

# ANTON 8.4

## EXERCISES ON CONCEPTS

27. The integral

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

can be evaluated either by a trigonometric substitution or by the substitution  $u = x^2 + 4$ . Do it both ways and show that the results are equivalent.

28. The integral

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

can be evaluated either by a trigonometric substitution or by algebraically rewriting the numerator of the integrand as  $(x^2 + 4) - 4$ . Do it both ways and show that the results are equivalent.

29. Find the arc length of the curve  $y = \ln x$  from  $x = 1$  to  $x = 2$ .

30. Find the arc length of the curve  $y = x^2$  from  $x = 0$  to  $x = 1$ .

31. Find the area of the surface generated when the curve in Exercise 30 is revolved about the  $x$ -axis.

32. Find the volume of the solid generated when the region enclosed by  $x = y(1 - y^2)^{1/4}$ ,  $y = 0$ ,  $y = 1$ , and  $x = 0$  is revolved about the  $y$ -axis.

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

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

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

4.  $\int \frac{dx}{x^2 \sqrt{9 - x^2}}$

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

6.  $\int \frac{x^2}{\sqrt{5 + x^2}} dx$

7.  $\int \frac{\sqrt{x^2 - 9}}{x} dx$

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

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

10.  $\int x^3 \sqrt{5 - x^2} dx$

11.  $\int \frac{dx}{x^2 \sqrt{9x^2 - 4}}$

12.  $\int \frac{\sqrt{1 + t^2}}{t} dt$

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

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

15.  $\int \frac{dx}{\sqrt{x^2 - 9}}$

16.  $\int \frac{dx}{1 + 2x^2 + x^4}$

17.  $\int \frac{dx}{(4x^2 - 9)^{3/2}}$

18.  $\int \frac{3x^3}{\sqrt{x^2 - 25}} dx$

19.  $\int e^x \sqrt{1 - e^{2x}} dx$

20.  $\int \frac{\cos \theta}{\sqrt{2 - \sin^2 \theta}} d\theta$

21.  $\int_0^1 5x^3 \sqrt{1 - x^2} dx$

22.  $\int_0^{1/2} \frac{dx}{(1 - x^2)^2}$

23.  $\int_{\sqrt{2}}^2 \frac{dx}{x^2 \sqrt{x^2 - 1}}$

24.  $\int_{\sqrt{2}}^2 \frac{\sqrt{2x^2 - 4}}{x} dx$

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

26.  $\int_0^3 \frac{x^3}{(3 + x^2)^{5/2}} dx$

33.  $\int \frac{dx}{x^2 - 4x + 5}$

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

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

36.  $\int \frac{dx}{16x^2 + 16x + 5}$

37.  $\int \frac{dx}{\sqrt{x^2 - 6x + 10}}$

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

39.  $\int \sqrt{3 - 2x - x^2} dx$

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

41.  $\int \frac{dx}{2x^2 + 4x + 7}$

42.  $\int \frac{2x + 3}{4x^2 + 4x + 5} dx$

43.  $\int_1^2 \frac{dx}{\sqrt{4x - x^2}}$

44.  $\int_0^4 \sqrt{x(4 - x)} dx$