MATHS

BOOKS - HIMALAYA MATHS (KANNADA ENGLISH)

DIFFERENTIATION

QUESTION BANK

1. If $y = \sqrt{\sin x}$, then dy/dx =

A. $\frac{\cos x}{2\sqrt{\sin x}}$

B. $\frac{\sin x}{2x\sqrt{\sin x}}$

C. $\frac{\cos x}{\sqrt{\sin x}}$

D. $\frac{2\cos x}{\sqrt{\sin x}}$

Answer: A

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2. If $y = \log \sqrt{\sin x}$, then dy/dx =

A. $\frac{\cos x}{\sqrt{\sin x}}$

B. 1/2 (cot x)

C. 1/2 (tan x)

D. $\sqrt{\sin x \cos x}$

Answer: B

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3. If $y = \log \cos \sqrt{x}$, then dy/dx =

A. $\frac{\tan\sqrt{x}}{2\sqrt{x}}$

B. $-\frac{\tan\sqrt{x}}{2\sqrt{x}}$

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

D. $\tan\sqrt{x}$

Answer: B

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4. If $y=\left(\frac{x^a}{x^b}\right)^{a+b}.\left(\frac{x^b}{x^c}\right)^{b+c}.\left(\frac{x^c}{x^a}\right)^{c+a}$ then, dy/dx =

A. 0

B. 1

C. a + b+c

D. (-1)

Answer: A

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5. If $y = \sqrt[3]{x}$, then $\frac{d^2y}{dx^2} =$

A. $-\frac{2}{9\sqrt[3]{x^5}}$

B. $\frac{2}{9x^{\frac{5}{3}}}$

C. `2/9 x^(5/2)

D. none of these

Answer: A

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6. If $y = \sqrt{\cot x}$, then dy/dx =

A. $\frac{\cos ec^2 x}{2\sqrt{\cot x}}$

B. $\frac{\cos ec^2 x}{\sqrt{\cot x}}$

C. $\frac{1}{2\sqrt{\cos x}}$

D. none of these

Answer: D

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7. If y = cos(log sin x), then dy/dx =

A. (-sin (log sin x))

B. (-cot x. sin (log (sin x)))

C. cot x. sin (log sin x)

D. none of these

Answer: B

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8. If $y = \cos\sqrt{x}$, then dy/dx =

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

B. $-\sin\sqrt{x}\cos\sqrt{x}$

C. $\frac{\sin 2\sqrt{x}}{2\sqrt{x}}$

D. none of these

Answer: A

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

A. $\frac{4x^3}{1-x^4}$

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

C. $\frac{-4x^3}{1-x^4}$

D. `(-4x)/(1-x^(4))

Answer: D

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10. If $y = \log\left(\tan\sqrt{x}\right)$, $\frac{dy}{dx} =$

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

B. $\frac{\sec^2\sqrt{x}}{\sqrt{x}\tan\sqrt{x}}$

C. $\frac{2\sec^2\sqrt{x}}{2\sqrt{x}\tan\sqrt{x}}$

D. $\frac{\sec^2\sqrt{x}}{2\sqrt{x}\tan\sqrt{x}}$

Answer: D

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11. If $y = e^{\sin(\log x)}$, then dy/dx =

A. $e^{\cos(\log x)}$

B. y/x cos (log x)

C. (-sin (log x))

D. none of these

Answer: B

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12. If y = log (sec x + tan x), then dy/dx =

A. sec x

B. 1/(sec x + tanx)

C. $\log\left(\cos x \sec^2 x\right)$

D. none of these

Answer: A

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13. d/dx ((3x+4)/(2x-3)) =

A. $\frac{17}{(2x-3)^2}$

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

C. $\frac{-17}{(2x-3)^2}$

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

Answer: C

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14. $\frac{d}{dx}\left(\frac{3e^x+4}{2e^x-3}\right)=$

A. $\frac{-17e^x}{(2e^x-3)^2}$

B. $\frac{17e^x}{(2e^x-3)^2}$

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

D. $\frac{e^x}{2e^x-3^2}$

Answer: A

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15. d/dx ((a-b cos x)/(a+b cos x)) =

A. $\frac{(a^2 - b^2)\sin x}{(a + b\cos x)^2}$

B. $\frac{ab\sin x}{(a + b\cos x)^2}$

C. $\frac{2ab\sin x}{(a + b\cos x)^2}$

D. $\frac{-2ab\sin x}{(a + b\cos x)^2}$

Answer: C

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16. If $y = \cos^n x \sin nx$, then dy/dx at $x = \frac{\pi}{2}$ is

A. 0

B. 1

C. n

D. (-n)

Answer: A

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17. If $f(x) = \frac{1+\tan x}{1-\tan x}$, then $f'(x) =$

A. $\sec^2\left(\frac{\pi}{4} - x\right)$

B. $\tan^2\left(\frac{\pi}{4} - x\right)$

C. $\sec^2 x$

D. $\sec^2\left(\frac{\pi}{4} + x\right)$

Answer: D

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18. If $y = e^{\log\sqrt{1+\tan^2 x}}$, then dy/dx =

A. $\sec^2$

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

C. `(-sin 2x)

D. none

Answer: D

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19. If $y = \sqrt{\frac{\sec x + \tan x}{\sec x - \tan x}}$ and $0 < x < \frac{\pi}{2}$, then dy/dx =

A. sec x(sec x - tanx)

B. tanx (sec x + tan x)

C. sec x(sec x +tan x)

D. tan(sec x - tanx)

Answer: C

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20. If $y = \sqrt{\frac{\cos ecx - \cot x}{\cos ecx + \cot x}}$ and $0 < x < \frac{\pi}{2}$ then, dy/dx =

A. cosecx (cosec x - cot x)

B. cosec x (cosec x + cot x)

C. cosec x (cot x - cosec x)

D. cot x (cosec x - cot x)

Answer: A

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21. If $y = \frac{\sin x + \cos x}{\sqrt{1 + \sin 2x}}$, then dy/dx =

A. 1

B. (-1)

C. ± 1

D. 0

Answer: D

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22. If $y = \log\left(x + \sqrt{x^2 + 1}\right.$ then dy/dx =

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

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

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

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

Answer: A

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23. If $y = \sqrt{a\sqrt{x}}$ then, dy/dx =

A. 1y/2 x

B. $\frac{a^{\sqrt{x}} \log a}{2y\sqrt{x}}$

C. $\frac{a^{\sqrt{x}} \log a}{4y\sqrt{x}}$

D. $\frac{a^{\sqrt{x}} \log a}{y\sqrt{x}}$

Answer: A

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24. $y = \log\left[\sqrt{x + \sqrt{x^2 + a^2}}\right]$, then dy/dx =

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

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

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

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

Answer: A

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25. $\frac{d}{dx}\log\left[e^x\left(\frac{x-2}{x+2}\right)^{\frac{3}{4}}\right] =$

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

B. $\frac{x^2-1}{x^2\_4}$

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

D. none of these

Answer: B

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26. $\frac{d}{dx}\tan^{-1}(\sin hx) =$

A. cosh x

B. sinh x

C. sec h x

D. cosech x

Answer: C

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27. $\frac{d}{dx}\sin^{-1}(\tan x)$

A. cos x

B. sin x

C. sec x

D. cosech x

Answer: A

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28. $\frac{d}{dx}\cosh^{-1}(\cos ecx) =$

A. (-cosec s)

B. cosec x

C. sec x

D. (-sexh x)

Answer: D

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29. $y = \sqrt{ax} + \frac{a^2}{\sqrt{ax}}$ then dy/dx at x = a is

A. a

B. 1/a

C. 1

D. 0

Answer: D

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30. $y = \cot^{-1}\left(x^2\right)$, then dy/dx =

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

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

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

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

Answer: C

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31. If $y = \tan^{-1}\left(e^{2x}\right)$, then dy/dx =

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

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

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

D. none of these

Answer: C

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32. If $y = \tan^{-1} 3x$, then dy/dx =

A. $\frac{1}{\sqrt{1-9x^2}}$

B. $\frac{1}{\sqrt{1+9x^2}}$

C. $\frac{3}{\sqrt{1-9x^2}}$

D. $\frac{3}{(1+9x^2)}$

Answer: D

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33. $\frac{d}{dx}\left[\sin^2 \cot^{-1} \sqrt{\frac{1+x}{1-x}}\right] =$

A. 0

B. (1/2)

C. (-1/2)

D. (-1)

Answer: C

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34. $\frac{d}{dx}\left[\sin^2 \cot^{-1}\sqrt{\frac{1-x}{1+x}}\right] =$

A. (-1)

B. (1/2)

C. (-1/2)

D. 1

Answer: B

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35. If $y = \sin^{-1}\left[\frac{1-x^2}{1+x^2}\right]$, then dy/dx =

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

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

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

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

Answer: A

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36. If $f(x) = \tan^{-1}\left(\frac{4\cos x - 3\sin x}{3\cos x + 4\sin x}\right)$ then $f'(x) =$

A. 1

B. (-1)

C. (1/2)

D. 0

Answer: B

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37. $\frac{d}{dx}\left\{\sin^{-1}\left(\frac{3x}{2}-\frac{x^3}{2}\right)\right\}=$

A. $\frac{3}{\sqrt{4-x^2}}$

B. $\frac{-3}{\sqrt{4-x^2}}$

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

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

Answer: B

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38. $\frac{d}{dx}\sin^{-1}\left(5x+12\frac{\sqrt{1-x^2}}{13}\right)=$

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

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

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

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

Answer: A

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39. If $y=\sin^{-1}\left(x\sqrt{1-x}-\sqrt{x}\sqrt{1-x^2}\right)$ then dy/dx =

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

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

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

D. none of these

Answer: C

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40. If $y = \sin^{-1}\sqrt{1-x} + \cos^{-1}\sqrt{x}$ then dy/dx =

A. $\frac{1}{\sqrt{x(1-x)}}$

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

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

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

Answer: B

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41. $y = \sin^{-1} x + \sin^{-1} \sqrt{1 - x^2}, 0 < x < 1$ find $\frac{dy}{dx}$.

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

B. 0

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

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

Answer: B

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42. $\frac{d}{dx} \cot^{-1}(\cot x + \cos ecx) =$

A. 1

B. -1

C. (1/2)

D. (-1/2)

Answer: C

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43. If $y = \tan^{-1}\left(\frac{x - \sqrt{1 - x^2}}{x + \sqrt{1 - x^2}}\right)$, then dy/dx =

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

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

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

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

Answer: B

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44. If $y = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$ then dy/dx =

A. (-1/x)

B. $sex^{-1}\left(\frac{2x}{1-x^2}\right.$

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

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

Answer: D

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45. If $y = \tan^{-1}\left(\frac{2\tan x}{1-\tan^2 x}\right)$, then dy/dx =

A. tan 2x

B. 2

C. 1

D. none of these

Answer: B

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46. If $y = \tan^{-1}\left[\frac{x}{1+\sqrt{1-x^2}}\right]$ + sin [2tan^(-1) sqrt((1-x)/(1+x))]

dy/dx =`

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

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

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

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

Answer: C

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47. If $y = \tan^{-1}\left(\frac{4x}{1+5x^2}\right) + \tan^{-1}\left(\frac{2+3x}{3-2x}\right)$ then, dy/dx

A. $\frac{3}{1+9x^2}$

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

C. $\frac{5}{1+25x^2}$

D. $\frac{-5}{1+25x^2}$

Answer: C

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48. If $y = \tan^{-1}\left(\frac{\log\left(\frac{e}{x^2}\right)}{\log(ex^2)}\right) + \tan^{-1}\left(\frac{3 + 2\log x}{1 - 6\log x}\right)$ then $\frac{d^2y}{dx^2} =$

A. 2

B. 1

C. 0

D. (-1)

Answer: C

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49. If $y = \sin^{-1}\left(\frac{a\cos x + b\sin x}{\sqrt{a^2 + b^2}}\right), a, b > 0, \frac{dy}{dx} =$

A. 0

B. 1

C. (-1)

D. ± 1

Answer: B

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50. $\frac{d}{dx}\tan^{-1}\left(\frac{2+3\tan x}{3-2\tan x}\right) =$

A. (-1)

B. 0

C. (2/3)

D. 1

Answer: D

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51. $\frac{d}{dx}\tan^{-1}\left[\frac{x-x^{\frac{1}{2}}}{1+x^{\frac{3}{2}}}\right] =$

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

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

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

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

Answer: D

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52. If $y=\tan\left[\tan^{-1}x+\cot^{-1}(x+1)\right]$ then dy/dx =

A. x^2+x+1

B. 2x+1

C. 2x

D. 2x-1

Answer: B

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53. $\frac{d}{dx}\left[\tan\left(\tan^{-1}\left(\frac{x}{a}\right)-\tan^{-1}\left(\frac{x-a}{x+a}\right)\right)\right]=$

A. 0

B. 1

C. (1/2)

D. (-1)

Answer: A

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54. If $\sin^{-1} x + \sin^{-1} y = \frac{\pi}{2}$ then dy/dx =`

A. x/y

B. (-x/y)

C. y/x

D. (-y/x)

Answer: B

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55. $\frac{d}{dx}\left(\sin^{-1}\sqrt{\frac{1-x}{2}}\right) =$

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

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

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

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

Answer: D

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56. $\frac{d}{dx}\cot^{-1}\left(\frac{1+\sqrt{1-x^2}}{x}\right) =$

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

B. none of all

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

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

Answer: A

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57. If $y = \sin^{-1}\left(\frac{2x}{1+x^2}\right) + \sec^{-1}\left(\frac{1+x^2}{1-x^2}\right)$ then , dy/dx =

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

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

C. (1/2)

D. 0

Answer: B

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58. If $y = \sin^{-1}\left(\frac{x^2}{\sqrt{x^4+a^4}}\right)$ then dy/dx =

A. $\frac{a^4}{x^4+a^4}$

B. $\frac{x^4}{x^4+a^4}$

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

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

Answer: D

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59. If $y=\sin^{-1}\left(2x\sqrt{1-x^2}\right)+\sec^{-1}\left(\frac{1}{\sqrt{1-x^2}}\right)$ then dy/dx =

A. $\frac{3}{\sqrt{1-x^2}}$

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

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

D. 0

Answer: A

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60. If $y = \sec^{-1}\left(\frac{1}{\sqrt{1-x^2}}\right) + \sec^{-1}\left(\frac{1}{1-2x^2}\right)$ then dy/dx =

A. 0

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

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

D. $\frac{3}{\sqrt{1-x^2}}$

Answer: D

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61. $\frac{d}{dx}\left[\tan^{-1}x+\sin^{-1}\left(\frac{x}{\sqrt{1+x^2}}\right)\right]=$

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

B. 0

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

D. none of these

Answer: C

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62. If $y=\tan^{-1}\sqrt{\frac{1+\sin x}{1-\sin x}}$, then dy/dx =

A. 1

B. (-1/2)

C. (1/2)

D. 0

Answer: C

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63. $\frac{d}{dx}\tan^{-1}\left(\frac{\cos x}{1+\sin x}\right) =$

A. 0

B. (1/2)

C. (-1/2)

D. (-1)

Answer: C

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64. $\frac{d}{dx}\left[\cot^{-1}\left(\frac{1+x}{1-x}\right)^{-1}\right] =$

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

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

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

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

Answer: D

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65. If $y = \cos^{-1}\left(\frac{x-x^{-1}}{x+x^{-1}}\right)$, then dy/dx =

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

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

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

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

Answer: D

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66. If $y = \tan^{-1}\left(\frac{\sqrt{1+x}+\sqrt{1-x}}{2}\right)$ then, dy/dx =

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

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

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

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

Answer: C

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67. If $y = \tan^{-1}\left(\frac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right)$ then dy/dx =

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

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

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

D. none of these

Answer: A

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68. Prove that $\cot^{-1}\left[\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right]$

A. (-1)

B. 0

C. 1

D. (1/2)

Answer: D

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69. $\frac{d}{dx}\left[\cos^{-1}\left(\frac{5x+12\sqrt{1-x^3}}{13}\right)\right] =$

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

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

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

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

Answer: A

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70. If xy = x +y then dy/dx =

A. (xy)/(1-x)

B. (y+1)/(1-x)

C. y/(1-xy)

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

Answer: D

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71. If $3x^2 + 2xy + 6y^2 = 6$ then dy/dx at (1,1,) is

A. 1

B. (-1)

C. 2

D. (-4/7)

Answer: D

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72. If $y = \log(xy)$, $dy/dx =$

A. $(x+y)/(x(1+\log xy))$

B. $(x-y)/(x(1+\log xy))$

C. $(y-x)/(x(1+\log xy))$

D. none

Answer: B

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73. If $y = \log_y^x$, then dy/dx =

A. 1/(x+logy)

B. 1/(x+xlogy)

C. 1/(1+xlogy)

D. 1/(y+logx)

Answer: B

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74. If $x = \sqrt{1 + \cos y}$ then dy/dx in term of x is

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

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

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

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

Answer: B

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75. If y = x tan y, then dy/dx =

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

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

C. (tan y)/(y-x)

D. none of these

Answer: A

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76. If $y^2 - 2x^2 = y$, then dy/dx at (1,-1) is

A. (-4/3)

B. (4/3)

C. (3/4)

D. (-3/4)

Answer: A

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77. If $y = x.\sin y$, then $\frac{dy}{dx} =$

A. $\frac{1 - x\cos y}{\sin y}$

B. $\frac{1 - x \sin y}{x \cos y}$

C. $\frac{\sin y}{1 - x \cos y}$

D. none of these

Answer: D

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78. If 3 sin(xy) + 4 cos(xy) = 5, then dy/dx =

A. (-y/x)

B. (3sin(xy)+7cos(xy))/(3cos (xy)-7 sin (xy))

C. (7 sin (xy) + 3 cos (xy))/(7 sin (xy)-3 cos (xy))

D. none of these

Answer: A

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79. $If \sin(x+y) = \log(x+y) then \frac{dy}{dx} =$

A. 2

B. 1

C. cos(x+y)

D. (-1)

Answer: D

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80. If $f(x) = \log_{x^2}(\log_e x)$, then $f'(x)$ at x=e is

A. 0

B. 1

C. 1/e

D. 1/(2e)

Answer: D

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81. If $\cos^{-1}\left(\frac{x^2-y^2}{x^2+y^2}\right) = \log a$, then dy/dx =

A. x/y

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

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

D. y/x

Answer: D

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82. If $x\sqrt{1+y}+y\sqrt{1+x}=0 x \neq y$ prove that $\frac{dy}{dx}=\frac{-1}{(1+x)^2}$

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

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

C. 1/(1+x)

D. none of these

Answer: B

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83. If $y=\log_x(\log x)$ then (dy/dx)_(x = e) =`

A. e

B. 1/e

C. 1

D. 0

Answer: D

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84. If sqrt(x) + sqrt(y) = sqrt(xy)`, dy/dx =

A. $-\frac{y\sqrt{y}}{x\sqrt{x}}$

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

C. $-\frac{x\sqrt{x}}{y\sqrt{y}}$

D. $-\frac{y\sqrt{x}}{x\sqrt{y}}$

Answer: A

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85. If $\sqrt[x]{1+y}+\sqrt[y]{1+y}=0$ then $\left(\frac{dy}{dx}\right)_{x=1}=$

A. (1/4)

B. (-1/4)

C. (1/2)

D. -1

Answer: B

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86. If $y=\log_5(\log_5 x)$ then dy/dx =

A. $\frac{1}{x \log_5 x}$

B. $\frac{1}{\log_5 x . \log_5 x}$

C. $\frac{1}{x \log_5 x . (\log 5)^2}$

D. none of these

Answer: C

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87. If $x^y . y^x = c$, then dy/dx at (e,e) is

A. 1

B. (-1)

C. log e +1

D. 1-e

Answer: B

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88. If x = sin t. cos 2t, y = cost sin 2t then dy/dx at $t = \frac{\pi}{4}$ is

A. (-2)

B. 2

C. (-1/2)

D. (1/2)

Answer: D

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89. If $x = \theta\cos\theta + \sin\theta, y = \cos\theta - \theta\sin\theta,$ then dy/dx at $\theta = \frac{\pi}{2}$

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

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

C. $\frac{\pi}{4}$

D. $\frac{4}{\pi}$

Answer: D

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90. If $x = a\sin^2 t, y = a\cos^2 t,$ then $\frac{dy}{dx}$

A. tan t

B. t cos t

C. 1

D. (-1)

Answer: D

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91. $x = \cos^3 t, y = \sin^3 t$, then $\frac{dy}{dx}$ at $t = \frac{\pi}{4}$ is

A. (-1)

B. 1

C. (1/2)

D. (-1/2)

Answer: A

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92. If $x = \frac{2}{t^2}, y = t^3 - 1, \frac{d^2y}{dx^2} =$

A. $15t^2$

B. $\frac{15}{6t^2}$

C. $\frac{15}{16}t^7$

D. $16t^2$

Answer: C

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93. Find $\frac{dy}{dx}$, if $x = a[\cos t + \log(\tan t/2)] \& y = a \sin t$

A. tan t

B. cot t

C. (- t cot t)

D. (- tan t)

Answer: A

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94. If $x = a(\theta - \sin\theta), y = a(1 - \cos\theta)$ then $\frac{dy}{dx}$ at $\frac{\pi}{2}$ is

A. 1

B. 0

C. ∞

D. (-1)

Answer: A

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95. If $x = e^{\cos t}, y = e^{\sin t}$, then dy/dx =

A. $-\cot t.\, e^{\sin t - \cos t}$

B. $\cot t.\, e^{\sin t - \cos t}$

C. $\tan t.\, e^{\sin t - \cos t}$

D. $-\tan t.\, e^{\sin t - \cos t}$

Answer: A

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96. $x = a\cos\theta, y = b\sin\theta.$

A. $-\cot\theta$

B. $-\tan\theta$

C. $\cot\theta$

D. $\tan\theta$

Answer: A

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97. If $x = \theta.\sin 2\theta, y = \theta.\cos 2\theta$ then dy/dx at $\theta = \frac{\pi}{4}$ is

A. (1/2)

B. (-1/2)

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

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

Answer: D

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98. If $x = e^{\sin t}, y = e^{\cos t}$, then dy/dx =

A. $-\cot t.\, e^{\sin t - \cos t}$

B. $\cot t.\, e^{\sin t - \cos t}$

C. $-\tan t.\, e^{\cos t - \sin t}$

D. $-\tan t.\, e^{\sin t - \cos t}$

Answer: C

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99. If $x = \cos^{-1}\left(\frac{1}{\sqrt{1+t^2}}\right), y = \sin^{-1}\left(\frac{t}{\sqrt{1+t^2}}\right)$ then dy/dx =

A. 0

B. t cos t

C. 1

D. (-1)

Answer: C

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100. If $\sin x = \frac{2t}{1+t^2}, \tan y = \frac{2t}{1-t^2}$, then $\frac{dy}{dx}$ is equal to

A. 1

B. 0

C. (-1)

D. t

Answer: A

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101. Derivatives $\cos^{-1}\left(2x^2-1\right)$ w.r.t $\sqrt{1+3x}$ at $x=-\frac{1}{3}$ is

A. 0

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

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

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

Answer: A

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102. Derivatives $\sin^{-1}\left(\frac{\sqrt{1+x}+\sqrt{1-x}}{2}\right)$ w.r.t $\cos^{-1}x$ is

A. (1/2)

B. 1

C. (-1/2)

D. (-1)

Answer: A

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103. Derivative of $\sec^{-1}\left(\frac{1}{2x^2-1}\right)$ w.r.t $\sqrt{1-x^2}$ is

A. x

B. x/2

C. 2/x

D. 0

Answer: C

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104. The derivative of $\tan^{-1}\left[\frac{\sqrt{1+x^2}-1}{x}\right]$ with respect to $\tan^{-1}$ x is

A. (1/2)

B. (-1/2)

C. 1

D. (-1)

Answer: A

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105. Derivative of log(sec x) w.r.t tan x is

A. sin x . cosx

B. tan x

C. cot x

D. (-sin x.cosx)

Answer: A

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106. Derivative of $\cos^{-1} x$ w.r.t $\sin^{-1} x$ is

A. (-1)

B. 1

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

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

Answer: A

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107. Derivative of log x w.r.t $\sqrt{x}$ is

A. (1/x)

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

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

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

Answer: D

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108. The derivative of $\cos^{-1}\left(2x^2-1\right)$ w.r.t $\cos^{-1}$ x is

A. 2

B. 2/x

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

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

Answer: A

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109. If $y = x^7.7^x$ then dy/dx =

A. $7x^6.7x$

B. $x^6.7^x(7 + x\log 7)$

C. $x^7 \log 7$

D. `7x^(7).7^(x-1)+7x.x^(6)

Answer: B

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110. If $y = 10^{-x}$ then dy/dx =

A. $10^{-x} \log 10$

B. $10^{-x} \log\left(\frac{1}{10}\right)$

C. $\frac{\log 10}{10^x + 1}$

D. $\frac{1}{2} 10^{-x} \log 10$

Answer: B

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111. If $y = 2^{-x}$ then dy/dx =

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

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

C. $2^{-x}.\log 2$

D. none of these

Answer: B

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112. If $y = 5^x$ then dy/dx =

A. $x.5^{x-1}$

B. 5^{x-1}

C. $5^x \log x$

D. $5^x.\log 5$

Answer: D

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113. If $x = e^{\tan^{-1}\left(\frac{y-x^2}{x^2}\right)}$ then dy/dx =

A. $2x[1+\tan(\log x)] + x\sec^2(\log x)$

B. $2x[1+\tan(\log x)] + \sec^2(\log x)$

C. $2x[1+\tan(\log x)] + x^2\sec^2(\log x)$

D. $2x[1+\tan(\log x)] + \sec^2(\log x)$

Answer: A

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114. If $y^x = e^{y-x}$, prove that $\frac{dy}{dx} = \frac{(1+\log y)^2}{\log y}$.

A. $\frac{y}{1+\log y}$

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

C. (x-y)/(1+ log y)

D. $\frac{\log Y}{(1+\log y)^2}$

Answer: D

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115. If $x^m . y^n = a^{m+n}$, then dy/dx =

A. $-\frac{my}{nx}$

B. (my)/(nx)

C. y/x

D. m/n

Answer: C

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116. $y = (x^x)^x$, then dy/dx =

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

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

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

D. none of these

Answer: B

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117. $y = (x^x)^x$, then dy/dx =

A. $x.\ x^x(1+2\log x)$

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

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

D. none

Answer: B

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118. If $y = e^{x^e}$ then dy/dx =

A. $e^{(x^e)}.\ (x^e)$

B. $e^{(x^e)}.\ x^e \log x$

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

D. none

Answer: C

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119. If $y = x(e^x)$ then dy/dx =

A. $\frac{e^x}{x} + e^x \log x$

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

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

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

Answer: D

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120. If $y = e^{x^x}$ then dy/dx =

A. $e^{(x^x)}.x^x(1+\log x)$

B. $e^{(x^x)}.x^x$

C. $e^{(x^x)}.x^x.\log\left(\frac{x}{e}\right)$

D. $e^{(x^x)}.\log(ex)$

Answer: A

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121. $\frac{d}{dx}(\sin x)^{\cos x} =$

A. $(\sin x)^{\cos x}[\sin x\log(\sin x)+\cot x.\cos x]$

B. $(\sin x)^{\cos x}[-\sin x\log(\sin x)+\cot x.\cos x]$

C. $(\sin x)^{\cos x}[-\sin x\log(\sin x)+\cot x]$

D. none of these

Answer: B

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122. $\frac{d}{dx}(ax+b)^{cx+d} =$

A. $(ax+b)^{c+d}\left[\frac{cx+d}{ax+d}+\log(ax+b)\right]$

B. $(ax+b)^{cx+d}\left[a.\ \frac{cx+d}{ax+d}+c.\log(ax+b)\right]$

C. $a(ax+b)^{c+d}$

D. $(ax+b)^{c+d}\left[\frac{cx+d}{ax+d}+c.\log(ax+b)\right]$

Answer: B

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123. If $y=\sqrt{\log x+y}$ then dy/dx =

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

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

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

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

Answer: C

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124. If $y = 3^x$ then $\frac{d^2y}{dx^2} =$

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

B. 1

C. 3

D. $y(\log 3)^2$

Answer: D

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125. If $y = \sin^2 x$, then $\frac{d^2y}{dx^2} =$

A. sin 2x

B. (-2 cos 2x)

C. 2 cos 2x

D. 2 sin 2x

Answer: C

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126. If $y = ax^4 + \frac{b}{x^3}$ then (d^(2)y)/(dx^(2)) =`

A. $\frac{12x^2}{y}$

B. $\frac{12y}{x^2}$

C. $12x^2y$

D. none of these

Answer: B

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127. If $x = e^t.\cos 2t$, $\frac{d^2y}{dx^2}$ at $t = \frac{\pi}{2}$ is

A. $-3e^{\frac{\pi}{2}}$

B. $3e^{\frac{\pi}{2}}$

C. $4e^{\frac{\pi}{2}}$

D. $e^{\frac{\pi}{2}}$

Answer: B

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128. If $x = e^{2t}.\cos 3t$, $\frac{d^2y}{dx^2}$ at $\frac{\pi}{2}$ is

A. $12e^{\Pi}$

B. $12e^{-\pi}$

C. $6e^{\pi}$

D. $-6e^{\pi}$

Answer: A

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129. $y = \left(\sin^{-1}x\right)^2 + \left(\cos^{-1}x\right)^2$, then $\left(1-x^2\right)y_2 - xy_1 =$

A. 0

B. 1

C. 4

D. 3

Answer: C

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130. If $f(a) = 2, f'(a) = 1, g(a) = -1, g'(a) = 2$, then $\lim_{x \to a} \frac{g(x) \cdot f(a) - g(a) \cdot f(x)}{x - a}$ is equal to

A. (-5)

B. (1/5)

C. 5

D. 0

Answer: C

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131. If $f(x) = e^x . g(x), g(0) = 4$ and $g'(0) = 2$, then f^(')(0) =`

A. 1

B. 3

C. 2

D. 6

Answer: D

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132. If $y = x - x^2$ then the derivative of $y^2 w . r . t$x^(2)` is

A. $2x^2 + 3x - 1$

B. $2x^2 - 3x + 1$

C. $2x^2 + 3x + 1$

D. $2x^2 - 3x - 1$

Answer: B

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133. If $x^2 + y^2 = t + \frac{1}{t}$ and $x^4 + y^4 = t^2 + \frac{1}{t^2}$ then dy/dx

A. y/x

B. none of above

C. x/y

D. (-x/y)

Answer: B

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134. If $y = e^{\tan x}$, then $\cos^2 x . \frac{d^2y}{dx^2} =$

A. (1-sin 2x) dy/dx

B. (-)(1+ sin 2x) dy/dx

C. (1+ sin 2x)dy/dx

D. (sin 2x -1)dy/dx

Answer: C

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135. $\frac{d}{dx}\{\cos^{-1} x + \sin^{-1} x\} =$

A. 0

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

C. $\pi - x$

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

Answer: A

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136. If y = log (sec x + tan x), then dy/dx =

A. sec x

B. tan x

C. $\sec^2 x$

D. $\tan^2 x$

Answer: A

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137. If $x = \sin^{-1}(3t - 4t^3)$ and $y = \cos^{-1}\sqrt{1 - t^2}$, and $-\frac{1}{2} \leq t \leq \frac{1}{2}$, then dy/dx =

A. (1/2)

B. (2/5)

C. (3/2)

D. (1/3)

Answer: D

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138. If $y = \sin^{-1}\sqrt{\frac{x-1}{x+1}} + \sec^{-1}\sqrt{\frac{x+1}{x-1}}$ then dy/dx = $(x > 0 \text{ and } x \neq 1)$

A. (x-1)/(x+1)

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

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

D. 0

Answer: D

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139. If f(x) = log (tan x), then $f'(x) =$

A. $\sec^3 x$

B. sec x. cotx

C. 2 cosec 2x

D. cosec 2x

Answer: C

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140. If f(x) is an even function , then f'(x) is

A. an even function

B. an odd function

C. may be even or may be odd

D. nothing can be said

Answer: B

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141. If f(x) is an odd function, then $f'(x)$

A. is an odd function

B. is an even function

C. may be even or may be odd

D. nothing can be said

Answer: B

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142. If f(x) is an even funiction and f (x) exists , then f' (e) + f' (- e) is

A. 0

B. < 0

C. > 0

D. ≤ 0

Answer: A

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143. If f(x) is a differentiable even function, defined on $(- \infty, \infty)$ and $f'(- 3) = - 4$ then $f'(3) =$

A. 6

B. (-4)

C. 3

D. 4

Answer: D

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144. If y = f(x) is an odd function, which is differentiable, defined on $(-\infty, \infty)$ such that $f'(4) = -2$ then $f'(-4) =$

A. 8

B. 2

C. (-2)

D. 0

Answer: C

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145. Let f(x) be a polynomial function such that f(x). f(1/x) = f(x) + f(1/x). If f(4) = 65, then $f'(x) =$

A. x^2

B. $3x^2$

C. $4x^3$

D. $5x^4$

Answer: B

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146. Let f be a function defined for all $x \in R$. If f is differentiable and $f(x^3) = x^5$ for all $x \in R(x \neq 0)$, then the value of $f'(27)$ is

A. 15

B. 45

C. 0

D. 10

Answer: A

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147. If f(x) = (ax +b) sin x + (cx +d) cosx, then the values of a,b,c,d such that $f'(x) = x.\cos x$, for all x are

A. b = x = 0, a =d = 1

B. b = d = 0, a = c =1

C. c = d = 0, a = b = 1

D. none of these

Answer: A

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148. If x = a(t+1/t), y =a(t-1/t), then dy/dx =

A. $\frac{t^2-1}{t^2+1}$

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

C. $\frac{t^2+1}{1-t^2}$

D. $\frac{1-t^2}{1+t^2}$

Answer: B

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149. $f(x) = \log\left(x + \sqrt{x^2+1}\right.$, then $f'\left(\frac{1}{2}\right) =$

A. $\frac{1}{\sqrt{5}}$

B. $\frac{2}{\sqrt{5}}$

C. $\frac{\sqrt{5}}{2}$

D. 2

Answer: B

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150. $If f'(x) = \cos(\log x)$ and $y = f\left(\frac{2x-3}{2x+5}\right) then \frac{dy}{dx} =$

A. $-\sin\left[\log\left(\frac{2x-3}{2x+5}\right)\right]\frac{.16}{(2x+5)^2}$

B. $\cos\left[\frac{2x+5}{2x-3}\right]\frac{.16}{(2x+5)^2}$

C. $\cos\left[\log\left(\frac{2x-3}{2x+5}\right)\right]\frac{.16}{(2x+5)^2}$

D. $-\sin(\log x)\frac{.1}{x}.f'\left(\frac{2x+3}{3-2x}\right)$

Answer: C

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151. If $2^x + 2^y = 2^{x+y}$, then $\frac{dy}{dx}$ is

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

B. `(2^(x)+2^(y))/(1+2^(x+y))

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

D. `(2^(x)+2^(x+y))/2^(x)'

Answer: D

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152. If $y = (x^x)^x$, then $\left(\frac{dy}{dx}\right)_{x=1} =$

A. 1+log 2

B. 1

C. (-1)

D. 1-log 2

Answer: B

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153. If $y = \tan^{-1}(\cos ecx - \cot x)$, then dy/dx =`

A. 0

B. (1/2)

C. (-1/2)

D. 1

Answer: B

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154. If $y = \frac{e^x + 1}{e^x - 1}$, then $\frac{y^2}{2} + \frac{dy}{dx} =$

A. 1

B. (-1)

C. (-1/2)

D. (1/2)

Answer: D

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155. $y = \left(x + \sqrt{x^2 + a^2}\right)^n$, then dy/dx =

A. ny

B. $\frac{ny}{\sqrt{x^2+a^2}}$

C. $\frac{n}{\sqrt{x^2+a^2}}$

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

Answer: B

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156. If $y = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \ldots..$, then dy/dx =

A. y

B. y+1

C. y+x

D. y-x

Answer: A

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157. The least value of n so that $y_n = y_{n+1}$, where, $y = x^2 + e^x$ is

A. 2

B. 3

C. 4

D. 5

Answer: B

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158. If $y = \left(1 + \frac{1}{x}\right)^x$, then dy/dx =

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

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

C. $y.\left[\log\left(1+\frac{1}{x}\right)-\frac{1}{1+x}\right]$

D. $y\left[\frac{1}{1+x}+\log\left(1+\frac{1}{x}\right)\right]$

Answer: C

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159. If $y=(\sin x)^{\tan x}$, then dy/dx =

A. $(\sin x)^{\tan x}\left[1+\sec^2 x.\log\sin x\right]$

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

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

D. $(\sin x)^{\tan x}.\log(\sin x).\sec^2 x$

Answer: A

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160. A differentiable function f(x) is such that f91) =7 and $f'(1) = \frac{1}{7}$. If f^{-1} exists and $f^{-1} = g$, then ,

A. $g'(7) = \frac{1}{7}$

B. $g'(7) = 7$

C. $g'(1) = \frac{1}{7}$

D. $g'(1) = 8$

Answer: B

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161. The differentiable coefficient of x^6 w.r.t. x^3 is :

A. $6x^5$

B. $3x^2$

C. `2x^(3

D. x^3

Answer: C

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162. $\frac{d}{dx}\left(\frac{x}{2}\sqrt{x^2+a^2}+\frac{a^2}{2}\log\left(x+\sqrt{x^2+a^2}\right)\right)$ is

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

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

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

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

Answer: B

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163. If $y=f\left(\frac{2x-1}{x^2+1}\right)$ and $f'(x)=\sin x^2$, then dy/dx =

A. $\left(\cos x^2\right).f'(x)$

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

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

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

Answer: D

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164. If y = x . tan y, then dy/dx =

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

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

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

D. $\frac{\tan x}{x - y^2}$

Answer: B

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165. The derivative of $\sec^{-1}\left(\frac{1}{2x^2 - 1}\right)$ w.r.t. $\sqrt{1 - x^2}$ at $x = \frac{1}{2}$ is

A. 2

B. 4

C. 1

D. (-2)

Answer: B

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166. If $y = \sqrt{\tan x + \sqrt{\tan + \sqrt{\tan x + \ldots\ldots,}}}$ then dy/dx =

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

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

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

D. $\frac{\cot x}{2y - 1}$

Answer: B

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167. If $y = 2^{ax}$ and dy/dx = log 256 at x =1, then the value of a is

A. 0

B. 1

C. 2

D. 3

Answer: C

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168. If $x^y = \log x$, the value of dy/dx at x = e is

A. 0

B. 1

C. e

D. 1/e

Answer: D

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169. $\frac{d}{dx}\left\{\frac{\cos x + \sin x}{\cos x - \sin x}\right\} =$

A. 1/(cosx-sinx)

B. 2/(cosx-sinx)

C. 2/(1-sin2x)

D. 2/(1-cos2x)

Answer: C

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170. If f(x) = |x|, then $f'(0) =$

A. 0

B. 1

C. x

D. does not exist

Answer: D

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171. If $x = y\sqrt{1-y^2}$, then dy/dx =

A. 0

B. x

C. $\left(\frac{\sqrt{1-y^2}}{1-2y^2}\right.$

D. $\left(\frac{\sqrt{1-y^2}}{1+2y^2}\right.$

Answer: C

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172. If f(x) = (x-1)(x-2)(x-3), then $f'(0) =$

A. 0

B. 1

C. 11

D. 6

Answer: C

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173. If $y = \sin^{-1}\left(\frac{2x}{1+x^2}\right) + \sec^{-1}\left(\frac{1+x^2}{1-x^2}\right), (-1 < x < 0)$

then dy/dx =

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

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

C. 0

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

Answer: C

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174. If $y = \sin^{-1}\left(\frac{2x}{1+x^2}\right) + \sec^{-1}\left(\frac{1+x^2}{1-x^2}\right), (0 < x < 1)$

then dy/dx =

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

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

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

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

Answer: A

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175. If $y = \sin^{-1}\left(\frac{2x}{1+x^2}\right) + \sec^{-1}\left(\frac{1+x^2}{1-x^2}\right), (x > 1)$ then dy/dx =

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

B. 0

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

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

Answer: B

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

A. 0

B. (1/2)

C. 1

D. (-1)

Answer: C

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177. If $y = \tan^{-1}\left[\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right], 0 < x < \frac{\pi}{2}$ then dy/dx =

A. (1/2)

B. (-1/2)

C. x/2

D. (-x/2)

Answer: A

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178. If $y = x\sin^{-1}x + \sqrt{1-x^2}$, then dy/dx =

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

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

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

D. $\sin^{-1} x$

Answer: D

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179. If $y = \tan^{-1}\left[\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right], 0 < x < \frac{\pi}{2}$ then dy/dx =

A. (1/2)

B. (-1/2)

C. x/2

D. (-x/2)

Answer: B

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180. If $y = \tan^{-1}\left(\frac{4x}{1-5x^2}\right) + \tan^{-1}\left(\frac{3+8x}{8-3x}\right)$, then $\frac{dy}{dx}$ is :

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

B. $\frac{5}{1+x^2}$

C. $\frac{25}{1+x^2}$

D. $\frac{5}{1+25x^2}$

Answer: D

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181. $\frac{d}{dx}\left[\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)\right]$ at x = -1/sqrt2`.

A. 4

B. (4/3)

C. (-4/3)

D. (-4)

Answer: C

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182. $\frac{d}{dx}\left[\sin^{-1}\left(\frac{2x}{1+x^2}\right)\right]$ at x = 1/2 is

A. (5/8)

B. (-5/8)

C. (-8/5)

D. (8/5)

Answer: D

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183. $\frac{d}{dx}\left[\sin^{-1}\left(\frac{2x}{1+x^2}\right)\right]$ at x = 3/2 is

A. (-8/13)

B. (8/13)

C. (13/8)

D. (-13/8)

Answer: B

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184. If $y = \sin^{-1}\left(3x - 4x^3\right)$, then dy/dx at $x = \frac{1}{3}$ is

A. $-\frac{9\sqrt{2}}{4}$

B. $9\sqrt{2}$

C. $\frac{9\sqrt{2}}{4}$

D. $\frac{9}{\sqrt{8}}$

Answer: C

Watch Video Solution

185. If $y = \sin^{-1}\left(3x - 4x^3\right)$, then dy/dx at $x = \frac{1}{\sqrt{2}}$ is

A. $-3\sqrt{2}$

B. $\frac{1}{3\sqrt{2}}$

C. $\sqrt{2}$

D. $3\sqrt{2}$

Answer: D

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186. $\frac{d}{dx}\left[\cos^{-1}\left(2x^2-1\right)\right]$ at $x=-\frac{1}{\sqrt{2}}is$

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

B. $\sqrt{2}$

C. $2\sqrt{2}$

D. $-2\sqrt{2}$

Answer: D

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187. $\frac{d}{dx}\left[\cos^{-1}\left(2x^2-1\right)\right]$ at $x=\frac{1}{\sqrt{2}}$

A. $2\sqrt{2}$

B. $-2\sqrt{2}$

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

D. $\sqrt{2}$

Answer: B

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188. If $y = \sin^{-1}\left(2x\sqrt{1-x^2}\right)$, then $\frac{dy}{dx}$ at $x = \frac{\sqrt{3}}{2}$ is

A. 4

B. (-4)

C. 2

D. (-2)

Answer: B

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189. If $y = \sin^{-1}\left(2x\sqrt{1-x^2}\right)$, then dy/dx at x = 1/2 is

A. $\frac{4}{\sqrt{3}}$

B. $-\frac{4}{\sqrt{3}}$

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

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

Answer: A

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190. $\frac{d}{dx}\left[\text{cosec}^{-1}\left(\frac{1+x^2}{2x}\right)\right]$ is :

A. $\frac{-2}{1+x^2}, x \neq 0$

B. $\frac{1}{1+x^2}, x \neq 0$

C. $\frac{2\left(1-x^2\right)}{\left(1+x^2\right)\left|1-x^2\right|}, x \neq \pm 1, 0$

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

Answer: B

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191. If $y = \tan^{-1}(\sec x + \tan x)$ then $\frac{dy}{dx}$=

A. 0

B. sec x - tan x

C. (1/2)

D. 2

Answer: C

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

A. (1/2)

B. 0

C. 1

D. (-1)

Answer: C

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193. If $y = \sec^{-1}\left(\frac{x+1}{x-1}\right) + \sin^{-1}\left(\frac{x-1}{x+1}\right)$, then $\frac{dy}{dx}$ is

A. (x-1)/(x+1)

B. (x+1)/(x-1)

C. 0

D. 1

Answer: C

Watch Video Solution

194. If $y = \sin^{-1}\left(\frac{1-x^2}{1+x^2}\right)$, then dy/dx =

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

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

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

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

Answer: A

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195. The derivative of $\tan^{-1}\left[\frac{\sqrt{1+x^2}-1}{x}\right]$ with respect to $\tan^{-1}$ x is

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

B. $\left(\frac{\sqrt{1+x^2-1}}{x^2}\right.$

C. 1

D. (1/2)

Answer: D

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196. $\frac{d}{dx}\{\cos[2\sin^{-1}(\cos x)]\} =$

A. 2 sin 2x

B. 3 cos 2x

C. 0

D. (-2 sin 2x)

Answer: A

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197. If $y = \tan^{-1}\left(\frac{\sin x}{1+\cos x}\right)$ find $\frac{dy}{dx}$.

A. (1/2)

B. 0

C. 1

D. (-1)

Answer: A

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198. Let $f(x+y)=f(x)f(y)$ and $f(x)=1+(\sin 2x)g(x)$, where $g(x)$ is continuous. Then $f'(x)$ is equal to :

A. 2.g(0)

B. f(x).g(0)

C. 2f(x).g(0)

D. g(0)

Answer: C

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199. Let f and g be differentiable functions such that $(\text{fog})' = I$. If $g'(a) = 2$ and $g(a) = b$, then $f'(b)$ equals :

A. (-2)

B. (1/2)

C. 2

D. (-1/2)

Answer: B

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200. Let f(x+y) = f(x).f(y), $\forall, x, y$. Suppose f(5) =2, $f'(0) = 3$ then $f'(5) =$

A. 5

B. 6

C. 0

D. none of these

Answer: B

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201. $\lim_{h \to 0} \frac{\cos^2(x+h) - \cos^2 x}{h}$ is equal to :

A. $\cos^2 x$

B. (-sin 2x)

C. sin x cos x

D. 2 sin x

Answer: B

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202. If f(x) is differentiable at x = a then $\lim_{a \to a} \frac{xf(a) - af(x)}{x - a} =$

A. $f(a) - af'(a)$

B. $af'(a) - f(a)$

C. $f'(a)$

D. $a.\ f'(a)$

Answer: A

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203. If $g(x) = \frac{1}{\sqrt{9 + x^2}}$ then $\lim_{x \to 4} \left(\frac{g(x) - g(4)}{x - 4} \right) =$

A. 4/375

B. (-4/125)

C. 375/4

D. (-375/4)

Answer: B

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204. Let f be twice differentiable function such that $f''(x) = -f(x)$ and $f'(x) = g(x)$. Also $h(x) = [f(x)]^2 + [g(x)]^2$. If h(4) = 7, then h(7) =

A. 0

B. 5

C. 4

D. 7

Answer: D

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205. If $y = e^{-x}(A\cos x + B\sin x)$, then y satisfies :

A. $y_2 + 2y_1 = 0$

B. $Y_2 + 2y_1 + 2y = 0$

C. $Y_2 + 2y = 0$

D. `y_(2)-2y_(1)+2y = 0

Answer: B

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206. If $y = e^{2x}(A\cos 3x - B\sin 3x)$, then y satisfies

A. $y_2 + 4y_1 + 13y = 0$

B. $y_2 + 4y_1 - 13y = 0$

C. $y_2 - 4y_1 - 13y = 0$

D. $y_2 - 4y_1 + 13y = 0$

Answer: D

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207. If $y = Ae^{2x} + Be^{-3x}$, then y satisfies

A. $y_2 + y_1 + 6y = 0$

B. $y_2 - y_1 + 6y = 0$

C. $y_2 + y_1 - 6y = 0$

D. $y_2 - y_1 - 6y = 0$

Answer: C

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208. If $y = 2e^{-x} + 3e^{-2x}$, then y satisfies

A. $y_2 + 3y_1 - 2y = 0$

B. $y_2 + 3y_1 + 2y = 0$

C. $y_2 - 3y_1 + 2y = 0$

D. $y_2 - 3y_1 - 2y = 0$

Answer: B

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209. If $y = (3x + 5)e^{-2x}$, then y satisfies

A. $y_2 - 4y_1 + 4y = 0$

B. $y_2 + 4y_1 + 4y = 0$

C. $y_2 + 4y_1 - 4y = 0$

D. $y_2 - 4y_1 - 4y = 0$

Answer: B

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210. If $y = Ae^{-4x} + Be^{4x}$, then y satisfies

A. $y_2 - 16y = 0$

B. $y_2 + 16y = 0$

C. $y_2 - 8y_1 - 16y = 0$

D. $y_2 - 8y_1 + 16y = 0$

Answer: A

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211. If $x = \sqrt{\frac{1-t^2}{1+t^2}}$ and $y = \frac{\sqrt{1+t^2}-\sqrt{1-t^2}}{\sqrt{1+t^2}+\sqrt{1-t^2}}$ then $\frac{d^2y}{dx^2} =$

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

B. $\frac{4}{(1+x)^3}$

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

D. $\frac{-4}{(1+x)^3}$

Answer: B

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

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

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

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

D. e^x

Answer: C

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213. If S_n denotes the sum of n terms of a G.P., whose common ratio is r, then $(r-1)\frac{dS_n}{dr} =$

A. $(n-1)S_n$

B. $(n-1)S_n - nS_{n-1}$

C. $(n-1)S_n + nS_{n-1}$

D. $(n+1)S_n$

Answer: B

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214.

$$y = \frac{1}{1 + x^{\beta-\alpha} + x^{\gamma-\alpha}} + \frac{1}{1 + x^{\alpha-\beta} + x^{\gamma-\beta}} + \frac{1}{1 + x^{\alpha-\gamma} + x^{\beta-\gamma}}$$

then dy/dx =

A. 0

B. $(\alpha+\beta+\gamma)^{\alpha+\beta+\gamma-1}$

C. 1

D. (-1)

Answer: A

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215. If $y = \left(1 + x^{\frac{1}{4}}\right)\left(1 + x^{\frac{1}{2}}\right)\left(1 - x^{\frac{1}{4}}\right)$, then dy/dx =

A. x

B. 1

C. (-1)

D. $\sqrt{x}$

Answer: C

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216. If f(x) = x sin x, then $f'\left(\frac{\pi}{2}\right)$ is equal to

A. 0

B. 1

C. (-1)

D. (1/2)

Answer: B

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217. Let $f(x) = x - [x], x \in R$ then $f'\left(\frac{1}{2}\right)$ is

A. (3/2)

B. 1

C. 0

D. (-1)

Answer: B

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218. If $y = \sqrt{x} + \frac{1}{x}$ then dy/dx at x = 1 is

A. 1

B. (-1/2)

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

D. 0

Answer: D

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219. If f(x) = (x-1)(x-2)(x-3), then $f'(0) =$

A. (5/4)

B. (4/5)

C. 1

D. 0

Answer: A

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220. If $y = \frac{1 + \frac{1}{x^2}}{1 - \frac{1}{x^2}}$ then dy/dx is

A. $\frac{-4x}{(x^2 - 1)^2}$

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

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

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

Answer: A

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221. If $y = \left(\frac{\sin x + \cos x}{\sin x - \cos x}\right)$ then dy/dx at x = 0 is

A. (-2)

B. 0

C. (1/2)

D. does not exist

Answer: A

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222. If $y = \frac{\sin(x+9)}{\cos x}$, then $\frac{dy}{dx}$ at $x = 0$ is :

A. cos 9

B. sin 9

C. 0

D. 1

Answer: A

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223. If $f(x) = 1 + x + \frac{x^2}{2} + \ldots. + \frac{x^{100}}{100}$, then $f'(1)$ is equal to

A. 1/100

B. 100

C. does not exist

D. 0

Answer: B

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224. If $f(x) = \frac{x^n - a^n}{x - a}$ for some constant 'a', then $f'(a)$ is :

A. 1

B. 0

C. does not exist

D. (1/2)

Answer: C

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225. If $f(x) = x^{100} + x^{99} + \ldots + x + 1$, then $f'(1)$ is equal to

A. 5050

B. 5049

C. 5051

D. 50051

Answer: A

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226. If $f(x) = 1 - x + x^2 - x^3 + \ldots. - x^{99} + x^{100}$, then $f'(1)$ is equal to

A. 150

B. (-50)

C. (-150)

D. 50

Answer: D

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227. Differential coefficient of $\sec\left(\tan^{-1} x\right)$ is

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

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

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

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

Answer: A

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228. If $u = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$ and $v = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, then $\frac{du}{dv}$ is :

A. (1/2)

B. x

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

D. 1

Answer: D

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229. The set of points where the function f given by f(x) = |x-3| cos x is differentiable is

A. R

B. R-{3}

C. $(0, \infty)$

D. none of these

Answer: B

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230. The set of points where the function f given by f(x) = |2x-1|sin x is differentiable is

A. R

B. R-{1/2}

C. $(0, \infty)$

D. none of these

Answer: B

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231. The function $f(x) = e^{|x|}$ is

A. continuous every where but not differentiable at x =0

B. continuous and differentiable every where

C. not continuous at x =0

D. none of these

Answer: A

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232. Let f(x) = |sin x|. Then

A. f is every where differentiable

B. f is every where differentiable bu not at $x = n\pi, n \in Z$

C. f is every where continuous but not differentiable at $x = (2n+1)\frac{\pi}{2}, n \in Z$

D. none of these

Answer: B

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

A. $\frac{4x^3}{1-x^4}$

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

C. $\frac{1}{4-x^4}$

D. $\frac{-4x^3}{1-x^4}$

Answer: B

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234. If $y = \sqrt{\sin x + y}$ then dy/dx is equal to

A. (cos x)/(2y-1)

B. (cos x)/(1-2y)

C. (sin x)/(1-2y)

D. (sin x)/(2y-1)

Answer: A

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235. The derivative of $\cos^{-1}\left(2x^2-1\right)$ w.r.t $\cos^{-1}$ x is

A. 2

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

C. 2/x

D. $1-x^2$

Answer: A

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236. If $x=t^2, y=t^3$ then $\frac{d^2y}{dx^2}$ is

A. (3/2)

B. 3/(4t)

C. 3/(2t)

D. 2/(3t)

Answer: B

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237. The value of 'c' in Rolle's theorem for the function $f(x) = x^3 - 3x$ in the interval $[0, \sqrt{3}]$ is :

A. 1

B. (-1)

C. (3/2)

D. (1/3)

Answer: A

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238. For the function $f(x) = x + \frac{1}{x}, x \in [1, 3]$ the value of c for mean value theorem is

A. 1

B. $\sqrt{3}$

C. 2

D. none of these

Answer: B

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239. The value of c in Rolle's theorem for the function $f(x) = e^x . \sin x, x \in [0, \pi]$ is

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

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

D. $\frac{3\pi}{4}$

Answer: D

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240. The value of c in Mean value theorem, for the function f(x) = x(x2) and `x in [1,2] is

A. (3/2)

B. (2/3)

C. (1/2)

D. (3/2)

Answer: A

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241. If $y = \sqrt{x + \sqrt{x + \sqrt{x + \ldots\ldots\ldots\infty}}}$, m then $\frac{dy}{dx} =$

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

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

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

D. $\frac{1}{2y + x}$

Answer: B

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242. If $x^m y^n = (x + y)^{m+n}$, then $\frac{dy}{dx} =$

A. y/x

B. x/y

C. m/n

D. n/m

Answer: A

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243. If $y = \left(1 + x^2\right)\tan^{-1} x - x$, then dy/dx =

A. $\tan^{-1} x$

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

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

D. none of these

Answer: C

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244. If $y = \sin x^0$, $\frac{dy}{dx} =$

A. $\cos x^o$

B. $\frac{\pi}{180}\cos x^o$

C. $\frac{180}{\pi}\cos x^o$

D. none of these

Answer: B

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245. If $x = a(\cos\theta + \theta\sin\theta), y = a(\sin\theta - \theta\cos\theta), \frac{dy}{dx} =$

A. $\cot\theta$

B. $\tan\theta$

C. $(\tan)\frac{\theta}{2}$

D. $(\cot)\frac{\theta}{2}$

Answer: B

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246. If $x^y = e^{x-y}$ then $\frac{dy}{dx}$ is equal to

A. (log x)/((1+log x)^(2)`

B. `(1-x)/(y+xlogy)

C. (x-y)/(1+log x)

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

Answer: A

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247. If $y = \tan^{-1}\left(\frac{x+a}{1-xa}\right)$ then $\frac{dy}{dx} =$

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

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

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

D. $\frac{a^2}{(1-xa)^2}$

Answer: B

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248. If $y = x^x$, $\frac{dy}{dx}$=

A. $x.\ x^{-1}$

B. $x^x.\ \log x$

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

D. $\frac{x^x}{\log x}$

Answer: C

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249. If $xy = x + y,\ \frac{dy}{dx} =$

A. (xy)/(1-x)

B. (y+1)/(1-x)

C. y/(1-xy)

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

Answer: D

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250. $If \sin(x+y) = \log(x+y) then \frac{dy}{dx} =$

A. 2

B. (-2)

C. 1

D. (-1)

Answer: D

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251. If $y = \sqrt{\sin x + y}$ then dy/dx is equal to

A. (sinx)/(2y-1)

B. (sinx)/(1-2y)

C. (cosx)/(1-2y)

D. (cosx)/(2y-1)

Answer: D

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252. For the curve $\sqrt{x}+\sqrt{y}=1$, dy/dx at (1/4,1/4) is

A. (1/2)

B. 1

C. (-1)

D. 2

Answer: C

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253. If $y = \tan^{-1}\left(\frac{\sin x}{1+\cos x}\right)$ find $\frac{dy}{dx}$.

A. (1/4)

B. (1/2)

C. $1 + \cos^2 x$

D. (-1/4)

Answer: B

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254. If $u = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$ and $v = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, then $\frac{du}{dv}$ is :

A. x

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

C. 1

D. (1/4)

Answer: C

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255. If $y = \sin^{-1}(\cos x)$ then dy/dx =

A. 1/(sinx)

B. `cos^(-1)x

C. (-1)

D. (1/2)

Answer: C

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256. If `y = log log (log x), then dy/dx =

A. 1/(xlog(log x))

B. 1/(log (log x))

C. 1/((xlogx)log (logx))

D. none of these

Answer: C

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257. If $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \ldots\ldots \to \infty}}}$ then dy/dx =

A. (2y-1)/cosx

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

C. (cosx)/(2y-1)

D. (sinx)/(2y-1)

Answer: C

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258. If $f(x) = \cos^{-1}\left[\frac{1-(\log x)^2}{1+(\log x)^2}\right]$, then $f'(e) =$

A. 1/e

B. does not exist

C. 1

D. 2/e

Answer: A

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259. If $2^x + 2^y = 2^{x+y}$, then the value dy/dx at x = y =1 is

A. 1

B. 2

C. 0

D. (-1)

Answer: D

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260. The derivative of $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$ w.r.t $\sin^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ is

A. 2

B. (1/2)

C. (-1)

D. 1

Answer: C

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261. If $\sin y = x.\sin(a+y) then \frac{dy}{dx} =$

A. $\frac{\sin(a+y)}{\sin a}$

B. $\frac{\cos^2(a+y)}{\cos a}$

C. $\frac{\sin^2 a}{\sin(a+y)}$

D. $\frac{\sin^2(a+y)}{\sin a}$

Answer: D

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262. If $x = \frac{1-t^2}{1+t^2}$ and $y = \frac{2t}{1+t^2}$ then dy/dx =

A. (-x/y)

B. x/y

C. (-y/x)

D. y/x

Answer: A

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263. If $x = 2\cos t + \cos 2t, y = 2\sin t - \sin 2t,$ then $\frac{dy}{dx}$ at $t = \frac{\pi}{4}$ is

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

B. $1 - \sqrt{2}$

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

D. $\sqrt{2}$

Answer: B

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264. The differential of e^{x^3} with respect to log x is

A. $3x^2 . e^{x^3} + 3x^2$

B. e^{x^3}

C. $3x^3 . e^{x^3}$

D. $3x^2 . e^{x^3}$

Answer: C

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265. The derivative of $\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ w.r.t. $\cot^{-1}\left(\frac{1-3x^2}{3x-x^3}\right)$ is

A. (3/2)

B. 1

C. (1/2)

D. (2/3)

Answer: D

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266. The differential coefficient of f(sin x) with respect to x where f(x) = log x is

A. tan x

B. cot x

C. f(cos x)

D. (1/x)

Answer: B

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267. If $x = a\left(t - \frac{1}{t}\right), y = a\left(t + \frac{1}{t}\right)$ then $\frac{dy}{dx}$=

A. y/x

B. (-y/x)

C. x/y

D. (-x/y)

Answer: C

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268. $y = \tan^{-1}(\sec x - \tan x)$, then dy/dx =

A. 2

B. (-2)

C. (-1/2)

D. (-1)

Answer: D

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269. If $y = \frac{e^x + e^{-x}}{e^x - e^{-x}}$ then is equal to...

A. $-\text{sech}^2 x$

B. $-\cos ech^2 x$

C. $\text{sech}^2 x$

D. $\cos ech^2 x$

Answer: B

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270. If $y = \tan^{-1}\left(\frac{\sqrt{1+x^2}-\sqrt{1-x^2}}{\sqrt{1+x^2}+\sqrt{1-x^2}}\right)$ then dy/dx =

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

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

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

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

Answer: B

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271. If f (x) and g (x) are two functions with $g(x) = x - \frac{1}{x}$ and $fog(x) = x^3 - \frac{1}{x^3}$, then $f'(x) =$

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

B. $3x^2 + 3$

C. $3x^2 + \frac{3}{x^4}$

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

Answer: B

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272. The derivative of $a^{\sec x}$ w.r.t. $a^{\tan x}(a > 0)$ is

A. $\sin x.\ a^{\tan x - \sec x}$

B. `sec x.a^(sec x- tanx)

C. $a^{\sec x - \tan x}$

D. $\sin x.\ a^{\sec x - \tan x}$

Answer: D

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273. If $\sec^{-1}\left(\frac{1+x}{1+y}\right) = a$, then $\frac{dy}{dx}$ is

A. (y+1)/(x-1)

B. (y-1)/(x+1)

C. (x-1)/(y+1)

D. (x-1)/(y-1)

Answer: B

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274. If $y = \sin^{3^{-x}}$ then dy/dx =

A. $-\frac{\log 3}{\sqrt{3^{2x}-1}}$

B. $\frac{3^x \log 3}{\sqrt{3^{2x}-1}}$

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

D. $\frac{\log 3}{3^x \sqrt{3^{2x}-1}}$)

Answer: A

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275. $\alpha+\beta$ are the zeroes of the polynomial x^2-6x+4, then the value of $\frac{(\alpha+\beta)^2-2\alpha\beta}{\alpha\beta}$ is

A. 3

B. 1

C. 4

D. 2

Answer: D

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276. The derivative of $\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ w.r.t. $\cot^{-1}\left(\frac{1-3x^2}{3x-x^3}\right)$ is

A. (3/2)

B. 1

C. (1/2)

D. (2/3)

Answer: D

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277. $y = \tan^{-1}(\sec x - \tan x)$, then dy/dx =

A. 2

B. (-2)

C. (1/2)

D. (-1/2)

Answer: D

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278. If $\sqrt{1-x^2}+\sqrt{1-y^2}=x-y$, then dy/dx =

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

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

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

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

Answer: D

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279. If $x^y = \log x$, then dy/dx at the point where the curve cut the x-axis is

A. e

B. 1/e

C. 1

D. 0

Answer: B

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280. If $y = a^x$, then $\frac{d^2y}{dx^2} =$

A. $a^x(\log a)^2$

B. $a^{2x}.\log a$

C. $a^x.\log a$

D. none of these

Answer: A

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281. If $x^2+xy+y^2=0, \frac{d^2y}{dx^2}=$

A. 0

B. 1

C. (1/2)

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

Answer: A

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282. If $x = at^2, y = 2at$, then $\frac{d^2y}{dx^2} =$

A. $-\frac{1}{t^2}$

B. $\frac{1}{2at^3}$

C. $-\frac{1}{t^3}$

D. $-\frac{1}{2at^3}$

Answer: D

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283. If $y = ax^{n+1} + bx^{-1}$, then $x^2\frac{d^2y}{dx^2} =$

A. n(n-1)y

B. n(n+1)y

C. ny

D. n^2y

Answer: B

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

A. $a\theta\cos^3\theta$

B. $\frac{\sec^2\theta}{a}$

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

D. $\frac{\sec^2\theta}{\theta}$

Answer: C

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285. If $y = \tan^{-1}\sqrt{\frac{1-\cos x}{1+\cos x}}$, then`(d^(2)y)/(dx^(2)) = =

A. (1/2)

B. 1/(cosx)

C. 0

D. 1

Answer: C

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286. If $2x^2 + 4xy + 3y^2 = 0$, then $\frac{d^2y}{dx^2} =$

A. 0

B. (1/2)

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

D. (3/4)

Answer: A

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287. If $y = 1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \frac{x^4}{4!} - \ldots\ldots\ldots\ldots$ then $\frac{d^2y}{dx^2} =$

A. (-x)

B. x/y

C. y

D. (-y)

Answer: C

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288. If $x = a(\theta - \sin\theta), y = a(1 - \cos\theta)$ then $\frac{dy}{dx} =$

A. $(\cot)\frac{\theta}{2}$

B. $(\tan)\frac{\theta}{2}$

C. $\frac{1}{2}(\cos ec^2)\frac{\theta}{2}$

D. $-\frac{1}{2}(\cos ec^2)\frac{\theta}{2}$

Answer: A

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289. If x Aos 4t+Bsin4t then $\frac{d^2x}{dt^2}$=

A. (-16x)

B. 16x

C. x

D. x

Answer: A

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290. If $x = \sin t, y = \cos pt$ then...

A. $\left(1 + x^2\right)y_2 - xy_1 + p^2y = 0$

B. $\left(1 - x^2\right)y_2 - xy_1 + p^2y = 0$

C. $\left(1 - x^2\right)y_2 + xy_1 + p^2y = 0$

D. $\left(1 - x^2\right)y_2 + xy_1 - p^2y = 0$

Answer: B

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291. If $y = 1 + \frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3} + \ldots$ to ∞ with $|x| > 1$ then $\frac{dy}{dx} =$

A. x^2y^2

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

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

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

Answer: C

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292. If $\sin(x+y)+\cos(x+y)=\log(x+y)$, then $\frac{d^2y}{dx^2}=$

A. 0

B. (-y/x)

C. 1

D. (-1)

Answer: A

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293. If f (x) is a function such that $f''(x)+f(x)=0$ and $g(x)=[f(x)]^2+[f'(x)]^2$ and $g(3)=3$ then $g(8)=$

A. 0

B. 5

C. 8

D. 3

Answer: C

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294. If $y = \left(\cos^2\right)\frac{3x}{2} - \left(\sin^2\right)\frac{3x}{2}$, then $\frac{d^2y}{dx^2}$ is

A. 9y

B. $-3\sqrt{1-y^2}$

C. $3\sqrt{1-y^2}$

D. (-9y)

Answer: D

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295. If $x^y = e^{x-y}$, $\frac{dy}{dx} =$

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

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

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

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

Answer: B

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296. Let $f(2) = 4$ and $f'(2) = 4$.

Then $\lim_{x \to 2} \frac{xf(2) - 2f(x)}{x-2}$ is given by :

A. 2

B. (-2)

C. (-4)

D. 3

Answer: C

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297. If $y = \left(x + \sqrt{1 + x^2}\right)^n$, then $\left(1 + x^2\right)\frac{d^2y}{dx^2} + x\frac{dy}{dx}$ is

A. n^2y

B. $-n^2y$

C. (-y)

D. $2x^2y$

Answer: A

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298. If $f(x) = x^n$, then the value of f(1) - (f^(')(1))/(1!) -(f^('')(1))/(3!) + ... + ((-1)^(n)f^(n)(1))/(n!) =`

A. 2^{n-1}

B. 0

C. 1

D. 2^n

Answer: B

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299. If $f(x) = \begin{cases} xe^{-\left(\frac{1}{|x|}+\frac{1}{x}\right)} & x \neq 0 \\ 0 & x = 0 \end{cases}$ then f(x) is

A. continuous for all x but not differentiable at x =0

B. neither differentiable nor continuous at x =0

C. discontinuous everywhere

D. continuous as well as diffferentiable for all x

Answer: A

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300. If f(x) is a polynomial function of second degree. IF f(1) = f(-1) and a,b,c are in A.P., then f'(a), f'(b), f'(c) are in :

A. A.P

B. G.P

C. H.P

D. none of these

Answer: A

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301. f(x) is differential function. Given $f'(1) = 4, f'(2) - 6$, then

$$\lim_{h \to 0} \frac{f\left(2 + 2h + h^2\right) - f(2)}{f(1 + h - h^2) - f(1)}$$

A. does not exist

B. is -3

C. is 3

D. (3/2)

Answer: C

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302. If $e^{y+e^y+e^y+\infty}x > 0$, then dy/dx is

A. x/(1+x)

B. 1/x

C. (1-x)/x

D. (1+x)/x

Answer: C

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303. Suppose $f(x)$ is differentiable at $x = 1$ and $\lim_{h \to 0} \frac{1}{h}(1+h) = 5$, then $f'(1)$ equals :

A. 4

B. 3

C. 6

D. 5

Answer: D

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304. If f is a real valued differentiable function satisfying :

$|f(x) - f(y)| \leq (x - y)^2, x, y \in R$ and $f(0) = 0$, then $f(1)$ equals :

A. 0

B. (-1)

C. 1

D. 2

Answer: A

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305. The set of points, where $f(x) = \frac{x}{1+|x|}$ is differentiable, is :

A. $(-\infty, 0) \cup (0, \infty)$

B. $(-\infty, -1) \cup (-1, \infty)$

C. $(-\infty, \infty)$

D. $(0, \infty)$

Answer: C

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306. If $x^m y^n = (x+y)^{m+n}$, then $\frac{dy}{dx} =$

A. y/x

B. (x+y)/(xy)

C. xy

D. x/y

Answer: A

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307. If $f(x) = \log_{x^2}(\log_e x)$, then $f'(x)$ at x=e is

A. e

B. 1/e

C. (-e)

D. (-1/e)

Answer: B

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308. If $y = f(x) is an even function such t$ f^(')(0) $\exists$, $then$ f^(')(0) =`

A. 0

B. (-1)

C. 1

D. none of these

Answer: A

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309. If $f(x) = \cot^{-1}(\cos 2x)^{1/2}$, then $f'(\pi/6)$ is :

A. $\left(\frac{2}{3}\right)^{\frac{1}{2}}$

B. $\left(\frac{1}{3}\right)^{\frac{1}{2}}$

C. $3^{\frac{1}{2}}$

D. $6^{\frac{1}{2}}$

Answer: A

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310. If $f(x)$ is odd differentiable function defined on $(-\infty, \infty)$, such that $f'(3) = 2$, then $f'(-3)$ is :

A. 0

B. 1

C. 2

D. 4

Answer: C

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311. If $f(x) = \tan^{-1}\left[\sqrt{\frac{1+\sin x}{1-\sin x}}\right], 0 \leq x \leq \frac{\pi}{2}$ then $f'\left(\frac{\pi}{6}\right) =$

A. (-1/4)

B. (-1/2)

C. (1/4)

D. (1/2)

Answer: D

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312. If `x^(2)+y^(2) =1 then

A. $yy_2 - 2y_1^2 + 1 = 0$

B. $yy_2 + 2y_1^2 + 1 = 0$

C. $yy_2 + 2y_1^2 - 1 = 0$

D. $yy_2 + 2y_1^2 + 1 = 0$

Answer: B

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313. Let $f: R \to R$ be such that $f(1) = 3$ and $f(1) = 6$. Then $\lim_{x \to 0} \left(\frac{f(1+x)}{f(1)} \right)^{1/x}$ equal

A. 1

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

C. e^2

D. e^3

Answer: C

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314. If log (x+y) = 2xy, then $y'(0) =$

A. 1

B. (-1)

C. 2

D. 0

Answer: A

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315. $y = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$

A. dz/dx

B. 2dz/dx

C. 1/2 dz/dx

D. none

Answer: D

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316. If $y = \sin^{-1}\left(\frac{1-x^2}{1+x^2}\right)$, then dy/dx =

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

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

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

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

Answer: A

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317. Derivative of $\sec^{-1}\left(\frac{1}{2x^2-1}\right)$ w.r.t $\sqrt{1+3x}$ at x = -1/3 is

A. 0

B. (1/2)

C. (1/3)

D. none

Answer: A

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318. If $x = a\cos^3\theta, y = a\sin^3\theta,$ then $1 + \left(\frac{dy}{dx}\right)^2$ is _____

A. $\tan^2\theta$

B. $\sec^2\theta$

C. $\sec\theta$

D. $|\sec\theta|$

Answer: D

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319. If the function f is defined by $f(x) = \frac{x}{1+|x|}$, then at what points is f differntiable ?

A. everywhere

B. except at x = +_1

C. except at x = 0

D. except at x = 0 or +_1

Answer: A

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320. If 3sin(xy) + 4 cos (xy) = 5, then dy/dx =

A. (-y/x)

B. ((3sin(xY)+4cos(xy))/(3cos(xy)-3sin(xy))

C. ((3cos(xY)+4sin(xy))/(3cos(xy)-3sin(xy))

D. none of these

Answer: A

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321. The derivative of $\cos^{-1}\left(2x^2-1\right)$ w.r.t $\cos^{-1}$ x is

A. 2

B. 2/x

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

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

Answer: A

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322. If $\sin y = x.\sin(a+y) then \frac{dy}{dx} =$

A. $\frac{\sin\alpha}{\sin^2(\alpha+y)}$

B. $\frac{\sin^2(\alpha+y)}{\sin\alpha}$

C. $\sin\alpha.\sin^2(\alpha+y)$

D. $\frac{\sin^2(\alpha-y)}{\sin\alpha}$

Answer: B

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323. If $\sqrt{\tan y} = e^{\cos 2x}.\sin x$ then dy/dx =

A. sin 2y . (cot x-2sin 2x)

B. sin 2x . (cot y - sin y)

C. sin 2y. Sin 2x

D. cos 2y. Cot 2x

Answer: A

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324. $\frac{d}{dx}\left[\sin^2 \cot^{-1}\sqrt{\frac{1+x}{1-x}}\right] =$

A. 0

B. (1/2)

C. (-1/2)

D. (-1)

Answer: C

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325. If $y \sin x = x + y, then \left(\frac{dy}{dx}\right)(x = 0) =$

A. 1

B. (-1)

C. 0

D. 2

Answer: B

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326. $\frac{d}{dx}\left\{\sin^{-1}\left(\frac{3x}{2} - \frac{x^3}{2}\right)\right\} =$

A. $\frac{3}{\sqrt{4 - x^2}}$

B. $\frac{-3}{\sqrt{4 - x^2}}$

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

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

Answer: A

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327. If $x^x = y^y$, then $\frac{dy}{dx}$ is

A. (log x)/((1+log x)^(2)`

B. (1-x)/(y+xlog y)

C. (x+y)/(x log (e^(x))

D. (-logx)/(y+xlogy)

Answer: A

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328. $\frac{d}{dx}\left[\cos^{-1}\left(4\frac{x^3}{27}-x\right)\right]=$

A. $\frac{3}{\sqrt{9-x^2}}$

B. $\frac{1}{\sqrt{9-x^2}}$

C. $\frac{-3}{\sqrt{9-x^2}}$

D. $\frac{-1}{\sqrt{9-x^2}}$

Answer: C

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329. $\frac{d}{dx}(x^x)=$

A. $x^x(1+\log_e x)$

B. $x.\,x^x-1$

C. $x^x \log x$

D. $x^x(1 - \log x)$

Answer: A

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330. Derivative of $\sin^2 x$ w.r.t $(\log x)^2$ is

A. $\frac{x \sin x . \cos x}{\log x}$

B. $\frac{2 \sin x . \cos x}{(\log x)^2}$

C. $\frac{\sin^2 x}{2 \log x}$

D. x log x

Answer: A

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331. $\frac{d}{dx}(\cos x^o) =$

A. $-\sin x^o$

B. $-\frac{\pi}{180}\sin x^o$

C. $\frac{\pi}{180}\sin x^o$

D. $\frac{2\pi}{180}\sin x^o$

Answer: B

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332. If $\sin x = \frac{2t}{1+t^2}, \tan y = \frac{2t}{1-t^2}$, then $\frac{dy}{dx}$ is equal to

A. 0

B. cos x

C. tan x

D. 1

Answer: D

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333. $\frac{d}{dx}\left(\cos^{-1} x + \sin^{-1}\sqrt{1-x^2}\right) =$

A. 0

B. 1

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

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

Answer: D

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334. The derivative of $\sin^{-1} x$ w.r.t $\cos^{-1}\left(\sqrt{1-x^2}\right)$ is

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

B. $\cos^{-1} x$

C. 1

D. 0

Answer: C

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335. If $y = \cot^{-1}\left(\tan\left(\frac{\pi}{2} - x\right)\right)$, dy/dx =

A. x

B. 1

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

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

Answer: B

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336. If $y = 2^{2^x}$ then dy/dx =

A. $y(\log_{10} 2)^{20}$

B. $y(\log_e 2)^2$

C. $y(2^x)(\log_e 2)^2$

D. $y\frac{(L\log_e 2)^2}{2^x}$

Answer: C

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337. If $xy = (x + y)^n$ and dy/dx = y/x, then n =

A. 1

B. 2

C. 3

D. 4

Answer: B

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338. If $2^x + 2^y = 2^{x+y}$, then $\frac{dy}{dx}$ is

A. 2^{x-y}

B. -2^{x-y}

C. 2^(y-x)`

D. -2^{y-x}

Answer: D

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339. If $x = \frac{2t}{1+t^2}, y = \frac{1-t^2}{1+t^2}$ then dy/dx =

A. x/y

B. y/x

C. (-x/y)

D. (-y/x)

Answer: C

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340. Let $f(x) = e^x, g(x) = \sin^{-1} x$ and h(x) = f(g(x)) then $\frac{h'(x)}{h(x)} =$

A. $\sin^{-1} x$

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

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

D. $e^{\sin^{-1} x}$

Answer: B

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341. If $f(x) = \sqrt{ax} + \frac{a^2}{\sqrt{ax}}$ then $f'(a) =$

A. -1

B. 1

C. 0

D. a

Answer: C

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342. If $f(x)\begin{cases}\frac{x-1}{2x^2-7x+5} & x \neq 1 \\ -\frac{1}{3} & x = 1\end{cases}$ then $f'(1) =$

A. 0

B. 1

C. 2

D. 3

Answer: B

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343. If f(x) = x/(1+|x|) for $x \in R$, then $f'(0) =$

A. $-x\frac{dy}{dx}$

B. 0

C. x dy/dx

D. $x\left(\frac{dy}{dx}\right)^2$

Answer: B

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344. $y = \sin^{-1} x$, then $\left(1-x^2\right)\frac{d^2Y}{dx}x^2\Big) =$

A. f

B. f'

C. $f' + f''$

D. $f)+f\hat{}(\prime$

Answer: C

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345. The derivative of an odd function is :

A. cos x

B. 4 cos x

C. sin x

D. 4 sin x

Answer: B

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346. f(x) = 10 cos x + (13 + 2x) sin x, then $f''(x) + f(x) =$

A. cos x

B. 4 cos x

C. sin x

D. 4 sin x

Answer: B

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347. If $f: R \to R$ is an even function which is twice differentiable on R, and $f''(\pi) = 1$, then $f''(-\pi) =$

A. 1

B. 0

C. 1

D. 2

Answer: C

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348. If $f(x) = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$, then $f(\sqrt{3})$ is

A. 1 is true but 2 isfalse

B. Bothe 1 and 2 are true

C. Neither 1 nor 2 is true

D. 1 is false but 2 is true

Answer: A

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349. If $x\sqrt{1+y}+y\sqrt{1+x}=0 x \neq y$ prove that $\frac{dy}{dx}=\frac{-1}{(1+x)^2}$

A. 1/(1+x^(2))`

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

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

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

Answer: B

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350. If $x^y = y^x$ find $\frac{dy}{dx}$

A. y(y-xlog y)

B. y(y+xlog y)

C. x(x+ylogx)

D. x (y - x log x)

Answer: A

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351. If $\sec\left(\frac{x+y}{x-y}\right) = a$, then dy/dx =

A. x/y

B. y/x

C. y

D. x

Answer: B

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352. Derivative of $f(x) = \log_5(\log_7 x)$, where $x > 7$ is

A. $\frac{1}{x(\log 5)(\log 7)\log_7 x}$

B. $\frac{1}{x(\log 5)(\log 7)}$

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

D. none of these

Answer: A

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353. If g is the inverse function of f and $f'(x) = \frac{1}{1+x^n}$, then $g'(x)$ eauals

A. $1 + [g(x)]^n$

B. 1-g(x)

C. 1+g(x)

D. $1 - (g(x))^n$

Answer: A

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354. If $x = \sin^{-1}(3t - 4t^3)$ and $y = \cos^{-1}\sqrt{1-t^2}$, and $-\frac{1}{2} \leq t \leq \frac{1}{2}$, then dy/dx =

A. (1/2

B. (2/5)

C. (3/2)

D. (1/3)

Answer: D

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355. If $y = \tan^{-1}\left(\frac{a\cos x - b\sin x}{b\cos x + a\sin x}\right)$, then dy/dx =

A. 2

B. (-1)

C. a/b

D. b/a

Answer: B

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356. If $\sqrt{1-x^6}+\sqrt{1-y^6}=a^3\left(x^3-y^3\right)$ then dy/dx =

A. $\frac{x^2}{y^2}\sqrt{\frac{1-y^6}{1-x^6}}$

B. $\frac{y^2}{x^2}\sqrt{\frac{1-y^6}{1-x^6}}$

C. $\frac{x^2}{y^2}\sqrt{\frac{1-x^6}{1-y^6}}$

D. none of these

Answer: A

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357. If $f(x)=\frac{x^2-x}{x^2+2x}$, then $\frac{d}{dx}\left[f^{-1}(x)\right]=$

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

B. -3/((1-x^(2))`

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

D. none of these

Answer: C

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358. If $g(x) = \left(x^2 + 2x + 3\right)$ f(x) and f(0) = 5 and $\lim_{x \to 0} \frac{f(x) - 5}{x} = 4, then$g'(0) =`

A. 22

B. 14

C. 18

D. 12

Answer: B

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359. The derivative of $\tan^{-1}\left(\frac{2x}{1-x^2}\right)$ w.r.t $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$ is

A. 0

B. (-1)

C. 1

D. none of these

Answer: C

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360. Let F(x) = f(x) g(x) h(x) for all real x, where f(x), g(x) and h(x) are differentiable functions. At some point x_0, if

$F'(x_0) = 21F(x_0), f'(x_0) = 4f(x_0), f'(x_0) = -7g(x_0)$ and

` h^(')(x_(0)) = kh(x_(0)), then k =

A. 12

B. (-12)

C. 24

D. (-24)

Answer: C

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361. $\frac{d^2x}{dy^2}$ equals :

A. $\left(\frac{d^2y}{dx^2}\right)^{-1}$

B. $\left(\frac{d^2y}{dx^2}\right)\left(\frac{dy}{dx}\right)^{-3}$

C. $\left(\frac{d^2y}{dx^2}\right)\left(\frac{dy}{dx}\right)^{-2}$

D. $-\left(\frac{d^2y}{dx^2}\right)\left(\frac{dy}{dx}\right)^{-3}$

Answer: D

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362. If the function $f(x) = x^3 + e^{\frac{x}{2}}$ and $g(x) = f^{-1}(x)$ then the value of $g'(1)$ is

A. (1/2)

B. 2

C. 1

D. (-1/2)

Answer: B

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363. $f(x)$ and $g(x)$ are two differentiable functions on $[0, 2]$ such that $f''(x) - g''(x) = 0$, $f'(1) = 4, g'(1) = 2, f(2) = 9, g(2) = 3,$ then $f(x) - g(x)$ at $x = \frac{3}{2}$ is

A. 0

B. 2

C. 10

D. 5

Answer: D

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364. If f(1) =1 and $f'(1) = 2$ then $\lim_{x \to 1} \frac{\sqrt{f(x)} - 1}{\sqrt{x} - 1} =$

A. 2

B. 4

C. 1

D. (1/2)

Answer: A

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365. If $x^p . y^q = (x + y)^{p+q}$, then dy/dx is equal to

A. y/x

B. (py)/(qx)

C. x/y

D. (qy)/(px)

Answer: A

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366. Let y be an implict function of x defined by $x^{2x} - 2x^x \cot y - 1 = 0$. Then $y'(1)$ equals

A. 1

B. (-1)

C. log 2

D. (-log 2)

Answer: A

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367. If $f(x) = \log\left(\frac{1+x}{1-x}\right)$ and $g(x) = \frac{3x+x^3}{1+3x^2}$, then $f(g(x))$ is equal to :

A. $\frac{3}{1+9x^2} f \text{ or } all x \in R$

B. `3/(1+x^(2)) for all x in R

C. $\frac{3}{1+x^2} f \text{ or } all x \in R - \left\{-\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right\}$

D. $\frac{1}{9+x^2}$

Answer: C

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368. The derivative of $\sec^{-1}\left(\frac{1}{2x^2-1}\right)$ w.r.t. $\sqrt{1-x^2}$ at $x = \frac{1}{2}$ is

A. (-4)

B. 4

C. 2

D. (-2)

Answer: B

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369. Let f and g be differentiable functions such that $(\text{fog})' = I$.

If $g'(a) = 2$ and $g(a) = b$, then $f'(b)$ equals :

A. 2

B. (2/3)

C. (1/2)

D. none of these

Answer: C

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370. The expression of dy/dx of the function $y = a^{x^a \hat{} x \cdots \infty}$ is

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

B. `(y^(2)logy)/(x(1-ylogx)

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

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

Answer: C

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371. If $f(x) = \log_a(\log_a x)$, then $f'(x)$ is

A. `(log_(a)e)/(x log_(e)x)

B. $\frac{\log_e a}{x \log_a x}$

C. $\frac{\log_e a}{x}$

D. `x/(log_(e)a)

Answer: A

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372. If $f(x)$ is odd differentiable function defined on $(-\infty, \infty)$, such that $f'(3) = 2$, then $f'(-3)$ is :

A. 4

B. 2

C. (-2)

D. 0

Answer: C

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373. The differential coefficient of f(log x) w.r.t. x when f(x) = log x

A. x/ (log x)

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

C. (log x)/x

D. x log x

Answer: B

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374. If $y = x^{x\ \hat{}\ (x)^{x\ \hat{}\ (\infty)}}$, then x(1-y log x) dy/dx =

A. x^2

B. y^2

C. xy^2

D. xy

Answer: B

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

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

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

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

D. e^x

Answer: C

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376. If f(x) = x +2, then $f'(f(x))$ at x = 4 is

A. 8

B. 1

C. 4

D. 5

Answer: B

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377. If $y = [f(x)]^{\phi(x)}$ then dy/dx is

A. $e^{\phi \log f}\left[\frac{\phi}{f}.\, d\frac{f}{dx} + \log f.\, \frac{d\phi}{dx}\right]$

B. $\frac{\phi}{f\left(d\frac{f}{dx}\right)} + \frac{d\phi}{dx}\log f$

C. $e^{\phi \log f}\left[\phi\frac{f'}{f} + \phi' \log f'\right]$

D. none of these

Answer: A

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378. If $y = \tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$, prove that $\frac{dx}{dy} = \frac{1}{2(1+x^2)}$

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379. If f(x) = log |x|, $x \neq 0$ then $f'(x)$ equals

A. 1/|x|

B. 1/x

C. (-1/x)

D. none of these

Answer: B

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380. If $f(x) = x \tan^{-1} x$, then $f'(1)$ is equal to

A. $\frac{1}{2} + \frac{\pi}{4}$

B. 0

C. $-\frac{1}{2} - \frac{\pi}{4}$

D. $\frac{1}{2} - \frac{\pi}{4}$

Answer: A

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381. If $y = \sec^{-1}\left(\frac{x+1}{x-1}\right) + \sin^{-1}\left(\frac{x-1}{x+1}\right)$, then $\frac{dy}{dx}$ is

A. 1

B. (x-1)/(x+1)

C. 0

D. (x+1)/(x-1)

Answer: C

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382. If $y = x^{x^{x^{x^{\infty}}}}$, then $x\frac{dy}{dx}$ is equal to

A. yx^{y-1}

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

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

D. none of these

Answer: B

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383. The derivative of $\log_{10} x$ with respect to x^2 is

A. $\frac{1}{2x^2}\log_e 10$

B. $2.\ x^2\log_{10} e$

C. $\frac{1}{2x^2}\log_{10} e$

D. none of these

Answer: C

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384. If $y = \sin^{-1}\left(\frac{x}{2}\right) + \cos^{-1}\left(\frac{x}{2}\right)$ then the value of dy/dx is

A. 1

B. (-1)

C. 0

D. 2

Answer: C

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385. If g is the inverse function of f and $f'(x) = \frac{1}{1+x^n}$, then $g'(x)$ eauals

A. $1 + x^n$

B. $1 + [f(x)]^n$

C. $1 + [g(x)]^n$

D. none of these

Answer: C

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386. The derivative of $(\tan x)$ w.r.t $g(\sec x)$ at x = $\frac{\pi}{4}$ where, $f'(1) = 2$ and $g'\left(\sqrt{2}\right) = 4$ is

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

B. $\sqrt{2}$

C. 1

D. 0

Answer: A

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387. If $y = [\log_{\cos x}(\sin x)][\log_{\sin x} \cos x] + \sin^{-1}\left(\frac{2x}{1+x^2}\right)$ then dy/dx at $x = \frac{\pi}{2}$ is equal to

A. $\frac{8}{\pi^2+4}$

B. 0

C. $\frac{-8}{\pi^2+4}$

D. 1

Answer: C

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388. The derivative of $\tan^{-1}\left(\frac{2x}{1-x^2}\right)$ w.r.t $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$ is

A. 1

B. 5

C. -2

D. 0

Answer: C

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389. If $x = a\left(\cos x + \frac{\log \tan \theta}{2}\right)$ and $y = a \sin \theta$ then dy/dx is equal to

A. $\cot \theta$

B. $\tan \theta$

C. $\sin \theta$

D. $\cos \theta$

Answer: B

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390. If f(x) = 1/(1-x), then the derivative of the composition function f[f{f(x)}] is equal to

A. 0

B. (1/2)

C. 1

D. 2

Answer: C

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