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Find the derivative of each of the functions below. Simplify each expression as much as possible.

1. $f(t) = 3t^4 + 6\sqrt[3]{t} - \frac{1}{2t}$

2. $g(s) = \sin(s) - 4\cos(5s)$

3. $h(t) = e^{4t} - e^{-t}$

4. $f(x) = (3x^2 + 7)(x + 2)$

5. $g(t) = \frac{t^2 + t - 1}{t^2 - 1}$

6. $h(x) = \sqrt{x}\sin(x)$

7. $y(t) = 4te^t$

8. $g(x) = \sqrt{1 - x^3}$

9. $f(s) = \left(s^2 + \frac{1}{s}\right)^5$

10. $y(\theta) = \csc(3\theta) + \cot(2\theta^2)$

11. $y(x) = 2\sqrt{\cosh(2x)}$

12. $s(t) = \ln\sqrt{1 + t^2}$

13. $h(z) = \frac{1}{2}e^{\sin(2z)}$

14. $q(x) = x\sqrt[3]{\ln(x)}$

15. $f(y) = 2\sec^3(y^2)$

16. $g(y) = \arctan\left(\frac{y}{a}\right)$

17. $a(x) = x\arcsin^2(x) - 2x + 2\sqrt{1 - x^2}\arcsin(x)$

18. $g(y) = \ln(\sinh(y))$

19. $f(q) = q^4\sin(\sqrt{3}q)$

20. $F(t) = \arctan(\tanh(t)) - t\,\text{sech}(t)$

21. $Y(x) = \ln(\sec(x) + \tan(x))$

22. $G(x) = x^{\ln(x)}$

23. $H(x) = \int_0^x t^2\sqrt[3]{1 - t^3}\,dt$

24. $T(t) = \int_a^{\sin(t^2)} e^{x^3}\,dx$

25. $p(t) = 3^{4t}$