Table of Integrals

1. $\int u\, dv = uv - \int v\, du$

2. $\int u^n = \frac{u^{n+1}}{n+1} + C, \quad n \neq -1$

3. $\int \frac{du}{u} = ln\, |u| + C$

4. $\int e^u = e^u + C$

5. $\int a^u du = \frac{a^u}{ln\, a} + C$

6. $\int sin\, u\, du = -cos\, u + C$

7. $\int cos\, u\, du = sin\, u + C$

8. $\int sec^2 u\, du = tan\, u + C$

9. $\int csc^2 u\, du = -cot\, u + C$

10. $\int sec\, u tan\, u\, du = sec\, u + C$

11. $\int csc\, u cot\, u\, du = -csc\, u + C$

12. $\int tan\, u\, du = lm\, |sec\, u| + C$

13. $\int cot\, u\, du = ln\, |sin\, u| + C$

14. $\int sec\, u\, du = ln\, |sec\, u + tan\, u| + C$

15. $\int csc\, u\, du = ln\, |csc\, u - cot\, u| + C$

16. $\int \frac{du}{\sqrt{a^2-u^2}} = sin^{-1} \frac{u}{a} + C$

17. $\int \frac{du}{a^2+u^2} = \frac{1}{a} tan^{-1} \frac{u}{a} + C$

18. $\int \frac{du}{u\, \sqrt{u^2-a^2}} = \frac{1}{a} sec^{-1} \frac{u}{a} + C$

19. $\int \frac{du}{a^2-u^2} = \frac{1}{2a} ln\, \left|\frac{u+a}{u-a}\right| + C$

20. $\int \frac{du}{u^2-a^2} = \frac{1}{2a} ln\, \left|\frac{u-a}{u+a}\right| + C$

BASIC FORMS
FORMS INVOLVING

$$\sqrt{a^2 + u^2}, \ a > 0$$

21. $\int \sqrt{a^2 + u^2}\, du = \frac{u}{2}\sqrt{a^2 + u^2} + \frac{a^2}{2} \ln\left(u + \sqrt{a^2 + u^2}\right) + C$

22. $\int u^2 \sqrt{a^2 + u^2}\, du = \frac{u}{8}(a^2 + 2u^2)\sqrt{a^2 + u^2} - \frac{a^4}{8} \ln\left(u + \sqrt{a^2 + u^2}\right) + C$

23. $\int \frac{\sqrt{a^2 + u^2}}{u}\, du = \sqrt{a^2 + u^2} - a \ln\left|\frac{a + \sqrt{a^2 + u^2}}{u}\right| + C$

24. $\int \frac{\sqrt{a^2 + u^2}}{u^3}\, du = -\frac{\sqrt{a^2 + u^2}}{u} + \ln\left(u + \sqrt{a^2 + u^2}\right) + C$

25. $\int \frac{du}{\sqrt{a^2 + u^2}} = \ln\left(u + \sqrt{a^2 + u^2}\right) + C$

26. $\int \frac{u^2\, du}{\sqrt{a^2 + u^2}} = \frac{u}{2}\sqrt{a^2 + u^2} - \frac{a^2}{2} \ln\left(u + \sqrt{a^2 + u^2}\right) + C$

27. $\int \frac{du}{u\sqrt{a^2 + u^2}} = -\frac{1}{a} \ln\left|\frac{\sqrt{a^2 + u^2} + a}{u}\right| + C$

28. $\int \frac{du}{u^2\sqrt{a^2 + u^2}} = -\frac{\sqrt{a^2 + u^2}}{a^2 u} + C$

29. $\int \frac{du}{(a^2 + u^2)^{\frac{3}{2}}} = \frac{u}{a^2\sqrt{a^2 + u^2}} + C$

FORMS INVOLVING

$$\sqrt{a^2 - u^2}, a > 0$$

30. $\int \sqrt{a^2 - u^2}\,du = \frac{u}{2}\sqrt{a^2 - u^2} + \frac{a^2}{2}\sin^{-1}\frac{u}{a} + C$

31. $\int u^2\sqrt{a^2 - u^2}\,du = \frac{u}{8}(2u^2 - a^2)\sqrt{a^2 - u^2} + \frac{a^4}{8}\sin^{-1}\frac{u}{a} + C$

32. $\int \frac{\sqrt{a^2-u^2}}{u}\,du = \sqrt{a^2 - u^2} - a\ln\left|\frac{a+\sqrt{a^2-u^2}}{u}\right| + C$

33. $\int \frac{\sqrt{a^2-u^2}}{u^2}\,du = \frac{1}{u}\sqrt{a^2 - u^2} - \sin^{-1}\frac{u}{a} + C$

34. $\int \frac{u^2\,du}{\sqrt{a^2-u^2}} = -\frac{u}{2}\sqrt{a^2 - u^2} + \frac{a^2}{2}\sin^{-1} + C$

35. $\int \frac{du}{u\sqrt{a^2-u^2}} = -\frac{1}{a}\ln\left|\frac{a+\sqrt{a^2-u^2}}{u}\right| + C$

36. $\int \frac{du}{u^2\sqrt{a^2-u^2}} = -\frac{1}{a^2 u}\sqrt{a^2 - u^2} + C$

37. $\int (a^2 - u^2)^{\frac{3}{2}}\,du = -\frac{u}{8}(2u^2 - 5a^2)\sqrt{a^2 - u^2} + \frac{3a^4}{8}\sin^{-1}\frac{u}{a} + C$

38. $\int \frac{du}{(a^2-u^2)^{\frac{3}{2}}} = \frac{u}{a^2\sqrt{a^2-u^2}} + C$

FORMS INVOLVING $\sqrt{u^2 - a^2}, a > 0$

39. $\int \sqrt{u^2 - a^2}\,du = \frac{u}{2}\sqrt{u^2 - a^2} - \frac{a^2}{2}\ln|u + \sqrt{u^2 - a^2}| + C$

40. $\int u^2\sqrt{u^2 - a^2}\,du = \frac{u}{8}(2u^2 - a^2\sqrt{u^2 - a^2} - \frac{a^4}{8}\ln|u + \sqrt{u^2 - a^2}| + C$

41. $\int \frac{\sqrt{u^2-a^2}}{u}\,du = \sqrt{u^2 - a^2} - a\,\cos^{-1}\frac{a}{|u|} + C$

42. $\int \frac{\sqrt{u^2-a^2}}{u^2}\, du = -\frac{\sqrt{u^2-a^2}}{u} + \ln\left|u + \sqrt{u^2-a^2}\right| + C$

43. $\int \frac{du}{\sqrt{u^2-a^2}} = \ln\left|u + \sqrt{u^2-a^2}\right| + C$

44. $\int \frac{u^2\, du}{\sqrt{u^2-a^2}} = \frac{u}{2}\sqrt{u^2-a^2} + \frac{a^2}{2}\ln\left|u + \sqrt{u^2-a^2}\right| + C$

45. $\int \frac{du}{u^2\sqrt{u^2-a^2}} = \frac{\sqrt{u^2-a^2}}{a^2 u} + C$

46. $\int \frac{du}{(u^2-a^2)^{\frac{3}{2}}} = -\frac{u}{a^2\sqrt{u^2-a^2}} + C$

FORMS INVOLVING

$$a + bu$$

47. $\int \frac{u \, du}{a+bu} = \frac{1}{b^2}(a + bu - a \, ln|a + bu|) + C$

48. $\int \frac{u^2 du}{a+bu} = \frac{1}{2b^3}[(a + bu)^2 - 4a(a + bu) + 2a^2 ln|a + bu|] + C$

49. $\int \frac{du}{u(a+bu)} = \frac{1}{a}ln|\frac{u}{a+bu}| + C$

50. $\int \frac{du}{u^2(a+bu)} =- \frac{1}{au} + \frac{b}{a^2}ln|\frac{a+bu}{u}| + C$

51. $\int \frac{u \, du}{(a+bu)^2} = \frac{a}{b^2(a+bu)} + \frac{1}{b^2}ln|a + bu| + C$

52. $\int \frac{du}{u(a+bu)^2} = \frac{1}{a(a+bu)} - \frac{1}{a^2}ln|\frac{a+bu}{u}| + C$

53. $\int \frac{u^2 du}{(a+bu)^2} = \frac{1}{b^3}(a + bu - \frac{a^2}{a+bu} - 2a \, ln|a + bu|) + C$

54. $\int u\sqrt{a + bu}\,du = \frac{2}{15b^2}(3bu - 2a)(a + bu)^{\frac{3}{2}} + C$

55. $\int \frac{u \, du}{\sqrt{a+bu}} = \frac{2}{3b^2}(bu - 2a)\sqrt{a + bu} + C$

56. $\int \frac{u^2 du}{\sqrt{a+bu}} = \frac{2}{15b^3}(8a^2 + 3b^2u^2 - 4abu)\sqrt{a + bu} + C$

57. $\int \frac{du}{u\sqrt{a+bu}} = \frac{1}{\sqrt{a}}ln|\frac{\sqrt{a+bu}-\sqrt{a}}{\sqrt{a+bu}+\sqrt{a}}| + C$ if $a > 0$

$= \frac{2}{\sqrt{-a}}tan^{-1}\sqrt{\frac{a+bu}{-a}} + C$ if $a < 0$

58. $\int \frac{\sqrt{a+bu}}{u}du = 2\sqrt{a + bu} + a\int \frac{du}{u\sqrt{a+bu}}$

59. $\int \frac{\sqrt{a+bu}}{u^2} du = -\frac{\sqrt{a+bu}}{u} + \frac{b}{2} + \int \frac{du}{u\sqrt{a+bu}}$

60. $\int u^n \sqrt{a+bu}\, du = \frac{2}{b(2n+3)} [u^n(a+bu)^{\frac{3}{2}} - na\int u^{n-1}\sqrt{a+bu}\, du]$

61. $\int \frac{u^2 du}{\sqrt{a+bu}} = \frac{2u^n}{b(2n+1)} - \frac{2na}{b(2n+1)} \int \frac{u^{n-1} du}{\sqrt{a+bu}}$

62. $\int \frac{du}{u^n \sqrt{a+bu}} = \frac{\sqrt{a+bu}}{a(n-1)u^{n-1}} \int \frac{du}{u^{n-1}\sqrt{a+bu}}$

TRIGONOMETRIC FORMS

63. $\int sin^2 u\, du = \frac{1}{2}u - \frac{1}{4}sin\, 2u + C$

64. $\int cos^2 u\, du = \frac{1}{2}u - \frac{1}{4}sin\, 2u + C$

65. $\int tan^2 u\, du = tan\, u - u + C$

66. $\int cot^2 u\, du = - cot\, u - u + C$

67. $\int sin^3 u\, du = -\frac{1}{3}(2 + sin^2 u)cos\, u + C$

68. $\int cos^3 u\, du = \frac{1}{3}(2 + cos^3 u)sin\, u + C$

69. $\int tan^3 u\, du = \frac{1}{2}tan^2 u + ln|cos\, u| + C$

70. $\int cot^3 u\, du = -\frac{1}{2}cot^2 u - ln|sin\, u| + C$

71. $\int sec^3 u\, du = \frac{1}{2}sec\, u tan\, u + \frac{1}{2}ln|sec\, u + tan\, u| + C$

72. $\int csc^3 u\, du = -\frac{1}{2}csc\, u cot\, u + \frac{1}{2}ln|csc\, u - cot\, u| + C$

73. $\int sin^3 u\, du = -\frac{1}{n}sin^{n-1}cos\, u + \frac{n-1}{n}\int sin^{n-2}u\, du$

74. $\int cos^2 u\, du + \frac{1}{n}cos^{n-1}u sin\, u + \frac{n-1}{n}\int cos^{n-2}u\, du$

75. $\int tan^n u\, du = \frac{1}{n-1}tan^{n-1}u - \int tan^{n-2}u\, du$

76. $\int cot^n u\, du = \frac{-1}{n-1}cot^{n-1}u - \int cot^{n-2}u\, du$

77. $\int sec^n u\, du = \frac{1}{n-1}tan\, u\, sec^{n-1}u + \frac{n-2}{n-1}\int sec^{n-2}u\, du$

78. $\int csc^n u\, du = \frac{-1}{n-1}cot\, u\, csc^{n-2} + \frac{n-2}{n-1}\int csc^{n-2}u\, du$

79. $\int sin\, au sin\, bu\, du = \frac{sin\, (a-b)u}{2(a-b)} - \frac{sin\, (a+b)\, u}{2(a+b)} + C$

80. $\int cos\, au\, bu\, du = \frac{sin\, (a-b)\, u}{2(a-b)} + \frac{sin\, (a+b)\, u}{2(a+b)} + C$

81. $\int sin\, au cos\, bu\, du = -\frac{cos\, (a-b)\, u}{2(a-b)} - \frac{cos\, (a+b)\, u}{2(a+b)} + C$

82. $\int u sin\, u\, dn = sin\, u - u cos\, u + C$

83. $\int u cos\, u\, dn = cos\, u + u sin\, u + C$

84. $\int u^n sin\, u\, dn = - u^2 cos\, u + n\int u^{-1}cos\, u\, du$

85. $\int u^n cos\, u\, du = u^n sin\, u - n\int u^{n-1}sin\, u\, du$

86. $\int sin^n u\, cos^m u\, du = -\frac{sin^{n-1}u\, cos^{m+1}u}{n+m} + \frac{n-1}{n+m}\int sin^{n-2}u\, cos^m u\, du$

$= \frac{sin^{n+1}u cos^{m-1}u}{n+m} + \frac{m-1}{n+m}\int sin^n u\, cos^{m-2}u\, du$

INVERSE TRIGONOMETRIC FORMS

87. $\int sin^{-1}u\ du = u\ sin^{-1}u + \sqrt{1-u^2} + C$

88. $\int cos^{-1}u\ du = u\ sin^{-1}u - \sqrt{1-u^2} + C$

89. $\int tan^{-1}u\ du = u\ tan^{-1}u - \frac{1}{2}ln\ (1+u^2)\ + C$

90. $\int u\ sin^{-1}u\ du = \frac{2u^2-1}{4}sin^{-1}u + \frac{u\sqrt{1-u^2}}{4} + C$

91. $\int u\ cos^{-1}u\ du = \frac{2u^2-1}{4}cos^{-1}u - \frac{u\sqrt{1-u^2}}{4} + C$

92. $\int utan^{-1}u\ du = \frac{u^2+1}{2}tan^{-1}u - \frac{u}{2} + C$

93. $\int u^n\ sin^{-1}u\ du = \frac{1}{n+1}[u^{n+1}sin^{-1}u - \int \frac{u^{n+1}du}{\sqrt{1-u^2}}],\quad n \neq -1$

94. $\int u^n cos^{-1}u\ du = \frac{1}{n+1}[u^{n+1}cos^{-1}u + \int \frac{u^{n+1}du}{\sqrt{1-u^2}}],\quad n \neq -1$

95. $\int u^n tan^{-1}u\ du = \frac{1}{n+1}[u^{n+1}tan^{-1}u - \int \frac{u^{n+1}du}{1+u^2}],\quad n \neq -1$

EXPONENTIAL LOGARITHMIC FORMS

96. $\int ue^{au}du = \frac{1}{a^2}(au-1)e^{au} + C$

97. $\int u^n e^{au}du = \frac{1}{a}u^n e^{au} - \frac{n}{a}\int u^{n-1}e^{au}du$

98. $\int e^{au}sin\ bu\ du = \frac{e^{au}}{a^2+b^2}(asin\ bu - bcos\ bu) + C$

99. $\int e^{au}cosbu\ du = \frac{e^{au}}{a^2+b^2}(acos\ bu + bsin\ bu) + C$

100. $\int ln\ u\ du = uln\ u - u + C$

101. $\int u^n ln\ u\ du = \frac{u^{n+1}}{(n+1)^2}[(N+1)ln\ u\ -1] + C$

102. $\int \frac{1}{uln\ u}dn = ln|ln\ u\ | + C$

HYPERBOLIC FORMS

103. $\int sinh\ u\ du = cosh\ u + C$

104. $\int cosh\ u\ du = sinh\ u + C$

105. $\int tanh\ u\ du = ln\ cosh\ u + C$

106. $\int coth\ u\ du = ln|sinh\ u\ | + C$

108. $\int csch\ u\ du = ln|tanh\ \frac{1}{2}u\ | + C$

109. $\int sech^2 u\ du = tanh\ u + C$

110. $\int csch^2 udu = -coth\ u + C$

111. $\int sech\ utanh\ u\ du = -sech\ u + C$

107. $\int sech\,u\,du = tan^{-1}|sinh\,u\,| + C$

112. $\int csch\,u\,coth\,u\,du = -\,csch\,u + C$

FORMS INVOLVING

$$\sqrt{2au - u^2}, \ a > 0$$

113. $\int \sqrt{2au - u^2}\,du = \frac{u-a}{2}\sqrt{2au - u^2} + \frac{a^2}{2}\cos^{-1}(\frac{a-u}{a}) + C$

114. $\int u\sqrt{2au - u^2}\,du = \frac{2u^2 - au3a^2}{6}\sqrt{2au - u^2} + \frac{a^3}{2}\cos^{-1}(\frac{a-u}{a}) + C$

115. $\int \frac{\sqrt{2au-u^2}}{u}\,du = \sqrt{2au - u^2} + a\,\cos^{-1}(\frac{a-u}{a}) + C$

116. $\int \frac{\sqrt{2au-u^2}}{u^2}\,du = \frac{2\sqrt{2au-u^2}}{u} - \cos^{-1}(\frac{a-u}{a}) + C$

117. $\int \frac{du}{\sqrt{2au-u^2}} = \cos^{-1}(\frac{a-u}{a}) + C$

118. $\int \frac{u\,du}{\sqrt{2au-u^2}} = -\sqrt{2au - u^2} + a\,\cos^{-1}(\frac{a-u}{a}) + C$

119. $\int \frac{u^2 du}{\sqrt{2au-u^2}} = -\frac{(u+3a)}{2}\sqrt{2au - u^2} + \frac{3a^2}{2}\cos^{-1}(\frac{a-u}{a}) + C$

120. $\int \frac{du}{u\sqrt{2au-u^3}} = -\frac{\sqrt{2au-u^2}}{au} + C$