4.10 Exercises

1–16 Find the most general antiderivative of the function. (Check your answer by differentiation.)

1. $f(x) = 6x^2 - 8x + 3$

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

3. $f(x) = 1 - x^3 + 5x^5 - 3x^7$

4. $f(x) = x^{20} + 4x^{10} + 8$

5. $f(x) = 5x^{1/4} - 7x^{3/4}$

6. $f(x) = 2x + 3x^{1.7}$

7. $f(x) = 6\sqrt{x} - \sqrt[6]{x}$

8. $f(x) = \sqrt[4]{x^3} + \sqrt[3]{x^4}$

9. $f(x) = \dfrac{10}{x^9}$

10. $g(x) = \dfrac{5 - 4x^3 + 2x^6}{x^6}$

11. $f(u) = \dfrac{u^4 + 3\sqrt{u}}{u^2}$

12. $f(x) = 3e^x + 7\sec^2 x$

13. $g(\theta) = \cos\theta - 5\sin\theta$

14. $h(\theta) = \dfrac{\sin\theta}{\cos^2\theta}$

15. $f(x) = 2x + 5(1 - x^2)^{-1/2}$

16. $f(x) = \dfrac{x^2 + x + 1}{x}$

17–18 Find the antiderivative F of f that satisfies the given condition. Check your answer by comparing the graphs of f and F.

17. $f(x) = 5x^4 - 2x^5, \quad F(0) = 4$

18. $f(x) = 4 - 3(1 + x^2)^{-1}, \quad F(1) = 0$

19–42 Find f.

19. $f''(x) = 6x + 12x^2$

20. $f''(x) = 2 + x^3 + x^6$

21. $f''(x) = 1 + x^{4/5}$

22. $f''(x) = \cos x$

23. $f'''(t) = e^t$

24. $f'''(t) = t - \sqrt{t}$

25. $f'(x) = 1 - 6x, \quad f(0) = 8$

26. $f'(x) = 8x^3 + 12x + 3, \quad f(1) = 6$

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

28. $f'(x) = 2x - 3/x^4, \quad x > 0, \quad f(1) = 3$

29. $f'(t) = 2\cos t + \sec^2 t, \quad -\pi/2 < t < \pi/2, \quad f(\pi/3) = 4$

30. $f'(x) = 3x^{-2}, \quad f(1) = f(-1) = 0$

31. $f'(x) = 2/x, \quad x < 0, \quad f(-1) = 7$

32. $f'(x) = 4/\sqrt{1 - x^2}, \quad f(\frac{1}{2}) = 1$

33. $f''(x) = 24x^2 + 2x + 10, \quad f(1) = 5, \quad f'(1) = -3$

34. $f''(x) = 4 - 6x - 40x^3, \quad f(0) = 2, \quad f'(0) = 1$

35. $f''(\theta) = \sin\theta + \cos\theta, \quad f(0) = 3, \quad f'(0) = 4$

36. $f''(t) = 3/\sqrt{t}, \quad f(4) = 20, \quad f'(4) = 7$

37. $f''(x) = 2 - 12x, \quad f(0) = 9, \quad f(2) = 15$

38. $f''(x) = 20x^3 + 12x^2 + 4, \quad f(0) = 8, \quad f(1) = 5$

39. $f''(x) = 2 + \cos x, \quad f(0) = -1, \quad f(\pi/2) = 0$

40. $f''(t) = 2e^t + 3 \sin t, \quad f(0) = 0, \quad f(\pi) = 0$

41. $f''(x) = x^{-2}, \quad x > 0, \quad f(1) = 0, \quad f(2) = 0$

42. $f'''(x) = \sin x, \quad f(0) = 1, \quad f'(0) = 1, \quad f''(0) = 1$