

Evaluate the derivative of the following functions. Write your result as a single rational expression.

1. $f(x) = x \cos\left(\frac{x^2}{3}\right)$

2. $h(t) = \frac{1}{t} - \ln|t| + \sqrt{t}$

3. $g(x) = \ln\left(\frac{x^2}{\sqrt[3]{5-x}}\right)$

$$4. h(z) = e^{-z^4/2}$$

$$5. f(x) = x^2 \arctan x$$

$$6. f(x) = \frac{\sqrt{x}}{\sqrt{x}-1}$$

$$7. y = 25 \arcsin \frac{x}{5} - x\sqrt{25-x^2}$$

8. $y = \coth 3x$

9. $y = x \cosh x - \sinh x$

10. $y = 2x \sinh^{-1}(2x) - \sqrt{1 + 4x^2}$

11. $g(t) = t^2 e^{-t}$

$$12. \quad r(s) = \frac{\cot s - 5s}{\csc s}$$

$$13. \quad y = \ln\left(\tanh \frac{x}{2}\right)$$

$$14. \quad f(t) = \ln(t^2 + 4) - \frac{1}{2} \tan^{-1}\left(\frac{t}{2}\right)$$

15. $y = \sin(\arccos x)$

16. $g(x) = \frac{x(1-x)}{(2-x)}$

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

18. $y = \arcsin 2x$

19. $y = \sqrt{e^{2x} + e^{-2x}}$

20. $h(x) = \frac{\sin 2x}{e^{x^2}}$

21. $g(x) = \ln(\ln x)^3$

Find dy/dx .

22. $x = \sqrt{t}, y = t^2$

23. $x = e^{-\theta}, y = e^{\sqrt{\theta}}$

24. $2x^2 - 10y^2 = 11$

$$25. \quad \frac{(x-2)^2}{4} + \frac{(y+1)^2}{6} = 1$$

$$26. \quad r = 3 \cos 2\theta \sec \theta$$

$$27. \quad r = \frac{1}{\theta}$$