

Answers

1. $y' = \cos x - \sin x + 3 \csc^2 x + 5 \sec^2 x - \frac{1}{\sqrt{1-x^2}}$
2. $y' = -\csc x \cot x - \sec x \tan x + ex^{e-1} - \frac{1}{1+x^2}$
3. $y' = 12x^2 - 1 + 5\pi x^{\pi-1} + \frac{5}{x^2} - \frac{3}{2}x^{-3/2}$
4. $y' = -1 + 7(3-2x)^6(-2) - 16x^7$
5. $y' = \frac{-1}{5}x^{-6/5} - \frac{3(2x)}{\sqrt{1-(x^2)^2}}$
6. $y' = 9x^8 + 9^x \ln 9 + 0 + x^x(\ln x + 1)$
7. $y' = \cos^2 x - \sin^2 x$
8. $y' = -\sin x \cos(\cos x)$
9. $y' = -\sin(\ln(\tan x)) \frac{1}{\tan x} \sec^2 x$
10. $y' = \frac{1}{2}(\ln x^2)^{-1/2} \frac{1}{x^2} (2x) + \frac{1}{1+(\sqrt{x^2+1})^2} \frac{1}{2} (x^2+1)^{-1/2} (2x)$
11. $y' = \frac{(x+\csc x)(1+\cos x)-(x+\sin x)(1-\csc x \cot x)}{(x+\csc x)^2} + 3 \left(\frac{x \arcsin(2x)}{\sin x} \right)^2 \left(\frac{\sin x \left(\arcsin(2x) + x \frac{2}{\sqrt{1-(2x)^2}} \right) - x \arcsin(2x) \cos x}{\sin^2 x} \right)$
12. $y' = \frac{1}{3} \left(\frac{x^2-x}{x^3 \arctan(e^x)} \right)^{-2/3} \left(\frac{[x^3 \arctan(e^x)(2x-1)] - [(x^2-x) \left(3x^2 \arctan(e^x) + x^3 \frac{e^x}{1+(e^x)^2} \right)]}{[x^3 \arctan(e^x)]^2} \right)$
13. $y' = 0 + 5^{\tan x} \ln 5 \sec^2 x + 5 \tan^4 x \sec^2 x + \frac{1}{1+(e^x)^2} e^x$
14. $y' = 4 \sin^3(x^3) \cos(x^3)(3x^2) - 5 \left[\frac{1}{x} \sin^4 x + 4 \ln x \sin^3 x \cos x \right]$
15. $y' = e^x \sin x \cos(x^2-x) + e^x \cos x \cos(x^2-x) - e^x \sin x \sin(x^2-x)(2x-1)$
16. $y' = 50(1+x^2)^{49} (2x)(1-x^3)^{71} + (1+x^2)^{50} 71(1-x^3)^{70} (-3x^2)$
17. $y' = \frac{1}{2} \left[(1+x^2)^{50} (1-x^3)^{71} \right]^{-1/2} \left[50(1+x^2)^{49} (2x)(1-x^3)^{71} + (1+x^2)^{50} 71(1-x^3)^{70} (-3x^2) \right]$
18. $y' = 2x + x^{\cos x} (-\sin x \ln x + \frac{1}{x} \cos x)$
19. $y' = x^{\sqrt{x}} \left(\frac{\ln x}{2\sqrt{x}} + \frac{\sqrt{x}}{x} \right)$
20. $y' = (\cos x)^{x^2} \left[2x \ln(\cos x) + x^2 \frac{1}{\cos x} (-\sin x) \right]$
21. $y' = -e^{\csc x} \csc x \cot x + 3^{x^2} (\ln 3)(2x) - \frac{\sin x}{\sqrt{1-(\cos x)^2}}$
22. $y' = \frac{1}{\sqrt{x^3-1}} \frac{1}{2} (x^3-1)^{-1/2} (3x^2)$
23. $y' = \frac{1}{x \ln 5} + \frac{4x^3}{x^4 \ln 3} + \frac{\cos x}{\sin x \ln 10}$
24. $dL/dk = \frac{1}{ke^k \ln 2} (e^k + ke^k)$
25. $dy/dz = \frac{1}{1+(\frac{e^z}{\sin z})^2} \left(\frac{e^z \sin z - e^z \cos z}{\sin^2 z} \right)$
26. $dz/dr = 15cr^4 + b \cos(r^2 - 3\sqrt{r}) \left(2r - \frac{3}{2\sqrt{r}} \right) - b + 0$

27. $dh/dm = \frac{3T^4 m^2 r}{S^2 F}$, and $dh/dS = \frac{-2T^4 m^3 r}{S^3 F}$, and $dh/dr = \frac{T^4 m^3}{S^2 F}$