

練習 7.3

1–3 Evaluate the integral using the indicated trigonometric substitution. Sketch and label the associated right triangle.

1. $\int \frac{1}{x^2 \sqrt{x^2 - 9}} dx; \quad x = 3 \sec \theta$

4–30 Evaluate the integral.

5. $\int_{\sqrt{2}}^2 \frac{1}{t^3 \sqrt{t^2 - 1}} dt$

9. $\int \frac{dx}{\sqrt{x^2 + 16}}$

11. $\int \sqrt{1 - 4x^2} dx$

19. $\int \frac{\sqrt{1 + x^2}}{x} dx$

21. $\int_0^{0.6} \frac{x^2}{\sqrt{9 - 25x^2}} dx$

25. $\int \frac{x}{\sqrt{x^2 + x + 1}} dx$

27. $\int \sqrt{x^2 + 2x} dx$

7.3 答案

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1. $\sqrt{x^2 - 9}/(9x) + C$

3. $\frac{1}{3}(x^2 - 18)\sqrt{x^2 + 9} + C$

5. $\pi/24 + \sqrt{3}/8 - \frac{1}{4}$

7. $-\sqrt{25 - x^2}/(25x) + C$

9. $\ln(\sqrt{x^2 + 16} + x) + C$

11. $\frac{1}{4} \sin^{-1}(2x) + \frac{1}{2}x\sqrt{1 - 4x^2} + C$

13. $\frac{1}{6} \sec^{-1}(x/3) - \sqrt{x^2 - 9}/(2x^2) + C$

15. $\frac{1}{16} \pi a^4$

17. $\sqrt{x^2 - 7} + C$

19. $\ln |(\sqrt{1 + x^2} - 1)/x| + \sqrt{1 + x^2} + C$

21. $\frac{9}{500} \pi$

23. $\frac{9}{2} \sin^{-1}((x - 2)/3) + \frac{1}{2}(x - 2)\sqrt{5 + 4x - x^2} + C$

25. $\sqrt{x^2 + x + 1} - \frac{1}{2} \ln(\sqrt{x^2 + x + 1} + x + \frac{1}{2}) + C$

27. $\frac{1}{2}(x + 1)\sqrt{x^2 + 2x} - \frac{1}{2} \ln |x + 1 + \sqrt{x^2 + 2x}| + C$