

Find the indefinite integral.

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

7.  $\int (4x - 3 \sin x) dx$

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

In the following exercises, solve the differential equation.

4.  $h'(t) = 8t^3 + 5$ ,  $h(1) = -4$

6.  $f''(x) = 6$ ,  $f'(2) = 12$ ,  $f(2) = 22$

In 8, use  $a(t) = -32$  feet per second per second as the acceleration due to gravity.

8. A ball is thrown vertically upward from a height of 5 feet with an initial velocity of 40 feet per second. How high will the ball go?

Sketch the region whose area is given by the definite integral. Then evaluate the integral.

10.  $\int_1^4 (6 - |2x - 5|) dx$

Use the Fundamental Theorem of Calculus to evaluate the definite integral.

45.  $\int_{-1}^1 (4t^3 - 2t) dt$

48.  $\int_1^2 \left( \frac{1}{x^2} - \frac{1}{x^3} \right) dx$

50.  $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \sec^2 t dt$

Sketch the graph of the region whose area is given by the integral, and find the area.

53.  $\int_3^4 (x^2 - 9) dx$

54.  $\int_{-1}^2 (-x^2 + x + 2) dx$

Find the indefinite integral.

69.  $\int \left( \frac{x^2}{\sqrt{x^3 + 3}} \right) dx$

71.  $\int x(1 - 3x^2)^4 dx$

73.  $\int \sin^3 x \cos x dx$

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

72.  $\int \frac{x + 3}{(x^2 + 6x - 5)^2} dx$

74.  $\int x \sin 3x^2 dx$

76.  $\int \frac{\cos x}{\sqrt{\sin x}} dx$

77.  $\int \tan^n x \sec^2 x dx$ ,  $n \neq -1$

80.  $\int x \sqrt{x + 2} dx$

Evaluate the definite integral using u-substitution.

81. 
$$\int_{-1}^2 x(x^2 - 4) dx$$

82. 
$$\int_0^1 x^2(x^3 + 1)^3 dx$$

83. 
$$\int_0^3 \frac{1}{\sqrt{1+x}} dx$$

84. 
$$\int_3^6 \frac{x}{3\sqrt{x^2 - 8}} dx$$

86. 
$$2\pi \int_{-1}^0 x^2 \sqrt{x+1} dx$$

88. 
$$\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \sin 2x dx$$

Use the Trapezoidal Rule and Simpson's Rule with  $n=4$  (Do not use the graphing calculator program)

95. 
$$\int_1^2 \frac{1}{1+x^3} dx$$

97. 
$$\int_0^{\frac{\pi}{2}} \sqrt{x} \cos x dx$$

Use the Trapezoidal Rule and Simpson's Rule with  $n=8$  using the graphing calculator program.

96. 
$$\int_0^1 \frac{x^{3/2}}{3-x^2} dx$$

98. 
$$\int_0^{\pi} \sqrt{1 + \sin^2 x} dx$$