MATHS

BOOKS - BITSAT GUIDE

INDEFINITE INTEGRAL

Practice Exercise

1. If $\displaystyle\int \frac{f(x)}{\log \sin x} dx = \log\log\sin x,$ then f(x) is equal to

A. sinx

B. cosx

C. logsinx

D. cotx

Answer: D

2. If $\int f(x)dx = f(x)$, then $\int \{f(x)\}^2$ dx is equal to

A. $\frac{1}{2}\{f(x)\}^2$

B. $\{f(x)\}^3$

C. $\frac{\{(x)\}^2}{3}$

D. $\{f(x)\}^2$

Answer: A

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3.   If

$x = f''(t)\cos t + f'(t)\sin t, y = -f''(t)\sin t + f'(t)\cos t$ then $\int \left[\left(\frac{dx}{dt}\right.\right.$

dt equals

A. $f'(t) + f''(t) + C$

B. $f''(t) + f'''(t) + C$

C. $f(t) + f''(t) + C$

D. $f'''(t) - f''(t) + C$

Answer: C

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4. If $f(x) = \begin{vmatrix} 0 & x^2 - \sin x & \cos x - 2 \\ \sin x - x^2 & 0 & 1 - 2x \\ 2 - \cos x & 2x - 1 & 0 \end{vmatrix}$ then $\int f(x)$ dx is equal to

A. $\dfrac{x^3}{3} - x^2 \sin x + \sin 2x + C$

B. $\dfrac{x^3}{3} - x^2 \sin x - \cos 2x + C$

C. $\dfrac{x^3}{3} - x^2 \cos x - \cos 2x + C$

D. None of the above

Answer: D

▶

5. $\int \dfrac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 x \cos^2 x} dx$ is equal to

A. $\sin 2X + C$

B. $-\dfrac{1}{2}\sin 2x + C$

C. $\dfrac{1}{2}\sin 2x + C$

D. $-\sin 2x + C$

Answer: B

6. $\int \tan(x - \alpha).\tan(x + \alpha).\tan 2x\, dx$ is equal to

A. $\ln\left| \dfrac{\sqrt{sex2x}.\,sex(x - \alpha)}{\sec(s - \alpha)} \right| + C$

B. $\ln\left| \dfrac{\sqrt{sex2x}}{\sec(s - \alpha).\,sc(x + \alpha)} \right| + C$

C. $\ln\left| \dfrac{\sqrt{sex2x}.\,\sec(x - \alpha)}{\sec(x + \alpha)} \right| + C$

D. $\ln \left| \dfrac{\sec 2x}{\sec(x - \alpha) \cdot \sec(x + \alpha)} \right| + C$

Answer: B

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7. $\displaystyle \int \dfrac{x^2 + \cos^2 x}{x^2 + 1 \cdot \csc^2 x \, dx}$ is equal to

A. $\cot x + \cot^{-1} x + C$

B. $-e^{\ln \, \tan^{-1} x} - \cot x + C$

C. $C - \cot x + \cot^{-1} x$

D. $-\tan^{-1} x - \dfrac{\cos ecx}{\sec x} + C$

Answer: C

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8. $\displaystyle \int e^{3 \log x} \left(x^4 + 1\right)^{-1} dx$ 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

Answer: B

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9. If $\int \frac{2^x}{\sqrt{1 - 4^x}} dx = k \sin^{-1}(2^x) + C$, then k is equal to

A. log2

B. $\frac{1}{2}\log 2$

C. $\frac{1}{2}$

D. $\frac{1}{\log 2}$

Answer: D

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10. $\displaystyle\int \frac{(\sin\theta + \cos\theta)}{\sqrt{\sin 2\theta}} dth\eta$ is equal to

A. $\log\left|\cos\theta - \sin\theta + \sqrt{\sin 2\theta}\right| + C$

B. $\log\left|\sin\theta - \cos\theta + \sqrt{\sin 2\theta}\right| + C$

C. $\sin^{-1}(\sin\theta - \cos\theta) + C$

D. $\sin^{-1}(\sin\theta + \cos\theta) + C$

Answer: C

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11. $\displaystyle\int \frac{\text{In}(x+1) - \text{In}x}{x(x+1)} dx$ is equal to

A. $-\dfrac{1}{2}\left[\text{In}\left(\dfrac{x+1}{x}\right)\right]^2 + C$

B. $-\text{In}(x+1)^2 - (\text{In}x)^2 + C$

C. $-\text{In}\left[\text{In}\dfrac{x+1}{x}\right] + C$

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

Answer: A

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12. $\displaystyle\int \dfrac{\left(x - x^5\right)^{1/5}}{x^6}\,dx$ is equal to

A. $\dfrac{5}{24}\left(\dfrac{1}{x^4} - 1\right)^{6/5} + C$

B. $\dfrac{5}{24}\left(1 - \dfrac{1}{x^4}\right)^{6/5} + C$

C. $\dfrac{-5}{24}\left(\dfrac{1}{x^4} - 1\right)^{6/5} + C$

D. $\dfrac{5}{12}\left(1 + \dfrac{1}{x^4}\right)^{6/5} + C$

Answer: C

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13. $\displaystyle\int \dfrac{x^3}{\left(1 + x^2\right)^{1/3}}\,dx$ is equal to

A. $\dfrac{20}{3}\left(1+x^2\right)^{2/3}\left(2x^2-3\right)+C$

B. $\dfrac{3}{20}\left(1+x^2\right)^{2/3}\left(2x^2-3\right)+C$

C. $\dfrac{3}{20}\left(1+x^2\right)^{2/3}\left(2x^2+3\right)+C$

D. $\dfrac{3}{20}\left(1+x^2\right)^{3/2}\left(2x^2-3\right)+C$

Answer: B

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14. $\displaystyle\int \dfrac{\sqrt{1+\sqrt{x}}}{x}\,dx$ is equal to

A. $2\sqrt{1+\sqrt{x}}-2In\left|\dfrac{\sqrt{1+\sqrt{x}}+1}{\sqrt{1+\sqrt{x}}-1}\right|+C$

B. $4\sqrt{1+\sqrt{x}}-2In\left|\dfrac{\sqrt{1+\sqrt{x}}+1}{\sqrt{1+\sqrt{x}}-1}\right|+C$

C. $4\sqrt{1+\sqrt{x}}-2In\left|\dfrac{\sqrt{1+\sqrt{x}}-1}{\sqrt{1+\sqrt{x}}+1}\right|+C$

D. None of the above

Answer: C

15. $\int \dfrac{X + \sqrt[3]{x^2} + \sqrt[6]{x}}{X\left(1 + \sqrt[3]{x}\right)} dx$ is equal to

A. $\dfrac{3}{2} x^{2/3} + 6\tan^{-1} x^{1/6} + C$

B. $\dfrac{3}{2} x^{2/3} - 6\tan^{-1} x^{1/6} + C$

C. $-\dfrac{3}{2} x^{2/3} + 6\tan^{-1} x^{1/6} + C$

D. $\dfrac{1}{2} x^{2/3} - 6\tan^{-1} x^{1/6} + C$

Answer: A

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16. $\int \dfrac{\tan x}{\sqrt{\sin^4 x + \cos^4 x}} dx$ is equal to

A. $In\left(\tan^2 x + \sqrt{1 + \tan^2 x}\right) + C$

B. $\sec x + C$

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

D. None of the above

Answer: D

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17. If $x \in \left(\dfrac{\pi}{4}, \dfrac{3\pi}{4} \right)$, then $\displaystyle\int \dfrac{\sin x - \cos}{\sqrt{1 - \sin 2x}} e^{\sin x} \cos x \, dx$ is equal to

A. $e^{\sin x} + C$

B. $e^{\sin x - \cos} + C$

C. $e^{\sin x + \cos x} + C$

D. $e^{\cos x - \sin x} + C$

Answer: A

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18. Integral of $f(x) = \sqrt{1 + x^2}$ with respect to x^2 is

A. $\dfrac{2}{3}\dfrac{\left(1+x^2\right)^{3/2}}{x} + C$

B. $\dfrac{2}{3}x\left(1+x^2\right)^{3/2} + C$

C. $\dfrac{2}{3}\left(1+x^2\right)^{3/2} + C$

D. None of these

Answer: C

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19. If $f(x)\sin x \cos x\,dx = \dfrac{1}{2(b^2 - a^2)}\log\{f(x)\} + C$, then f(x) is equal to

A. $\dfrac{1}{a^2 \sin^2 x + b^2 \cos^2 x}$

B. $\dfrac{1}{a^2 \sin^2 x - b^2 \cos^2 x}$

C. $\dfrac{1}{a^2 \cos^2 x + b^2 \sin^2 x}$

D. $\dfrac{1}{a^2 \cos^2 x - b^2 \sin^2 x}$

Answer: A

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20. Let $x^2 \neq n\pi - 1$, $n \in N$, then $\int x \sqrt{\dfrac{2\sin(x^2 + 1) - \sin 2(x^2 + 1)}{2\sin(x^2 + 1) + \sin 2(x^2 + 1)}} \, dx$

equals

A. $\log\left|\dfrac{1}{2}\sec(x^2 + 1)\right| + C$

B. $\log\left|\sec\left(\dfrac{1}{2}(x^2 + 1)\right)\right| + C$

C. $\dfrac{1}{2}\log\left|\sec(x^2 + 1)\right| + C$

D. None of these

Answer: B

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21. If $\int \dfrac{xe^x}{\sqrt{1 + e^x}} \, dx = f(x)\sqrt{1 + e^x} - 2\log g(x) + C$ then g(x) is equal to

A. $x - 1$

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

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

D. $2(x-2)$

Answer: B

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22. $\displaystyle\int \dfrac{\sqrt{(x^2+1)}\left[\log(x^2+1)-2\log x\right]}{x^4}dx$ is equals to

A. $\dfrac{1}{3}\left(1+\dfrac{1}{x^2}\right)^{1/2}\left[\log\left(1+\dfrac{1}{x^2}\right)+\dfrac{2}{3}\right]+C$

B. $-\dfrac{1}{3}\left(1+\dfrac{1}{x^2}\right)^{3/2}\left[\log\left(1+\dfrac{1}{x^2}\right)-\dfrac{2}{3}\right]+C$

C. $\dfrac{2}{3}\left(1+\dfrac{1}{x^2}\right)^{3/2}\left[\log\left(1+\dfrac{1}{x^2}\right)-\dfrac{2}{3}\right]+C$

D. None of the above

Answer: B

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23. If $\int \dfrac{e^{4x} - 1}{e^{2x}} \log\left(\dfrac{e^{2x} + 1}{e^{2x} - 1}\right) dx = \dfrac{t^2}{2}\log t - \dfrac{t^2}{4} - \dfrac{u^2}{2}\log u + \dfrac{u^2}{4} + C,$

then

A. $t = u = e^x + e^x$

B. $t = e^x - e^{-x},\ u = e^x - e^{-x}$

C. $t = e^x + e^{-x},\ u = e^x - e^{-x}$

D. None of the above

Answer: C

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24. If an anti-derivative of f(x) is e^x and that of g(x) is co x, then

$\int f(x)\cos x\, dx + \int g(x)e^x\, dx$ is equal to

A. $f(x).\, g(x) + C$

B. $f(x) + g(x) + C$

C. $e^x \cos x + C$

D. $f(x) - g(x) + C$

Answer: C

25. $\int \cos 2\theta \log \left(\dfrac{\cos \theta + \sin \theta}{\cos \theta - \sin \theta} \right) d\theta$ is equal to

A. $(\cos \theta - \sin \theta)^2 \log \left(\dfrac{\cos \theta + \sin \theta}{\cos \theta - \sin \theta} \right) + C$

B. $(\cos \theta + \sin \theta)^2 \log \left(\dfrac{\cos \theta + \sin \theta}{\cos \theta - \sin \theta} \right) + C$

C. $\dfrac{(\cos \theta - \sin \theta)^2}{2} \log \left(\dfrac{\cos \theta - \sin \theta}{\cos \theta + \sin \theta} \right) + C$

D. $\dfrac{1}{2} \sin 2\theta \log \tan \left(\dfrac{\pi}{4} + \theta \right) - \dfrac{1}{2} \log \sec 2\theta + C$

Answer: D

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

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

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

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

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

Answer: A

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27. $\displaystyle \int \dfrac{dx}{1 + x + x^2 + x^3}$ is equal to

A. $\log\sqrt{1 + x} - \dfrac{1}{2}\log\sqrt{1 + x^2} + \dfrac{1}{2}\tan^{-1}x + C$

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

C. $\log\sqrt{1 + x^2} - \log\sqrt{1 + x} + \dfrac{1}{2}\tan^{-1}x + C$

D. $\log\sqrt{1 + x} + \tan^{-1}x + \log\sqrt{1 + x^2} + C$

Answer: A

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28. If $\int \dfrac{dx}{x+x^7} = p(x)$, **then** $\int \dfrac{x^6}{x+x^7}dx$ **is equal to**

A. $\log|x| - p(x) + C$

B. $\log|x| + p(x) + C$

C. $x - p(x) + C$

D. $x + p(x) + C$

Answer: A

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29. $\int \dfrac{(x+3)e^x}{(x+4)^2}dx$ **is equal to**

A. $\dfrac{1}{(x+4)^2} + C$

B. $\dfrac{e^x}{(x+4)^2} + C$

C. $\dfrac{e^x}{x+4} + C$

D. $\dfrac{e^x}{x+3} + C$

Answer: C

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30. $\displaystyle\int e^{\tan^{-1} x} \left(\dfrac{1 + x + x^2}{1 + x^2} \right) dx$ is equal to

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

B. $x^2 e^{\tan^{-1} x} + C$

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

D. None of these

Answer: A

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31. If $\displaystyle\int \left[In(Inx) + \dfrac{1}{(Inx)^2} \right] dx = x[f(x) - g(x)] = \dfrac{1}{Inx}$

A. $f(x) = \ln(\ln x)$, $g(x) = \dfrac{1}{\ln(x)}$

B. $f(x) = \ln x$, $g(x) = \dfrac{1}{\ln x}$

C. $f(x) = \dfrac{1}{\ln x}$, $g(x) = \ln(\ln x)$

D. $f(x) = \ln x$, $g(x) = \ln(\ln x)$

Answer: A

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32. $\displaystyle\int \dfrac{x^2 - 1}{x^4 + x^2 + 1}\,dx$ is equal to

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

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

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

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

Answer: D

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33. If $\displaystyle\int \frac{\cos 8x + 1}{\cot 2x - \tan 2x} dx = A \cos 8x + k,$ where k is an arbitrary constant, then A is equal to

A. $-\dfrac{1}{16}$

B. $\dfrac{1}{16}$

C. $\dfrac{1}{8}$

D. $-\dfrac{1}{8}$

Answer: A

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1. If $\displaystyle\int f(x) \cos x \, dx = \frac{1}{2} f^2(x) + C,$ then $f(x)$ can be

A. x

B. 1

C. cosx

D. sinx

Answer: D

2. If $\int \dfrac{4}{\sin^4 x + \cos^4 x} dx = a \tan^{-1}\left(\dfrac{\tan x - \frac{1}{\tan x}}{b}\right) + C,$ **then find the**

values of a and b, respectively.

A. $2\sqrt{2}, \sqrt{2}$

B. $\sqrt{2}, 2$

C. $\sqrt{3}, \sqrt{2}$

D. $\sqrt{2}, 4$

Answer: A

3. $\int \dfrac{2}{(e^x + e^{-x})^2}\,dx$ is equal to

A. $-\dfrac{e^{-x}}{(e^x + e^{-x})} + C$

B. $-\dfrac{1}{(e^x + e^{-x})} + C$

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

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

Answer: A

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4. $\int \dfrac{\sin 2x}{\sin^4 x + \cos^4 x}\,dx$ is equal to

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

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

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

D. None of these

Answer: D

5. If $\int \dfrac{1}{1+\sin x} dx = \tan\left(\dfrac{x}{2} + a\right) + b$, then

A. $a = -\dfrac{\pi}{4}, b \in R$

B. $a = \dfrac{\pi}{4}, b \in R$

C. $a = \dfrac{5\pi}{4}, b \in R$

D. None of these

Answer: A

6. $\int \dfrac{d(\cos \theta)}{\sqrt{1 - \cos^2 \theta}}$ is equal to

A. $\cos^{-1}\theta + C$

B. $\theta + C$

C. $\sin^{-1}\theta + C$

D. $\sin^{-1}(\cos\theta) + C$

Answer: D

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7. If $2f(x) = f'(x)$ and $f(0) = 3$, then f(2) equals

A. $4e^3$

B. $3e^4$

C. $2e^3$

D. $3e^2$

Answer: B

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8. If $\displaystyle\int \frac{dx}{x^4 + x^3} = \frac{a}{x^2} + \frac{b}{x} + \log\left|\frac{x}{x+1}\right| + C$, then

A. $a = \dfrac{1}{2}, b = 1$

B. $a = -\dfrac{1}{2}, b = 1$

C. $a = 1, b = -\dfrac{1}{2}$

D. $a = 1, b = 1$

Answer: B

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

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

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

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

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

Answer: C

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10. If $\displaystyle\int e^x (1 + x) . \sec^2(xe^x) dx = f(x) + C$, then f(x) is equal to

A. $\cos(xe^x)$

B. $\sin(xe^x)$

C. $2 \tan^{-1}(x)$

D. $\tan(xe^x)$

Answer: D

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11. If $\displaystyle\int e^x \left(\dfrac{1 - \sin x}{1 - \cos x} \right) dx = f(x) + C$, then f(x) is equal to

A. $e^x \cot\left(\dfrac{x}{2}\right)$

B. $e^{-x} \cot\left(\dfrac{x}{2}\right)$

C. $-e^x\left(\dfrac{x}{2}\right)$

D. $-e^{-x} \cot\left(\dfrac{x}{2}\right)$

Answer: C

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12. $\displaystyle\int \dfrac{1 + \tan^2 x}{1 - \tan^2 x}\,dx$ is equal to

A. $\log\left(\dfrac{1 - \tan x}{1 + \tan x}\right) + C$

B. $\log\left(\dfrac{1 + \tan x}{1 - \tan x}\right) + C$

C. $\dfrac{1}{2}\log\left(\dfrac{1 - \tan x}{1 + \tan x}\right) + C$

D. $\dfrac{1}{2}\log\left(\dfrac{1 + \tan x}{1 - \tan x}\right) + C$

Answer: D

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13. The value of $\int e^x \left[\dfrac{1 + \sin x}{1 + \cos x} \right] dx$ is equal to

A. $e^x \tan\left(\dfrac{x}{2}\right) + C$

B. $e^x \tan x + C$

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

D. $C - e^x \cot\left(\dfrac{x}{2}\right)$

Answer: A

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14. $\int \dfrac{\sin(2x)}{1 + \cos^2 x} dx$ is equal to

A. $-\dfrac{1}{2}\log\left(1 + \cos^2 x\right) + C$

B. $2\log\left(1 + \cos^2 x\right) + C$

C. $\dfrac{1}{2}\log(1 + \cos 2x) + C$

D. $C - \log\left(1 + \cos^2 x\right)$

Answer: D

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