

Exercises: Tricky Integrals

1–4 ■ Find an antiderivative of the given function.

1. $f(x) = \frac{1}{x^4}$

2. $f(x) = x\sqrt{x}$

3. $f(x) = e^{3x}$

4. $f(x) = 8 \cos(2x)$

5. $f(x) = x + \sin(3x)$

6. $f(x) = (3x + 1)^4$

7. $f(x) = x \cos(x^2)$

8. $f(x) = x^2 \sqrt{x^3 + 1}$

9. $f(x) = e^x(1 + e^x)^5$

10. $f(x) = e^{\sin x} \cos x$

11. $f(x) = \frac{2x}{1+x^2}$

12. $f(x) = \frac{\cos x}{1 + \sin x}$

13. $f(x) = \frac{1}{\sqrt{1-x^2}}$

14. $f(x) = \csc^2 x$

15. $f(x) = 2x^3 e^{2x} + 3x^2 e^{2x}$

16. $f(x) = 4x \cos x - 2x^2 \sin x$

17. $f(x) = \frac{\cos(\sqrt{x})}{\sqrt{x}}$

18. $f(x) = x^2 \sec(x^3) \tan(x^3)$

19–22 ■ Evaluate the following definite integrals.

19. $\int_0^2 (2x^3 - 5x) dx$

20. $\int_1^3 \frac{1}{3x^2} dx$

21. $\int_2^6 \sqrt{2x-3} dx$

22. $\int_0^1 x^2 \cos(x^3 + 1) dx$

Answers

1. $\frac{-1}{3x^3}$ 2. $\frac{2}{5}x^{5/2}$ 3. $\frac{1}{3}e^{3x}$ 4. $4\sin(2x)$ 5. $\frac{1}{2}x^2 - \frac{1}{3}\cos(3x)$ 6. $\frac{1}{15}(3x+1)^5$ 7. $\frac{1}{2}\sin(x^2)$ 8. $\frac{2}{9}(x^3+1)^{3/2}$
9. $\frac{1}{6}(1+e^x)^6$ 10. $e^{\sin x}$ 11. $\ln(1+x^2)$ 12. $\ln(1+\sin x)$ 13. $\sin^{-1}x$ 14. $-\cot x$ 15. x^3e^{2x} 16. $2x^2\cos x$
17. $2\sin(\sqrt{x})$ 18. $\frac{1}{3}\sec(x^3)$ 19. -2 20. $2/9$ 21. $26/3$ 22. $\frac{1}{3}\sin(2) - \frac{1}{3}\sin(1) \approx 0.0226$