

## ► Exercise Set 5.3

1. Evaluate the integrals by making the indicated substitutions.

(a)  $\int 2x(x^2 + 1)^{23} dx; u = x^2 + 1$

(b)  $\int \cos^3 x \sin x dx; u = \cos x$

(c)  $\int \frac{1}{\sqrt{x}} \sin \sqrt{x} dx; u = \sqrt{x}$

(d)  $\int \frac{3x dx}{\sqrt{4x^2 + 5}}; u = 4x^2 + 5.$

2. Evaluate the integrals by making the indicated substitutions.

(a)  $\int \sec^2(4x + 1) dx; u = 4x + 1$

(b)  $\int y\sqrt{1 + 2y^2} dy; u = 1 + 2y^2$

(c)  $\int \sqrt{\sin \pi\theta} \cos \pi\theta d\theta; u = \sin \pi\theta$

(d)  $\int (2x + 7)(x^2 + 7x + 3)^{4/5} dx; u = x^2 + 7x + 3.$

3. Evaluate the integrals by making the indicated substitutions.

(a)  $\int \cot x \csc^2 x dx; u = \cot x$

(b)  $\int (1 + \sin t)^9 \cos t dt; u = 1 + \sin t$

(c)  $\int x^2\sqrt{1+x} dx; u = 1+x$

(d)  $\int [\csc(\sin x)]^2 \cos x dx; u = \sin x.$

In Exercises 4–29, evaluate the integrals.

4.  $\int (3x - 1)^5 dx.$

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

6.  $\int \sin 3x dx.$

7.  $\int \cos 8x dx.$

8.  $\int \sec^2 5x dx.$

9.  $\int \sec 4x \tan 4x dx.$

10.  $\int \sqrt{3t + 1} dt.$

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

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

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

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

15.  $\int \frac{x}{(4x^2 + 1)^3} dx.$

16.  $\int x \cos(3x^2) dx.$

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

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

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

20.  $\int \cos^3 2t \sin 2t dt.$

21.  $\int \sin^5 3t \cos 3t dt.$

22.  $\int \frac{\sin 2\theta}{(5 + \cos 2\theta)^3} d\theta.$

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

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

25.  $\int \sec^3 2x \tan 2x dx.$

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

27.  $\int [\sec^2(\cos 3\theta)] \sin 3\theta d\theta.$

28.  $\int \sqrt[n]{a + bx} dx \quad (b \neq 0).$

29.  $\int \sin^n(a + bx) \cos(a + bx) dx \quad (n > 0, b \neq 0).$

In Exercises 30–36, evaluate the integrals. These are a little trickier than those in the preceding exercises.

30.  $\int (4x^2 - 12x + 9)^{2/3} dx.$

31.  $\int x\sqrt{x-3} dx.$

32.  $\int x^2\sqrt{2-x} dx.$

33.  $\int \frac{y dy}{\sqrt{y+1}}.$

34.  $\int \sin^3 2\theta d\theta.$

[Hint: Use the identity  $\sin^2 x + \cos^2 x = 1$ .]

35.  $\int \tan^2 3\theta d\theta.$

[Hint: Use a trigonometric identity.]

36.  $\int \sqrt{1 + x^{-2/3}} dx \quad (x > 0).$