



MATHS

BOOKS - NDA PREVIOUS YEARS

DERIVATIVES

Mcqs

1. If $y = \sin^{-1}(x - y)$, $x = 3t$, $y = 4t^3$, then what is the derivative of u with respect to t ?

A. $3(1 - t^2)$

B. $3(1 - t^2)^{-\frac{1}{2}}$

C. $5(1 - t^2)^{\frac{1}{2}}$

D. $5(1 - t^2)$

Answer: B



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2. If $x = \cos t$, $y = \sin t$, then what is $\frac{d^2y}{dx^2}$ equal to?

A. y^{-3}

B. y^3

C. $-y^{-3}$

D. $-y^3$

Answer: C



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3. If $y = x + e^x$, then $\frac{d^2x}{dy^2}$ is equal to

A. e^x

B. $-\frac{e^x}{(1 + e^x)^3}$

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

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

Answer: B



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4. What is the derivative of $f(x) = x|x|$?

A. $|x| + x$

B. $2x$

C. $2|x|$

D. $-2|x|$

Answer: C



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5. If $x + y = t - \frac{1}{t}$, $x^2 + y^2 = t^2 + \frac{1}{t^2}$, what is $\frac{dy}{dx}$ equal to?

A. $\frac{1}{x}$

B. $-\frac{1}{x}$

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

D. $-\frac{1}{x^2}$

Answer: C



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6. What is the derivative of $f(x) = \sqrt{1 - x^2}$ with respect to $g(x) = \sin^{-1} x$, where $|x| \neq 1$?

A. x

B. $-x$

C. $\frac{x}{1 - x^2}$

D. $-\frac{x}{1-x^2}$

Answer: B

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7. What is the derivative of $(\log_{\tan x} \cot x)(\log_{\cot x} \tan x)^{-1}$ at $x = \frac{\pi}{4}$?

A. -1

B. 0

C. 1

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

Answer: B

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8. What is the derivative of $\cos^{-1}\left(\frac{2 \cos x + 3 \sin x}{\sqrt{13}}\right)$?

A. $\frac{1}{\sqrt{1-x^2}}$

B. $-\frac{1}{\sqrt{1-x^2}}$

C. 0

D. 1

Answer: D [Watch Video Solution](#)

9. What is the derivative of $f(x) = \frac{7x}{(2x-1)(x+3)}$?

A. $-\frac{3}{(x+3)^2} - \frac{2}{(2x-1)^2}$

B. $-\frac{3}{(x+3)^2} - \frac{1}{(2x-1)^2}$

C. $\frac{3}{(x+3)^2} + \frac{1}{(2x-1)^2}$

D. $\frac{3}{(x+3)^2} + \frac{2}{(2x-1)^2}$

Answer: A [Watch Video Solution](#)

10. What is the solution of $y' = 1 + x + y^2 + xy^2$, $y(0) = 0$?

A. $y = \tan^2\left(\frac{x^2}{2} + x\right)$

B. $y = \tan^2(x^2 + x)$

C. $y = \tan(x^2 + x)$

D. $y = \tan\left(\frac{x^2}{2} + x\right)$

Answer: D



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11. If a differentiable function f defined for $x > 0$ satisfies the relation

$f(x^2) = x^3$, $x > 0$, then what is the value of $f'(4)$?

A. 1

B. 2

C. 3

D. 4

Answer: C

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12. What is the derivative of $\tan^{-1}\left(\frac{\sqrt{x} - x}{1 + x^{3/2}}\right)$ at $x = 1$?

A. $-\frac{1}{4}$

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

C. $\frac{3}{2}$

D. 1

Answer: A

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13. $x\sqrt{1+y} + y\sqrt{1+x} = 0$ then $\frac{dy}{dx} =$

A. $-\frac{1}{1+x}$

B. $-\frac{1}{(1+x)^2}$

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

D. $\frac{\sqrt{x}}{\sqrt{1+x}}$

Answer: B



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14. If $y = f(x)$, $p = \frac{dy}{dx}$ and $q = \frac{d^2y}{dx^2}$, then what is $\frac{d^2x}{dy^2}$ equal to ?

A. $-\frac{q}{p^2}$

B. $-\frac{q}{p^3}$

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

D. $\frac{q}{p^2}$

Answer: B



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15. If $x = \sin t - t \cos t$ and $y = t \sin t + \cos t$, then what is $\frac{dy}{dx}$ at point $t = \frac{\pi}{2}$?

A. 0

B. $\frac{\pi}{2}$

C. $-\frac{\pi}{2}$

D. 1

Answer: A



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16. If $y = \sin^{-1} x + \sin^{-1} \sqrt{1 - x^2}$, what is $\frac{dy}{dx}$ equal to?

A. $\cos^{-1} x + \cos^{-1} \sqrt{1 - x^2}$

B. $\frac{1}{\cos x} + \frac{1}{\cos \sqrt{1 - x^2}}$

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

D. 0

Answer: D



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17. If $f(x) = \log_e [\log_e x]$, then what is $f'(e)$ equal to?

A. e^{-1}

B. e

C. 1

D. 0

Answer: A



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18. If $f(x) = e^{\sin(\log \cos x)}$ and $g(x) = \log \cos x$, then what is the derivative of $f(x)$ with respect to $g(x)$?

A. $f(x) \cos[g(x)]$

B. $f(x) \sin[g(x)]$

C. $g(x) \cos[f(x)]$

D. $g(x) \sin[f(x)]$

Answer: A



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19. For the curve $\sqrt{x} + \sqrt{y} = 1$, what is the value of $\frac{dy}{dx}$ at $\left(\frac{1}{4}, \frac{1}{4}\right)$?

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

B. 1

C. -1

D. 2

Answer: C

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20. If $y = \frac{1}{\log_{10} x}$, then what is $\frac{dy}{dx}$ equal to?

A. x

B. $x \log_e 10$

C. $-\frac{(\log_x 10)^2 (\log_{10} e)}{x}$

D. $x \log_{10} e$

Answer: C

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21. If $y = \sin(m \sin^{-1} x)$, what is the value of d^2y/dx^2 at $x = 0$?

A. m

B. m^2

C. $m^2 + 2$

D. None of these

Answer: D

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22. If $x^y = e^{x-y}$, then dy/dx is equal to which one of the following ?

A. $\frac{(x - y)}{(1 + \log x)^2}$

B. $\frac{y}{(1 + \log x)}$

C. $\frac{(x + y)}{(1 + \log x)}$

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

Answer: D

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23. If $\frac{dy}{dx} = 1 + x + y + xy$ and $y(-1) = 0$, then function y is :

A. $e^{\frac{(1+x)^2}{2}} - 1$

B. $e^{\frac{(1-x)^2}{2}}$

C. $\log(1 + x) - 1$

D. $\log(1 - x)$

Answer: A



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24. If $f(x) = \tan x + e^{-2x} - 7x^3$, then what is the value of $f'(0)$?

A. -2

B. -1

C. 0

D. 3

Answer: B



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25. If $3^x + 3^y = 3^{x+y}$ then what is $\frac{dy}{dx}$ equal to?

A. $\frac{3^{x+y} - 3^x}{3^y}$

B. $\frac{3^{x-y}(3^y - 1)}{1 - 3^x}$

C. $\frac{3^x + 3^y}{3^x - 3^y}$

D. $\frac{3^x + 3^y}{1 + e^{x+y}}$

Answer: B



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26. If $f(x) = \sin^2 x^2$, then what $f'(x)$ equal to?

A. $4x \sin(x^2) \cos(x^2)$

B. $2 \sin(x^2) \cos(x^2)$

C. $4 \sin(x^2) \sin^2 x$

D. $2x \cos^2(x^2)$

Answer: A



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27. If $f(x) = \cos x$, $g(x) = \log x$ and $y = (g \circ f)(x)$, then what is the value of $\frac{dy}{dx}$ at $x = 0$?

A. 0

B. 1

C. -1

D. 2

Answer: A



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28. If $e^y + xy = e$ then the value of $\frac{d^2y}{dx^2}$ for $x = 0$ is

A. e^{-1}

B. e^{-2}

C. e

D. 1

Answer: B



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29. If $\sqrt{1-x^2} + \sqrt{1-y^2} = a$, then what is $\frac{dy}{dx}$ equal to?

A. $\sqrt{(1-x^2)(1-y^2)}$

B. $\sqrt{\frac{1-y^2}{1-x^2}}$

C. $\sqrt{\frac{1-x^2}{1-y^2}}$

D. None of these

Answer: D

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30. If $x = \log t$ and $y = t^2 - 1$, then what is $\frac{d^2y}{dx^2}$ at $t = 1$ equal to?

A. 2

B. 3

C. -4

D. 4

Answer: D

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31. What is the derivative of $\log_x 5$ with respect to $\log_5 x$?

A. $-(\log_5 x)^{-2}$

B. $(\log_5 x)^{-2}$

C. $-(\log_x 5)^{-2}$

D. $(\log_x 5)^{-2}$

Answer: A



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32. A function f is such that $f'(x) = 6 - 4 \sin 2x$ and $f(0) = 3$. What is $f(x)$ equal to?

A. $6x + 2 \cos 2x$

B. $6x - 2 \cos 2x$

C. $6x - 2 \cos 2x + 1$

D. $6x + 2 \cos 2x + 1$

Answer: D



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33. If $f(x) = e^x$ and $g(x) = (\log)_e x (x > 0)$, find $f \circ g$ and $g \circ f$. Is $f \circ g = g \circ f$?

A. 0

B. 1

C. e

D. None of these

Answer: B



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34. Let $g(x) = x^3 - 4x + 6$. If $f'(x) = g(x)$ and $f(1) = 2$, then what is $f(x)$ equal to?

A. $x^3 - 4x + 3$

B. $x^3 - 4x + 6$

C. $x^3 - 4x + 1$

D. $x^3 - 4x + 5$

Answer: D

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35. If $y = \sin^{-1}\left(\frac{4x}{1+4x^2}\right)$, then what is $\frac{dy}{dx}$ equal to?

A. $\frac{1}{1+4x^2}$

B. $-\frac{1}{1+4x^2}$

C. $\frac{4}{1+4x^2}$

D. $\frac{4x}{1+4x^2}$

Answer: C

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36. What is the differentiation of $\log_x x$ with respect to $\ln x$?

A. 0

B. 1

C. $1/x$

D. x

Answer: A



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37. If $y = x\sqrt{a^2 - x^2} + a^2 \sin^{-1}\left(\frac{x}{a}\right)$ then What will be $\frac{dy}{dx} = ?$

A. $\sqrt{a^2 - x^2}$

B. $2\sqrt{a^2 - x^2}$

C. $\sqrt{x^2 - a^2}$

D. $2\sqrt{x^2 - a^2}$

Answer: A



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38. If $x = t^2$ and $y = t^3$, then $\frac{d^2y}{dx^2}$ is equal to

A. 1

B. $\frac{3}{2t}$

C. $\frac{3}{4t}$

D. $\frac{3}{2}$

Answer: C



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39. What is the derivative of $\sin^2 x$ with respect to $\cos^2 x$?

A. $\tan^2 x$

B. $\cot^2 x$

C. -1

D. 1

Answer: C



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40. If $x = k(\theta + \sin \theta)$ and $y = k(1 + \cos \theta)$, then what is the derivative of y with respect to x at $\theta = \pi/2$?

A. -1

B. 0

C. 1

D. 2

Answer: A

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41. If $\sqrt{x} + \sqrt{y} = 2$, then what is $\frac{dy}{dx}$ at $y = 1$ and $x = 1$ equal to ?

A. 5

B. 2

C. 4

D. -1

Answer: D

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42. If $x = \cos(2t)$ and $y = \sin^2 t$, then what is $\frac{d^2y}{dx^2}$ equal to?

A. 0

B. $\sin(2t)$

C. $-\cos(2t)$

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

Answer: A



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43. If $f(x) = 2^x$, then what is $f''(x)$ equal to ?

A. $2^x (\ln 2)^2$

B. $x(x - 1)2^{x-2}$

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

D. $2^x (\log_{10} 2)^2$

Answer: A



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44. If $y = \left(1 + x^{\frac{1}{4}}\right)\left(1 + x^{\frac{1}{2}}\right)\left(1 - x^{\frac{1}{4}}\right)$, then what is $\frac{dy}{dx}$ equal to ?

A. 1

B. -1

C. x

D. $x^{\frac{1}{2}}$

Answer: B



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45. If $y = \ln \sqrt{\tan x}$, then what is the value of $\frac{dy}{dx}$ at $x = \frac{\pi}{4}$?

A. 0

B. -1

C. $1/2$

D. 1

Answer: D



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46. If $f(x) = x^2 - 6x + 8$ and there exists a point c in the interval $[2, 4]$ such that $f'(c) = 0$, then what is the value of c ?

A. 2.5

B. 2.8

C. 3

D. 3.5

Answer: C



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47. If $y = \frac{x + 1}{x - 1}$, then what is $\frac{dy}{dx}$ equal to?

A. $\frac{-2}{x - 1}$

B. $\frac{-2}{(x - 1)^2}$

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

D. $\frac{2}{(x-1)}$

Answer: B



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48. If $y = \cos t$ and $x = \sin t$, then what is $\frac{dy}{dx}$ equal to?

A. xy

B. x/y

C. $-y/x$

D. $-x/y$

Answer: D



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49. If $x^m + y^m = 1$ such that $\frac{dy}{dx} = -\frac{x}{y}$, then what should be the value of m ?

A. 0

B. 1

C. 2

D. None of the above

Answer: C



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50. Consider the following statements:

1. If $y = \ln(\sec x + \tan x)$, then $\frac{dy}{dx} = \sec x$.

2. If $y = \ln(\operatorname{cosec} x - \cot x)$, then $\frac{dy}{dx} = \operatorname{cosec} x$.

Which of the above is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: C



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51. If $f(x) = 2^{\sin x}$, then what is the derivative of $f(x)$?

A. $2^{\sin x} \ln 2$

B. $(\sin x)2^{\sin x - 1}$

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

D. None of the above

Answer: D



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52. If $y = \ln(e^{mx} + e^{-mx})$, then what is $\frac{dy}{dx}$ at $x = 0$ equal to ?

A. -1

B. 0

C. 1

D. 2

Answer: B



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53. If $2x^3 - 3y^2 = 7$, what is $\frac{dy}{dx}$ equal to ($y \neq 0$)?

A. $\frac{x^2}{2y}$

B. $\frac{x}{2y}$

C. $\frac{x^2}{y}$

D. None of these

Answer: C



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54. The derivative of $|x|$ at $x = 0$

A. is 1

B. is -1

C. is 0

D. does not exist

Answer: D



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55. If $y = \sin(ax + b)$, then what is $\frac{d^2y}{dx^2}$ at $x = -\frac{b}{a}$, where a, b are constants and $a \neq 0$?

A. 0

B. -1

C. $\sin(a - b)$

D. $\sin(a + b)$

Answer: A



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56. If $y = x^x$, what is $\frac{dy}{dx}$ at $x = 1$ equal to?

A. 0

B. 1

C. -1

D. 2

Answer: B



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57. What is the differential coefficient of $\log_x x$?

A. 0

B. 1

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

D. x

Answer: A



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58. The derivative of $\sec^2 x$ with respect to $\tan^2 x$ is

A. 1

B. 2

C. $2 \sec x \tan x$

D. $2 \sec^2 x \tan x$

Answer: A



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59. What is the derivative of x^3 with respect to x^2 ?

A. $3x^2$

B. $\frac{3x}{2}$

C. x

D. $\frac{3}{2}$

Answer: B



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60. If $f(x) = 2x^2 + 3x - 5$, then what is $f'(0) + 3f'(-1)$ equal to?

A. -1

B. 0

C. 1

D. 2

Answer: B



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61. What is the derivative of $\sin(\sin x)$?

A. $\cos(\cos x)$

B. $\cos(\sin x)$

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

D. $\cos(\cos x)\cos x$

Answer: C



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62. What is the derivative of $|x - 1|$ at $x = 2$?

A. -1

B. 0

C. 1

D. Derivative does not exist

Answer: C



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63. What is the derivative of $\sqrt{\frac{1 + \cos x}{1 - \cos x}}$?

A. $\frac{1}{2} \sec^2 \cdot \frac{x}{2}$

B. $-\frac{1}{2} \operatorname{cosec}^2 \cdot \frac{x}{2}$

C. $-\operatorname{cosec}^2 \cdot \frac{x}{2}$

D. None of these

Answer: B



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64. If $z = f \circ f \circ f$ of $(x) = x^2$ where $f(x) = x^2$, then what is $\frac{dz}{dx}$ equal to?

A. x^3

B. $2x^3$

C. $4x^3$

D. $4x^2$

Answer: C



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65. Find $\frac{dy}{dx}$, when $x = a(\cos \theta + \theta \sin \theta)$ and $y = a(\sin \theta - \theta \cos \theta)$

A. $\tan \theta$

B. $\cot \theta$

C. $\sin 2\theta$

D. $\cos \theta$

Answer: A

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66. if $x = a(\cos \theta + \theta \sin \theta)$, $y = a(\sin \theta - \theta \cos \theta)$ then $\frac{d^2y}{dx^2}$

A. $\sec^2 \theta$

B. $-\operatorname{cosec}^2 \theta$

C. $\frac{\sec^3 \theta}{a\theta}$

D. None of these

Answer: C

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67. Consider the curve

$$x = a(\cos \theta + \theta \sin \theta) \text{ and } y = a(\sin \theta - \theta \cos \theta).$$

If $y = x \ln x + xe^x$, then what is the value of $\frac{dy}{dx}$ at $x = 1$?

A. $1 + e$

B. $1 - e$

C. $1 + 2e$

D. None of these

Answer: C



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68. Given that $\frac{d}{dx} \left(\frac{1 + x^2 + x^4}{1 + x + x^2} \right) = Ax + B$ What is the value of A ?

A. -1

B. 1

C. 2

D. 4

Answer: C



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69. If $\frac{d}{dx} \left(\frac{1 + x^2 + x^4}{1 + x + x^2} \right) = ax + b$, then the value of a and b are respectively. 2 and 1 (b) 2 and - 1 (d) None of these

A. - 1

B. 1

C. 2

D. 4

Answer: A



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70. Differentiate $\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$ with respect to $\tan^{-1}x$, when $x \neq 0$.

A. 0

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

C. 1

D. X

Answer: B



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71. The derivative of $\ln(x + \sin x)$ with respect to $(x + \cos x)$ is

A. $\frac{1 + \cos x}{(x + \sin x)(1 - \sin x)}$

B. $\frac{1 - \cos x}{(x + \sin x)(1 + \sin x)}$

C. $\frac{1 - \cos x}{(x - \sin x)(1 + \cos x)}$

D. $\frac{1 + \cos x}{(x - \sin x)(1 - \cos x)}$

Answer: A



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72. If $y = \cot^{-1} \left[\frac{\sqrt{1 + \sin x} + \sqrt{1 - \sin x}}{\sqrt{1 + \sin x} - \sqrt{1 - \sin x}} \right]$, where $0 < x < \frac{\pi}{2}$, then

$\frac{dy}{dx}$ is equal to

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

B. 2

C. $\sin x + \cos x$

D. $\sin x - \cos x$

Answer: A



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73. If $x^a y^b = (x - y)^{a+b}$, then the value of $\frac{dy}{dx} - \frac{y}{x}$ is equal to

A. $\frac{a}{b}$

B. $\frac{b}{a}$

C. 1

D. 0

Answer: D



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74. If $s = \sqrt{t^2 + 1}$, then $\frac{d^2s}{dt^2}$ is equal to

A. $\frac{1}{s}$

B. $\frac{1}{s^2}$

C. $\frac{1}{s^3}$

D. $\frac{1}{s^4}$

Answer: C

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75. $\int \frac{dx}{1 + e^{-x}}$ is equal to

A. $1 + e^x + c$

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

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

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

Answer: C

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76. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function such that

$$f(x) = x^3 + x^2 f'(1) + x f''(2) + f''(3)$$

for $x \in R$

What is $f(1)$ equal to

A. -2

B. -1

C. 0

D. 4

Answer: D



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77. Let $f: R \rightarrow R$ be a function such that

$$f(x) = x^3 + x^2 f'(1) + x f''(2) + f''(3)$$

What is $f'(1)$ equal to

A. -6

B. -5

C. 1

D. 0

Answer: B



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78. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function such that

$$f(x) = x^3 + x^2 f'(1) + x f''(2) + f'''(3)$$

What is $f'''(3)$ equal to

A. 1

B. 5

C. 6

D. 8

Answer: C



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79. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function such that

$$f(x) = x^3 + x^2 f'(1) + x f''(2) + f''(3)$$

Consider the following :

1. $f(2) = f(1) - f(0)$
2. $f''(2) - 2f'(1) = 12$

Which of the above is/are correct?

- A. 1 only
- B. 2 only
- C. Both 1 and 2
- D. Neither 1 nor 2

Answer: C



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80. If $y = \log_{10} x + \log_x 10 + \log_x x + \log_{10} 10$ then what is $\left(\frac{dy}{dx}\right)_{x=10}$ equal to?

A. 10

B. 2

C. 1

D. 0

Answer: D



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81. Let $f(x) = [|x| - |x - 1|]^2$

What is $f'(x)$ equal to when $x > 1$?

A. 0

B. $2x - 1$

C. $4x - 2$

D. $8x - 4$

Answer: A

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82. Let $f(x) = [|x| - |x - 1|]^2$

What is $f'(x)$ equal to when $0 < x < 1$?

- A. 0
- B. $2x - 1$
- C. $4x - 2$
- D. $8x - 4$

Answer: D

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83. Let $f(x) = [|x| - |x - 1|]^2$

Which of the following equation is/are correct?

1. $f(-2) = f(5)$

$$2. f''(-2) + f''(0.5) + f''(3) = 4$$

Select the correct answer using the code given below:

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: A



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84. Let $f(x + y) = f(x)f(y)$ for all x and y . Then what is $f'(5)$ equal to [where $f'(x)$ the derivative of $f(x)$]?

A. $f(5)f'(0)$

B. $f(5) - f'(0)$

C. $f(5)f(0)$

D. $f(5) + f'(0)$

Answer: A



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85. What is the derivative of $\log_{10}(5x^2 + 3)$ with respect to x ?

A. $\frac{x \log_{10} e}{5x^2 + 3}$

B. $\frac{2x \log_{10} e}{5x^2 + 3}$

C. $\frac{10x \log_{10} e}{5x^2 + 3}$

D. $\frac{10x \log_e 10}{5x^2 + 3}$

Answer: C



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86.

If

$$y = (\cos x)^{\cos x} \wedge (\cos x) \wedge (((\infty))), \text{ provethat } \frac{dy}{dx} = - \frac{y^2 \tan x}{(1 - y \log \cos x)}$$

A. $-\frac{y^2 \tan x}{1 - y \ln (\cos x)}$

B. $\frac{y^2 \tan x}{1 + y \ln (\cos x)}$

C. $\frac{y^2 \tan x}{1 - y \ln (\sin x)}$

D. $\frac{y^2 \sin x}{1 + y \ln (\sin x)}$

Answer: A**Watch Video Solution**

87. If $y = \sec^{-1} \left(\frac{x+1}{x-1} \right) + \sin^{-1} \left(\frac{x-1}{x+1} \right)$, $x > 0$. Find $\frac{dy}{dx}$.

A. 0

B. 1

C. $\frac{x-1}{x+1}$

D. $\frac{x + 1}{x - 1}$

Answer: A



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88. If $y = \cos^{-1}\left(\frac{2x}{1+x^2}\right)$, then $\frac{dy}{dx}$ is equal to

A. $-\frac{2}{1+x^2}$ for all $|x| < 1$

B. $-\frac{2}{1+x^2}$ for all $|x| > 1$

C. $\frac{2}{1+x^2}$ for all $|x| < 1$

D. None of these

Answer: A



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89. What is the derivative of the function

$$f(x) = e^{\tan x} + \ln(\sec x) - e^{\ln x} \quad \text{at } x = \frac{\pi}{4}?$$

A. $\frac{e}{2}$

B. e

C. $2e$

D. $4e$

Answer: C



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90. If $y = e^{x^2} \sin 2x$, then what is $\frac{dy}{dx}$ at $x = \pi$ equal to?

A. $(1 + \pi)e^{\pi^2}$

B. $2\pi e^{\pi^2}$

C. $2e^{\pi^2}$

D. e^{π^2}

Answer: C



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91. If $y = \tan^{-1} \left(\frac{5 - 2 \tan \sqrt{x}}{2 + 5 \tan \sqrt{x}} \right)$, then what is $\frac{dy}{dx}$ equal to ?

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

B. 1

C. -1

D. $\frac{1}{2\sqrt{x}}$

Answer: A



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92. Evaluate: $\int_{\pi/4}^{\pi/2} \sqrt{1 - \sin 2x} dx$

A. $\cos x + \sin x$

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

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

D. None of these

Answer: A

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93. If $f(x) = \sin(\cos x)$, then $f'(x)$ is equal to

A. $\cos(\cos x)$

B. $\sin(-\sin x)$

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

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

Answer: D

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94. If $f(x) = \frac{x - 2}{x + 2}$, $x \neq -2$, then what is $f^{-1}(x)$ equal to?

A. $\frac{4(x + 2)}{x - 2}$

B. $\frac{x + 2}{4(x - 2)}$

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

D. $\frac{2(1 + x)}{1 - x}$

Answer: D



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