrac{e^{\sin x}}{\cos^2 x}\left(x \cos^3 x - \sin x\right)dx$

A. $(x + \sec x)e^{\sin x} + c$

B. $(x - \sec x)e^{\sin x} + c$

C. $(x + \tan x)e^{\sin x} + c$

D. $(x - \tan x)e^{\sin x} + c$

Answer: B

49. What is $\displaystyle\int \frac{dx}{x(x^7 + 1)}$ equal to?

A. $\dfrac{1}{2}\ln\left|\dfrac{x^7 - 1}{x^7 + 1}\right| + c$

B. $\dfrac{1}{7}\ln\left|\dfrac{x^7 + 1}{x^7}\right| + c$

C. $\ln\left|\dfrac{x^7 - 1}{7x}\right| + c$

D. $\dfrac{1}{7}\ln\left|\dfrac{x^7}{x^7 + 1}\right| + c$

Answer: D

50. What is $\displaystyle\int \frac{\left(x^{e-1} + e^{x-1}\right)dx}{x^e + e^x}$ equal to ?

A. $\dfrac{x^2}{2} + c$

B. $\ln\left(x + e\right) + c$

C. $\ln\left(x^e + e^x\right) + c$

D. $\dfrac{1}{e}\ \ln\ \left(x^e + e^x\right) + c$

Answer: D

51. Let F(x) be an indefinite integral of $\sin^2 x$

Statement-1: The function F(x) satisfies $F(x + \pi) = F(x)$ for all real x. because

Statement-2: $\sin^3(x + \pi) = \sin^2 x$ for all real x.

A) Statement-1: True , statement-2 is true, Statement -2 is not a correct explanation for statement -1

c) Statement-1 is True, Statement -2 is False.

D) Statement-1 is False, Statement-2 is True.

A. Both the Statement are true and Statement 2 is the correct explanation of Statement 1

B. Both the Statement are true but Statement 2

is not the correct explanation of Statement 1

C. Statement 1 is true but Statement 2 is false

D. Statement 1 is false but Statement 2 is true

Answer: B

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52. What is $\int \tan^{-1}(\sec x + \tan x)dx$ equal to ?

A. $\dfrac{\pi x}{4} + \dfrac{x^2}{4} + c$

B. $\dfrac{\pi x}{2} + \dfrac{x^2}{4} + c$

C. $\dfrac{\pi x}{4} + \dfrac{\pi x^2}{4} + c$

D. $\dfrac{\pi x}{4} - \dfrac{x^2}{4} + c$

Answer: A

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53. $\displaystyle\int (\ln x)^{-1} dx - \int (\ln x)^{-2} dx$ is equal to

A. $x(\ln \ x)^{-1} + c$

B. $x(\ln \ x)^{-2} + c$

C. $x(\ \ln \ x) + c$

D. $x(\ln \ x)^2 + c$

Answer: A

54. What is $\displaystyle\int \frac{dx}{2^x - 1}$ equal to ?

A. $\ln(2^x - 1) + c$

B. $\dfrac{\ln\left(1 - 2^{-x}\right)}{\ln 2} + c$

C. $\dfrac{\ln\left(2^{-x} - 1\right)}{2\ln 2} + c$

D. $\dfrac{\ln\left(1 + 2^{-x}\right)}{\ln 2} + c$

Answer: B

55. What is $\int \sin^3 x \cos x \, dx$ equal to ?

Where c is the constant of integration

A. $\cos^4 x + c$

B. $\sin^4 x + c$

C. $\dfrac{\left(1 - \sin^2 x\right)^2}{4} + c$

D. $\dfrac{\left(1 - \cos^2 x\right)^2}{4} + c$

Answer: D

56. What is $\int e^{\ln(\tan x)} \, dx$ equal to ?

A. $\ln |\tan x| + c$

B. $\ln |\sec x| + c$

C. $\tan x + c$

D. $e^{\tan x} + c$

Answer: B

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57. What is $\int \dfrac{dx}{a^2 \sin^2 x + b^2 \cos^2 x}$ equal to ?

A. $c + \dfrac{1}{ab}\tan^{-1}\left(\dfrac{a\tan x}{b}\right)$

B. $c - \dfrac{1}{ab}\tan^{-1}\left(\dfrac{b\tan x}{a}\right)$

C. $c + \dfrac{1}{ab}\tan^{-1}\left(\dfrac{b\tan x}{a}\right)$

D. None of these

Answer: A

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58. What is $\displaystyle\int \ln(x^2)\,dx$ equal to ?

A. $2x\ln(x) - 2x + c$

B. $\dfrac{2}{x} + c$

C. $2x \ln(x) + c$

D. $\dfrac{2 \ln(x)}{x} - 2x + c$

Answer: A

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59. What is $\displaystyle\int e^{x \ln(a)} \, dx$ equal to ?

A. $\dfrac{a^x}{\ln(a)} + c$

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

C. $\dfrac{e^x}{\ln(ae)} + c$

D. $\dfrac{ae^x}{\ln(a)} + c$

Answer: A

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