Anton 5.3

7–32 Evaluate the integrals using appropriate substitutions.

7. $\int (4x-3)^9\,dx$

8. $\int x^3\sqrt{5+x^4}\,dx$

9. $\int \sin 7x\,dx$

10. $\int \cos\frac{x}{3}\,dx$

11. $\int \sec 4x\tan 4x\,dx$

12. $\int \sec^2 5x\,dx$

13. $\int t\sqrt{7t^2+12}\,dt$

14. $\int \frac{x}{\sqrt{4-5x^2}}\,dx$

15. $\int \frac{6}{(1-2x)^3}\,dx$

16. $\int \frac{x^2+1}{\sqrt{x^3+3x}}\,dx$

17. $\int \frac{x^3}{(5x^4+2)^3}\,dx$

18. $\int \frac{\sin(1/x)}{3x^2}\,dx$

19. $\int \frac{\sin(5/x)}{x^2}\,dx$

20. $\int \frac{\sec^2(\sqrt{x})}{\sqrt{x}}\,dx$

21. $\int \cos^4 3t\sin 3t\,dt$

22. $\int \cos 2t\sin^5 2t\,dt$

23. $\int x\sec^2(x^2)\,dx$

24. $\int \frac{\cos 4\theta}{(1+2\sin 4\theta)^4}\,d\theta$

25. $\int \cos 4\theta\sqrt{2-\sin 4\theta}\,d\theta$

26. $\int \tan^3 5x\sec^2 5x\,dx$

27. $\int \sec^3 2x\tan 2x\,dx$

28. $\int [\sin(\sin\theta)]\cos\theta\,d\theta$

29. $\int \frac{y}{\sqrt{2y+1}}\,dx$

30. $\int x\sqrt{4-x}\,dx$

31. $\int \sin^3 2\theta\,d\theta$

32. $\int \sec^4 3\theta\,d\theta$ [*Hint:* Apply a trigonometric identity.]

33–35 Evaluate the integrals assuming that n is a positive integer and $b \neq 0$.

33. $\int (a+bx)^n\,dx$

34. $\int \sqrt[n]{a+bx}\,dx$

35. $\int \sin^n(a+bx)\cos(a+bx)\,dx$

39–40 Solve the initial-value problems.

39. $\frac{dy}{dx} = \sqrt{5x+1},\ y(3) = -2$

40. $\frac{dy}{dx} = 2+\sin 3x,\ y(\pi/3) = 0$

41. (a) Evaluate $\int [x/\sqrt{x^2+1}]\,dx$.
(b) Use a graphing utility to generate some typical integral curves of $f(x) = x/\sqrt{x^2+1}$ over the interval $(-5, 5)$.

42. (a) Evaluate $\int 2x\sin(25-x^2)\,dx$.
(b) Use a graphing utility to generate some typical integral curves of $f(x) = 2x\sin(25-x^2)$ over the interval $(-5, 5)$.

43. Find a function f such that the slope of the tangent line at a point (x, y) on the curve $y = f(x)$ is $\sqrt{3x+1}$, and the curve passes through the point $(0, 1)$.

44. A population of minnows in a lake is estimated to be 100,000 at the beginning of the year 2005. Suppose that t years after the beginning of 2005 the rate of growth of the population $p(t)$ (in thousands) is given by $p'(t) = (3+0.12t)^{3/2}$. Estimate the projected population at the beginning of the year 2010.