

The following integrals occur in the process of solving differential equations. Evaluate each integral by using integration formulas and various techniques of integration.

1.  $\int a \cos bx \, dx$

2.  $\int a \sin bx \, dx$

3.  $\int a \sec bx \, dx$

4.  $\int a \tan bx \, dx$

5.  $\int a \csc bx \, dx$

6.  $\int a \cot bx \, dx$

7.  $\int \sin^2 x \, dx$

8.  $\int \cos^2 x \, dx$

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

10.  $\int \cos^3 x \, dx$

11.  $\int \tan^2 x \, dx$

12.  $\int \cot^2 x \, dx$

13.  $\int \sec^2 x \, dx$

14.  $\int \csc^2 x \, dx$

15.  $\int \frac{\tan x}{\cos^2 x} \, dx$

16.  $\int \sec x \tan x \, dx$

17.  $\int \csc x \cot x \, dx$

18.  $\int \sec^3 x \tan x \, dx$

19.  $\int \csc^2 x \cot x \, dx$

20.  $\int \frac{1}{x} \, dx$

21.  $\int \frac{1}{x \ln x} \, dx$

22.  $\int a e^{bx} \, dx$

23.  $\int (1 + \ln x) \, dx$

24.  $\int x e^x \, dx$

**Evaluate each integral by using integration formulas and various techniques of integration.**

25.  $\int x \ln x \, dx$

26.  $\int x \cos x \, dx$

27.  $\int e^x \sin x \, dx$

28.  $\int \frac{1}{x^2 + a^2} \, dx$

29.  $\int \frac{x}{x^2 + a^2} \, dx$

30.  $\int \frac{x^2 + a^2}{x} \, dx$

31.  $\int \frac{x^2}{x^2 + a^2} \, dx$

32.  $\int \frac{x^3}{x^2 + a^2} \, dx$

33.  $\int \frac{x^2 + a^2}{x^3} \, dx$

34.  $\int \frac{1}{x^2 - a^2} \, dx$

35.  $\int \frac{x}{x^2 - a^2} \, dx$

36.  $\int \frac{x^2 - a^2}{x^2} \, dx$

37.  $\int \frac{x^2}{x^2 - a^2} \, dx$

38.  $\int \frac{x^3}{x^2 - a^2} \, dx$

39.  $\int \frac{x + a}{x^2 + a^2} \, dx$

40.  $\int \frac{x^2 + a^2}{x + a} \, dx$

41.  $\int \frac{1}{x - a} \, dx$

42.  $\int \frac{x}{x + a} \, dx$

43.  $\int \frac{x^2}{x - a} \, dx$

**Evaluate each integral by using integration formulas and various techniques of integration.**

$$44. \int \frac{x^3}{x+a} dx$$

$$45. \int \frac{1}{(x+a)^2} dx$$

$$46. \int \frac{x}{(x-a)^2} dx$$

$$47. \int \frac{x+3}{(x+1)^2} dx$$

$$48. \int \frac{x-a}{x} dx$$

$$49. \int \frac{x+a}{x^2} dx$$

$$50. \int \frac{x-a}{x^3} dx$$

$$51. \int \frac{1}{\sqrt{a^2-x^2}} dx$$

$$52. \int \frac{x}{\sqrt{a^2-x^2}} dx$$

$$53. \int \frac{x^2}{\sqrt{a^2-x^2}} dx$$

$$54. \int \frac{1}{\sqrt{x^2+a^2}} dx$$

$$55. \int \frac{x}{\sqrt{x^2+a^2}} dx$$

$$56. \int \frac{x^2}{\sqrt{x^2+a^2}} dx$$

$$57. \int \frac{1}{x\sqrt{x^2-a^2}} dx$$

$$58. \int \frac{x}{\sqrt{x^2-a^2}} dx$$

$$59. \int \frac{x^2}{\sqrt{x^2-a^2}} dx$$

$$60. \int \frac{1}{\sqrt{x^2-a^2}} dx$$

**Evaluate each integral by using integration formulas and various techniques of integration.**

$$61. \int \frac{1}{x(x+2)} dx$$

$$62. \int \frac{3x+7}{(3x+1)(x-1)} dx$$

$$63. \int \frac{4x^2+8x-1}{(4x^2+1)(x+1)} dx$$

$$64. \int \frac{x-6}{x(x-3)} dx$$

$$65. \int \frac{3-5x^2}{4x(1-x)(1+x)} dx$$

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

$$67. \int \frac{x^2-2x}{x^2-4x+5} dx$$

$$68. \int \frac{x^2}{x^3+8} dx$$

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

$$70. \int \frac{2x-3}{x^2-3x-4} dx$$

$$71. \exp \int \left( \frac{1}{x} + 1 \right) dx$$

$$72. \exp \int \sec x dx$$

$$73. \exp \int -\cot x dx$$

$$74. \exp \int \cot x dx$$

$$75. \exp \int \left( \frac{1}{x} + \cot x \right) dx$$

$$76. \exp \int (1-2x) dx$$

$$77. \exp \int \csc x dx$$

$$78. \exp \int \left( \frac{2}{x} - \tan x \right) dx$$

$$79. \exp \int \left( 5 - \frac{3}{x} \right) dx$$