

In Problems 1–15, calculate y' . Simplify your answers when possible.

1. $y = (x^4 - 3x^2 + 5)^5$

2. $y = \cos^3(\pi t)$

3. $y = \sqrt{x} + \frac{1}{\sqrt[3]{x^4}}$

4. $y = \frac{t}{1-t^2}$

5. $y = e^{\sin(2\theta)}$

6. $y = \sin^{-1}(e^x)$

7. $y = x^3 e^{-1/x}$

8. $y = \tan(\sqrt{1-x})$

9. $y = \ln(x^2 e^x)$

10. $y = \sec(1+x^2)$

11. $y = x \tan^{-1}(4x)$

12. $y = \cot(3x^2 + 5)$

13. $y = \ln(\ln x)$

In Problems 16–23, find the indefinite integral (the most general antiderivative).

14. $\int \left(x^3 - \frac{1}{x^3} \right) dx$

15. $\int \left(\sqrt[3]{x} + \frac{1}{\sqrt[3]{x}} \right) dx$

16. $\int \frac{\pi}{2} \cos \frac{\pi x}{2} dx$

17. $\int (4 \sec \theta \tan \theta - 2 \sec^2 \theta) d\theta$

18. $\int \left(1 - \frac{5}{x} \right) dx$

19. $\int (2e^x - 3e^{-2x}) dx$

20. $\int \frac{1}{2(x^2 + 1)} dx$

Solve the initial value problems.

21. $f'(x) = \sqrt{x}(6 + 5x), f(1) = 10$

22. $f'(x) = 2x + \frac{2}{x}, x < 0; f(-1) = 7$

23. $f'(t) = \sin t + \cos t, f(\pi) = 3$