TABLES OF INTEGRALS

POWERS

1. $\int u^n\,du = \dfrac{u^{n+1}}{n+1} + C,\ n \neq -1$

2. $\int \dfrac{du}{u} = \ln|u| + C$

EXPONENTIALS AND LOGARITHMS

3. $\int e^u\,du = e^u + C$

4. $\int p^u\,du = \dfrac{p^u}{\ln p} + C$

5. $\int ue^u\,du = ue^u - e^u + C$

6. $\int u^2 e^u\,du = u^2 e^u - 2ue^u + 2e^u + C$

7. $\int u^n e^u\,du = u^n e^u - n\int u^{n-1} e^u\,du$

8. $\int \ln u\,du = u\ln u - u + C$

9. $\int (\ln u)^2\,du = u(\ln u)^2 - 2u\ln u + 2u + C$

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

11. $\int u^n \ln u\,du = u^{n+1}\left[\dfrac{\ln u}{n+1} - \dfrac{1}{(n+1)^2}\right] + C$

12. $\int \dfrac{du}{u\ln u} = \ln|\ln u| + c$

SINES AND COSINES

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

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

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

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

17. $\int \sin^3 u\,du = \frac{1}{3}\cos^3 u - \cos u + C$

18. $\int \cos^3 u\,du = \sin u - \frac{1}{3}\sin^3 u + C$

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

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

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

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

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

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

25. $\int \sin mu\sin nu\,du = -\dfrac{\sin[(m+n)u]}{2(m+n)} + \dfrac{\sin[(m-n)u]}{2(m-n)} + C,\ m^2 \neq n^2$

26. $\int \cos mu\cos nu\,du = -\dfrac{\sin[(m+n)u]}{2(m+n)} + \dfrac{\sin[(m-n)u]}{2(m-n)} + C,\ m^2 \neq n^2$

27. $\int \sin mu\sin nu\,du = -\dfrac{\cos[(m+n)u]}{2(m+n)} + \dfrac{\cos[(m-n)u]}{2(m-n)} + C,\ m^2 \neq n^2$

28. $\int e^{au}\sin bu\,du = \dfrac{e^{au}}{a^2+b^2}(a\sin bu - b\cos bu) + C$

29. $\int e^{au}\cos bu\,du = \dfrac{e^{au}}{a^2+b^2}(a\cos bu - b\sin bu) + C$

TANGENTS AND SECANTS

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

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

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

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

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

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

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

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

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

COTANGENTS AND COSECANTS

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

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

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

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

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

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

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

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

47. $\int \csc^n u\,du = -\dfrac{\csc^{n-2} u \cot u}{n-1} + \dfrac{n-2}{n-1}\int \csc^{n-2} u\,du + C$

HYPERBOLIC FUNCTIONS

48. $\int \sinh u\,du = \cosh u + C$

49. $\int \cosh u\,du = \sinh u + C$

50. $\int \tanh u\,du = \ln(\cosh u) + C$

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

52. $\int \operatorname{sech} u\,du = \tan^{-1}(\sinh u) + C$

53. $\int \operatorname{csch} u\,du = \ln\left|\tanh \frac{1}{2}u\right| + C$

54. $\int \operatorname{sech}^2 u\,du = \tanh u + C$

55. $\int \operatorname{csch}^2 u\,du = -\coth u + C$

56. $\int \operatorname{sech} u \tanh u\,du = -\operatorname{sech} u + C$

57. $\int \operatorname{csch} u \coth u\,du = -\operatorname{csch} u + C$

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

59. $\int \coth^2 u\,du = \frac{1}{4}\sinh 2u + \frac{1}{2}u + C$

60. $\int \tanh^2 u\,du = u - \tanh u + C$

61. $\int \coth^2 u\,du = u - \coth u - C$

62. $\int u \sinh u\,du = u\cosh u - \sinh u + C$

63. $\int u \cosh u\,du = u\sinh u - \cosh u + C$

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INVERSE TRIGONOMETRIC FUNCTIONS

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

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

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

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

68. $\int \sec^{-1} u\,du = u\sec^{-1} u - \ln|u+\sqrt{u^2-1}| + C$

69. $\int \csc^{-1} u\,du = u\csc^{-1} u + \ln|u+\sqrt{u^2-1}| + C$

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

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

72. $\int u\cos^{-1} u\,du = \frac{1}{4}(2u^2-1)\cos^{-1} u - u\sqrt{1-u^2} + C$

73. $\int u^n \sin^{-1} u\,du = \dfrac{1}{n+1}\left[u^{n+1}\sin^{-1} u - \int \dfrac{u^{n+1}du}{\sqrt{1-u^2}}\right], n \neq -1$

74. $\int u^n \cos n^{-1} u\,du = \dfrac{1}{n+1}\left[u^{n+1}\cos^{-1} u - \int \dfrac{u^{n+1}\,du}{\sqrt{1-u^2}}\right], n \neq -1$

75. $\int u^n \tan^{-1} u\,du = \dfrac{1}{n+1}\left[u^{n+1}\tan^{-1} u - \int \dfrac{u^{n+1}du}{\sqrt{1-u^2}}\right], n \neq -1$

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

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

77. $\int \dfrac{du}{\sqrt{a^2+u^2}} = \ln|u+\sqrt{a^2+u^2}| + C$

78. $\int \sqrt{a^2+u^2}\,du = \dfrac{u}{2}\sqrt{a^2+u^2} + \dfrac{a^2}{2}\ln|u+\sqrt{a^2+u^2}| + C$

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

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

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

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

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

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

85. $\int \dfrac{du}{(a^2+u^2)^{3/2}} = \dfrac{u}{a^2\sqrt{a^2+u^2}} + C$

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

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

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

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

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

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

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

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

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

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

95. $\displaystyle\int \frac{du}{(a^2-u^2}^{3/2} = \frac{u}{a^2\sqrt{a^2-u^2}} + C$

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

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

97. $\displaystyle\int \frac{du}{u\sqrt{u^2-a^2}} = \frac{1}{a}\sec^{-1}\frac{|u|}{a} + C$

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

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

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

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

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

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

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

105. $\displaystyle\int \frac{u^2\,du}{(u^2-a^2)^{3/2}} = \frac{-u}{\sqrt{u^2-a^2}} + \ln|u+\sqrt{u^2-a^2}| + C$

$a+bu$, $\sqrt{a+bu}$

106. $\displaystyle\int \frac{u\,du}{a+bu} = \frac{1}{b_2}(a+bu-a\ln|a+bu|) + C$

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

108. $\displaystyle\int \frac{du}{u(a+bu)} = \frac{1}{a}\ln\left|\frac{u}{a+bu}\right| + C$

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

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

111. $\displaystyle\int \frac{du}{u(a+bu)^2} = \frac{1}{a(a+bu)} = \frac{1}{a^2}\ln\left|\frac{a+bu}{u}\right| + C$

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

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

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