

$$\text{h. } \int \frac{\cos^4 x \, dx}{1 - \sin^2 x}$$

The integration can be simplified by writing  $1 - \sin^2 x = \cos^2 x$ . After doing this substitution, you will obtain

$$\int \frac{\cos^4 x \, dx}{1 - \sin^2 x} = \int \frac{\cos^4 x \, dx}{\cos^2 x} = \int \cos^2 x \, dx$$

This form can be integrated by using a half-angle identity or Formula 317 in the table of integrals. It can also be integrated by parts. ■

## 7.5 PROBLEM SET

**A** Find each integral in Problems 1–54.

$$1. \int \frac{2x-1}{(x-x^2)^3} dx$$

$$3. \int (x \sec 2x^2) dx$$

$$5. \int (e^x \cot e^x) dx$$

$$7. \int \frac{\tan(\ln x) \, dx}{x}$$

$$9. \int \frac{(3+2 \sin t) \, dt}{\cos t}$$

$$11. \int \frac{e^{2t} \, dt}{1+e^{4t}}$$

$$13. \int \frac{x^2+x+1}{x^2+9} dx$$

$$15. \int \frac{1+e^x}{1-e^x} dx$$

$$17. \int \frac{2t^2 \, dt}{\sqrt{1-t^6}}$$

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

$$21. \int \frac{dx}{x^2+2x+2}$$

$$23. \int \frac{dx}{x^2+x+1}$$

$$25. \int \tan^{-1} x \, dx$$

$$27. \int e^{-x} \cos x \, dx$$

$$29. \int \cos^{-1}(-x) \, dx$$

$$31. \int \sin^3 x \, dx$$

$$33. \int \sin^3 x \cos^2 x \, dx$$

$$35. \int \sin^2 x \cos^4 x \, dx$$

$$37. \int \sin^5 x \cos^4 x \, dx$$

$$39. \int \tan^5 x \sec^4 x \, dx$$

$$2. \int \frac{2x+3}{\sqrt{x^2+3x}} dx$$

$$4. \int (x^2 \csc^2 2x^3) dx$$

$$6. \int \frac{\tan \sqrt{x} \, dx}{\sqrt{x}}$$

$$8. \int \sqrt{\cot x} \csc^2 x \, dx$$

$$10. \int \frac{2+\cos x}{\sin x} dx$$

$$12. \int \frac{\sin 2x \, dx}{1+\sin^4 x}$$

$$14. \int \frac{3x+2}{\sqrt{4-x^2}} dx$$

$$16. \int \frac{e^{1-\sqrt{x}} \, dx}{\sqrt{x}}$$

$$18. \int \frac{t^3 \, dt}{2^8+t^8}$$

$$20. \int \frac{dx}{4-e^{-x}}$$

$$22. \int \frac{dx}{x^2+x+4}$$

$$24. \int \frac{dx}{x^2-x+1}$$

$$26. \int x^3 \sin x^2 \, dx$$

$$28. \int e^{2x} \sin 3x \, dx$$

$$30. \int x \sec^{-1} x \, dx, \quad x > 0$$

$$32. \int \cos^5 x \, dx$$

$$34. \int \sin^3 x \cos^3 x \, dx$$

$$36. \int \sin^2 x \cos^5 x \, dx$$

$$38. \int \sin^4 x \cos^2 x \, dx$$

$$40. \int \tan^4 x \sec^4 x \, dx$$

$$41. \int \frac{\sqrt{1-x^2}}{x} dx$$

$$43. \int \frac{2x+3}{\sqrt{2x^2-1}} dx$$

$$45. \int \frac{dx}{x\sqrt{x^2+1}}$$

$$47. \int \frac{(2x+1) \, dx}{\sqrt{4x-x^2-2}}$$

$$49. \int \frac{\cos x \, dx}{\sqrt{1+\sin^2 x}}$$

$$51. \int \sin^5 x \, dx$$

$$53. \int \tan^4 x \, dx$$

$$42. \int \frac{dx}{\sqrt{x^2-16}}$$

$$44. \int \frac{dx}{x\sqrt{x^2-1}}$$

$$46. \int x\sqrt{x^2+1} \, dx$$

$$48. \int \sqrt{3+4x-4x^2} \, dx$$

$$50. \int \frac{\sec^2 x \, dx}{\sqrt{\sec^2 x - 2}}$$

$$52. \int \cos^6 x \, dx$$

$$54. \int \sec^4 x \, dx$$

Find the exact value of the definite integrals in Problems 55–62.

$$55. \int_0^2 \sqrt{4-x^2} \, dx$$

$$57. \int_0^{\ln 2} e^t \sqrt{1+e^{2t}} \, dt$$

$$59. \int_1^2 \frac{dx}{x^4 \sqrt{x^2+3}}$$

$$61. \int_{-2}^{2\sqrt{3}} x^3 \sqrt{x^2+4} \, dx$$

$$56. \int_0^1 \frac{dx}{\sqrt{9-x^2}}$$

$$58. \int_0^1 \frac{dt}{4t^2+4t+5}$$

$$60. \int_0^2 \frac{x^3}{(3+x^2)^{3/2}} dx$$

$$62. \int_0^{\sqrt{5}} x^2 \sqrt{5-x^2} \, dx$$

**B** Find each integral in Problems 63–72.

$$63. \int \frac{e^x \, dx}{\sqrt{1+e^{2x}}}$$

$$65. \int \frac{x^2+4x+3}{x^3+x^2+x} dx$$

$$67. \int \frac{5x^2+18x+34}{(x-7)(x+2)^2} dx$$

$$69. \int \frac{3x+5}{x^2+2x+1} dx$$

$$71. \int \frac{x \, dx}{(x+1)(x+2)(x+3)}$$

$$64. \int \frac{(2x+1) \, dx}{\sqrt{4x^2+4x+2}}$$

$$66. \int \frac{5x^2+3x-2}{x^3+2x^2} dx$$

$$68. \int \frac{-3x^2+9x+21}{(x+2)^2(2x+1)} dx$$

$$70. \int \frac{3x^2+2x+1}{x^3+x^2+x} dx$$

$$72. \int \frac{5x^2-4x+9}{x^3-x^2+4x-4} dx$$

73. Find the average value (to the nearest hundredth) of the function  $f(x) = x \sin^3 x^2$  between  $x = 0$  and  $x = 1$ .

74. An object moves along the  $x$ -axis in such a way that its velocity at time  $t$  is  $v(t) = \sin t + \sin^2 t \cos^3 t$ . Find the distance moved by the object between times  $t = 0$  and  $t = \frac{\pi}{3}$ .