

TYPE 1

Differentiate the following w.r.t. x

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| 1. $\sin (x^2 + 1)$ | 2. $\sin (m \sin^{-1} x)$ | 3. $\log \sin x$ | 4. $e^{\sin x}$ |
| 5. $\log \sin x^2$ | 6. $\sin (3x + 5)$ | 7. $\sin (\log x)$ | 8. $e^{\tan x}$ |
| 9. $e^{\sin \sqrt{x}}$ | 10. $e^{\sin^{-1} 2x}$ | 11. e^{e^x} | 12. $\sin^{-1} (x^3)$ |
| 13. $\sin (e^{x^2})$ | 14. $\sec (\log x^n)$ | 15. $\sin (\log \sin x)$ | 16. $e^{\tan 3x}$ |
| 17. $e^{\sqrt{\cot x}}$ | 18. $\log (x \sqrt{x^2 + a^2})$ | 19. $\log \left[\frac{a + b \sin x}{a - b \sin x} \right]$ | 20. $\tan (e^{\sin x})$ |
| 21. $\log \sqrt{\frac{1 + \sin x}{1 - \sin x}}$ | 22. $\log_7 (2x - 3)$ | 23. $\log \left[\frac{\sin x}{1 + \cos x} \right]$ | 24. $\log \sqrt{\frac{1 - \cos x}{1 + \cos x}}$ |
| 25. $\log (x + \sqrt{x^2 + 1})$ | 26. $\log (\operatorname{cosec} x - \cot x)$ | 27. $\log \sqrt{\frac{x-1}{x+1}}$ | 28. $\log x^3$ |
| 29. $\log_{10} x + \log_x 10 + \log x^x + \log_{10} 10$ | 30. $\log \left[\frac{x^2 + x + 1}{x^2 - x + 1} \right]$ | 31. $\log (\tan^{-1} x)$ | |
| 32. $\log \tan \left[\frac{\pi}{4} + \frac{x}{2} \right]$ | 33. $\log x^2$ | 34. $\log (\cos x^2)$ | |
| 35. $\log (x + 2 + \sqrt{x^2 + 4x + 1})$ | 36. $\sqrt{\frac{1 + \sin x}{1 - \sin x}}$ | 37. $\sqrt{\frac{a^2 - x^2}{a^2 + x^2}}$ | |
| 38. $\sqrt{\frac{1-x^2}{1+x^2}}$ | 39. $\sqrt{\frac{1+x}{1-x}}$ | 40. $\sqrt{\frac{1+e^x}{1-e^x}}$ | |
| 41. If $y = \frac{\sqrt{a^2 + x^2} + \sqrt{a^2 - x^2}}{\sqrt{a^2 + x^2} - \sqrt{a^2 - x^2}}$, show that $\frac{dy}{dx} = \frac{-2a^2}{x^3} \left\{ 1 + \frac{a^2}{\sqrt{a^4 - x^4}} \right\}$ | | | |
| 42. If $y = \sqrt{x+1} + \sqrt{x-1}$, prove that $\sqrt{x^2-1} \frac{dy}{dx} = \frac{1}{2}y$ | | | |
| 43. If $y = \frac{x}{x+2}$, prove that : $x \frac{dy}{dx} = (1-y)y$ | | | |
| 44. If $y = \sqrt{x} + \frac{1}{\sqrt{x}}$, prove that : $2x \frac{dy}{dx} = \sqrt{x} - \frac{1}{\sqrt{x}}$ | | | |
| 45. If $y = \sqrt{x^2 + a^2}$, prove that : $y \frac{dy}{dx} - x = 0$ | | | |
| 46. If $y = \log \sqrt{\frac{1 + \tan x}{1 - \tan x}}$, prove that $\frac{dy}{dx} = \sec 2x$ | | | |
| 47. If $y = \sqrt{a^2 - x^2}$, prove that : $y \frac{dy}{dx} + x = 0$ | | | |
| 48. If $y = \frac{e^x - e^{-x}}{e^x + e^{-x}}$, prove that : $\frac{dy}{dx} = 1 - y^2$ | | | |

49. If $y = \log (\sqrt{x-1} - \sqrt{x+1})$, prove that : $\frac{dy}{dx} = \frac{-1}{2\sqrt{x^2-1}}$
50. If $y = \log \sqrt{x} + \frac{1}{\sqrt{x}}$, prove that : $\frac{dy}{dx} = \frac{x-1}{2x(x+1)}$
51. If $y = \sqrt{\frac{1+e^x}{1-e^x}}$, show that : $\frac{dy}{dx} = \frac{e^x}{(1-e^x)(\sqrt{1-e^{2x}})}$
52. If $y = \frac{x \sin^{-1} x}{\sqrt{1-x^2}}$, prove that : $(1-x^2) \frac{dy}{dx} = x + \frac{y}{x}$
53. If $y = (x-1) \log (x-1) - (x+1) \log (x+1)$ prove that : $\frac{dy}{dx} = \log \frac{x-1}{1+x}$
54. If $y = e^x \cos x$, prove that : $\frac{dy}{dx} = \sqrt{2} e^x \cdot \cos \left(x + \frac{\pi}{4} \right)$
55. If $y = \frac{1}{2} \log \left(\frac{1-\cos 2x}{1+\cos 2x} \right)$, prove that : $\frac{dy}{dx} = 2 \operatorname{cosec} 2x$
56. If $y = x \sin^{-1} x + \sqrt{1-x^2}$, prove that : $\frac{dy}{dx} = \sin^{-1} x$
57. If $y = \sqrt{x^2+a^2}$, prove that : $y \frac{dy}{dx} - x = 0$
58. If $y = e^x + e^{-x}$, prove that : $\frac{dy}{dx} = \sqrt{y^2-4}$
59. If $y = \sqrt{a^2-x^2}$, prove that : $y \frac{dy}{dx} + x = 0$
60. If $xy = 4$, prove that : $x \left(\frac{dy}{dx} + y^2 \right) = 3y$
61. Prove that : $\frac{d}{dx} \left\{ \frac{x}{2} \sqrt{a^2-x^2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a} \right\} = \sqrt{a^2-x^2}$
62. If $y = \log \sqrt{\frac{1+\tan x}{1-\tan x}}$, prove that : $\frac{dy}{dx} = \frac{1}{\sqrt{1-\sin^2 2x}}$
63. If $y = \sqrt{\frac{1-x}{1+x}}$, prove that : $(1-x^2) \frac{dy}{dx} + y = 0$
64. If $y = [x + \sqrt{x^2+a^2}]^n$, prove that : $\frac{dy}{dx} = \frac{xy}{\sqrt{x^2+a^2}}$

Differentiate the following w.r.t x

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| 65. $\tan (x^\circ + 45^\circ)$ | 66. $\tan 5x^\circ$ | 67. $\log_7 (\log_7 x)$ |
| 68. $\sqrt{\log \left\{ \sin \left(\frac{x^2}{3} - 1 \right) \right\}}$ | 69. $\frac{e^x - e^{-x}}{e^x + e^{-x}}$ | 70. $e^{ax} \cos (bx + c)$ |

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| 71. $\frac{e^x + \log x}{\sin 3x}$ | 72. $e^x \log (1 + x^2)$ | 73. $\frac{\sin x + x^2}{\cot 2x}$ |
| 74. $a^{(\sin^{-1}x)^2}$ | 75. $e^{\cos^{-1}(\sqrt{1-x^2})}$ | 76. $5^{3-x^4} + (3-x^2)^5$ |
| 77. 3^{x^2+2x} | 78. 2^{x^3} | 79. $3^x \log x$ |
| 80. $e^{3x} \cos 2x$ | 81. $\frac{e^x \log x}{x^2}$ | 82. $\sqrt{\tan^{-1}\left[\frac{x}{2}\right]}$ |
| 83. $\frac{2x \cos x}{(x^2+3)^2}$ | 84. $x \sin 2x + 5^x + k^k + (\tan^2 x)^3$ | 85. $\frac{3x^2 \sin x}{\sqrt{7-x^2}}$ |
| 86. $\sin^2 \{ \log (2x+3) \}$ | 87. $ex \log \sin 2x$ | 88. $[\sin^{-1}x^4]^4$ |
| 89. $\sin^{-1} \frac{x}{\sqrt{x^2+a^2}}$ | 90. $\frac{e^x \sin x}{(x^2+2)^3}$ | 91. $3 e^{-3x} \log (1+x)$ |
| 92. $\log(3x+2) - x^2 \log (2x-1)$ | 93. $\frac{x^2(1-x^2)}{\cos 2x}$ | 94. $\frac{x^2+2}{\sqrt{\cos x}}$ |
| 95. $e^{ax} \sec x \tan 2x$ | 96. $\cos (\log x)^2$ | 97. $\sin (2 \sin^{-1} x)$ |
| 98. $\frac{e^{2x} + e^{-2x}}{e^{2x} - e^{-2x}}$ | 99. $\sin \left(\frac{1+x^2}{1-x^2} \right)$ | |

ADD : - 192 Ashoka Enclave Part - I Basement (Near Ashok Memorial Public School) MR. Bobby 9312285754, 0129- 4080192
 C - 16 Ashoka Enclave Part - II "Basement" (Near Saffron Public School) Behind D.A.V. School MR. Gajendra 9971979999, 0129-4008616
 Flat No. 62 Ground floor Surya Nagar, Phase II, Sector 91 (Near Keshav Vatika) Mob. 9899145426, 9971979999
 B-121 NEAR GATE NO. 4 GREEN FIELD Mob. 9971979999, 9654166111

Website : www.galaxytutorial.com

ANSWER

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|---|---|--|
| 1. $2x \cos (x^2 + 1)$ | 2. $\frac{m}{\sqrt{1-x^2}} \cos (m \sin^{-1}x)$ | 3. $\cot x$ |
| 4. $e^{\sin x} \cos x$ | 5. $2x \cot x^2$ | 6. $3 \cos (3x + 5)$ |
| 7. $\frac{1}{x} \cos (\log x)$ | 8. $e^{\tan x} \sec^2 x$ | 9. $\frac{\cos \sqrt{x} e^{\sin \sqrt{x}}}{2\sqrt{x}}$ |
| 10. $\frac{2}{\sqrt{1-4x^2}} e^{\sin^{-1} 2x}$ | 11. $e^x \cdot e^{e^x}$ | 12. $\frac{1}{\sqrt{1-x^6}} \cdot 3x^2$ |
| 13. $2x \cdot e^x \cdot \cos (e^{x^2})$ | 14. $\frac{n}{x} \sec (\log x^n) \tan \log x^n$ | 15. $\cos (\log \sin x) \cot x$ |
| 16. $3 e^{\tan 3x} \cdot \sec^2 3x$ | 17. $-\frac{1}{2} \frac{e^{\sqrt{\cot x}}}{\sqrt{\cot x}} \cdot \operatorname{cosec}^2 x$ | 18. $\frac{1}{\sqrt{a^2+x^2}}$ |
| 19. $\frac{2ab \cos x}{a^2 - b^2 \sin^2 x}$ | 20. $\sec^2 (e^{\sin x}) \cdot e^{\sin x} \cdot \cos x$ | 21. $\sec x$ |
| 22. $\frac{2}{(2x-3) \log_e 7}$ | 23. $\cot x + \frac{\sin x}{1 + \cos x}$ | 24. $\operatorname{cosec} x$ |
| 25. $\frac{1}{\sqrt{x^2+1}}$ | 26. $\operatorname{cosec} x$ | 27. $\frac{1}{x^2-1}$ |
| 28. $\frac{-1}{x \log_e^3 (\log_3 x)^2}$ | 29. $\frac{1}{x \log_e 10} - \frac{1}{x (\log_e x)^2} \log_e 10$ | |
| 30. $\frac{-2(x^2-1)}{x^4+x^2+1}$ | 31. $\frac{1}{\tan^{-1} x} \cdot \frac{1}{1+x^2}$ | 32. $\sec x$ |
| 33. $\frac{-1}{(\log_2 x)^2} \times \frac{1}{x \log_e^2}$ | 34. $-2x \tan x^2$ | 35. $\frac{1}{\sqrt{x^2+4x+1}}$ |
| 36. $\sec x (\tan x + \sec x)$ | 37. $\frac{-2a^2x}{\sqrt{a^2-x^2} (a^2+x^2)^{3/2}}$ | 38. $\frac{-2x}{\sqrt{1-x^2} (1+x^2)^{3/2}}$ |

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|---|---|
| <p>39. $\frac{1}{\sqrt{1+x}(1-x)^{3/2}}$</p> <p>65. $\frac{\pi}{180} \sec^2(x^\circ + 45^\circ)$</p> <p>68. $\frac{x \cot \left[\frac{x^2}{3} - 1 \right]}{3 \sqrt{\log \left\{ \sin \left[\frac{x^2}{3} - 1 \right] \right\}}}$</p> <p>70. $e^{ax} \{-b \sin (bx+c) + a \cos (bx+c)\}$</p> <p>72. $e^x + \frac{2x}{1+x^2} \log (1+x^2)$</p> <p>74. $\frac{2 \log a \cdot \sin^{-1} x}{\sqrt{1-x^2}}$</p> <p>76. $-2x\{5^{3-x^2} \cdot \log_e 5 + 5(3-x^2)^4\}$</p> <p>79. $3^{x \log x} \cdot \log 3 (1 + \log x)$</p> <p>81. $e^x \cdot x^{-2} \left(\log x + \frac{1}{x} - \frac{2}{x} \log x \right)$</p> <p>83. $\frac{2x}{(x^2+3)^2} \left\{ \cos x \cdot \log_e 2 - \sin x - \frac{4x \cos x}{x^2+3} \right\}$</p> <p>84. $\sin 2x + 2x \cos 2x + 5^x \log 5 + 6 \tan^5 x \sec^2 x$</p> <p>85. $\frac{6x \sin x + 3x^2 \cos x}{\sqrt{7-x^2}} + \frac{3x^3 \sin x}{(7-x^2)^{3/2}}$</p> <p>87. $2e^x \cot 2x + e^x \log \sin 2x$</p> <p>90. $\frac{e^x \sin x + e^x \cos x}{(x^2+2)^3} - \frac{6x e^x \sin x}{(x^2+2)^4}$</p> | <p>40. $\frac{e^x}{(1-e^x)\sqrt{1-e^{2x}}}$</p> <p>66. $\frac{5\pi}{180} \sec^2(5x^\circ)$</p> <p>69. $\frac{-4}{(e^x - e^{-x})^2}$</p> <p>71. $\frac{(e^x + 1/x) \sin 3x - 3(e^x + \log x) \cos 3x}{\sin^2 3x}$</p> <p>73. $2(\sin x + x^2) \sec^2 2x + \frac{(\cos x + 2x)}{\cot 2x}$</p> <p>75. $\frac{e^{\cos^{-1} \sqrt{1-x^2}}}{\sqrt{1-x^2}}$</p> <p>77. $(3^{x^2+2x} \cdot \log 3) \cdot (2x+2)$</p> <p>80. $e^{3x} (3 \cos 2x - 2 \sin 2x)$</p> <p>82. $\frac{1}{(4+x^2)\sqrt{\tan^{-1} x/2}}$</p> <p>78. $3x^2 \cdot 2^{x^3} \cdot \log 2$</p> <p>86. $\sin \{2 \log (2x+3)\}$</p> <p>88. $\frac{e^x \sin x + e^x \cos x}{\sqrt{1-x^8}}$</p> <p>89. $\frac{a}{a^2+x^2}$</p> <p>91. $3e^{-3x} \left\{ \frac{1}{x+1} - 3 \log (x+1) \right\}$</p> |
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92. $\frac{3}{3x+2} - \frac{2x^2}{2x-1} - 2x \log(2x-1)$ 93. $2x(1-x^2)^2 \sec 2x \{1-4x^2+x(1-x^2) \tan 2x\}$
94. $\frac{1}{\sqrt{\cos x}} \left\{ 2x + \left(\frac{x^2+2}{2} \right) \tan x \right\}$ 95. $e^{ax} \sec x \{a \tan 2x + \tan x \tan 2x + 2 \sec^2 2x\}$
96. $\frac{-2 \log x \sin(\log x)^2}{x}$ 97. $\cos(2 \sin^{-1}x) \cdot \frac{2}{\sqrt{1-x^2}}$
98. $\frac{-8}{(e^{2x} - e^{-2x})^2}$ 99. $\cos\left(\frac{1+x^2}{1-x^2}\right) \cdot \frac{4x}{(1-x^2)^2}$