TABELA DE DERIVADAS E INTEGRAIS

Tabela Schaum? ...não, não ....apenas tabelas simplificadas de integrais e derivadas para auxiliar em seus estudos. Enjoy it! ☺

Na sequência, considere que u e v são funções deriváveis/integráveis em y e/ou x.
Observe que n, a e b são constantes (cte.=constante)

1 Derivadas

1. $Derivada\ de\ constante = 0$

2. $y = u^n \Rightarrow y' = nu^{n-1}u'$

3. $y = uv \Rightarrow y' = u'v + v'u$

4. $y = \frac{u}{v} \Rightarrow y' = \frac{u'v - v'u}{v^2}$

Derivadas envolvendo funções exponenciais e/ou logarítmicas
("derivada de exp", "derivada de ln", etc)

5. $y = a^u \Rightarrow y' = a^u(\ln a)u', (a > 0, a \neq 1)$

6. $y = e^u \Rightarrow y' = e^u u'$

7. $y = \log_a u \Rightarrow y' = \frac{u'}{u} \log_a e$

8. $y = \ln u \Rightarrow y' = \frac{1}{u}u'$

9. $y = u^v \Rightarrow y' = vu^{v-1}u' + u^v(\ln u)v'$

Derivadas de funções trigonométricas ("derivada de $seno$", "derivada de $cosseno$", "derivada de $tangente$", etc)

10. $y = \sin u \Rightarrow y' = u'\cos u$

11. $y = \cos u \Rightarrow y' = -u'\sin u$

12. $y = \tan u \Rightarrow y' = u' \sec^2 u$

13. $y = \cot u \Rightarrow y' = -u' \csc^2 u$

14. $y = \sec u \Rightarrow y' = u' \sec u \cdot \tan u$

15. $y = \csc u \Rightarrow y' = -u' \csc u \cdot \cot u$

16. $y = \arcsin u \Rightarrow y' = \frac{u'}{\sqrt{1-u^2}}$

17. $y = \arccos u \Rightarrow y' = \frac{-u'}{\sqrt{1-u^2}}$

18. $y = \arctan u \Rightarrow y' = \frac{u'}{\sqrt{1+u^2}}$

19. $y = \text{arccot } u \Rightarrow y' = \frac{-u'}{\sqrt{1+u^2}}$

20. $y = \text{arcsec } u, |u| \geq 1 \Rightarrow y' = \frac{u'}{|u|\sqrt{u^2-1}}, |u| > 1$

21. $y = \text{arccsc } u, |u| \geq 1 \Rightarrow y' = \frac{-u'}{|u|\sqrt{u^2-1}}, |u| > 1$

Integrais

Integrais simples

22. $\int du = u + c$

23. $\int u^n du = \frac{u^{n+1}}{n+1} + c, n \neq -1$

24. $\int \frac{du}{u} = \ln|u| + c$

25. $\int a^u du = \frac{a^u}{\ln a} + c, a > 0, a \neq 1$

26. $\int e^u du = e^u + c$

Integrais com funções trigonométricas ("Int *sen*", "Int *cos*", etc)

27. $\int \sin u \cdot du = -\cos u + c$

28. $\int \cos u \cdot du = \sin u + c$

29. $\int \tan u \cdot du = \ln|\sec u| + c$

30. $\int \cot u \cdot du = \ln|\sin u| + c$

31. $\int \sec u \cdot du = \ln|\sec u + \tan u| + c$

32. $\int \csc u \cdot du = \ln|\csc u - \cot u| + c$

33. $\int \sec u \cdot \tan u \cdot du = \sec u + c$

34. $\int \csc u \cdot \cot u \cdot du = -\csc u + c$

35. $\int \sec^2 u \cdot du = \tan u + c$

36. $\int \csc^2 u \cdot du = -\cot u + c$

Integrais com funções racionais e raiz

37. $\int \frac{du}{u^2+a^2} = \frac{1}{a}\arctan\frac{u}{a} + c$

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

39. $\int \frac{du}{\sqrt{u^2+a^2}} = \ln\left|u + \sqrt{u^2+a^2}\right| + c$

40. $\int \frac{du}{\sqrt{u^2-a^2}} = \arcsin\frac{u}{a} + c, u^2 < a^2$

41. $\int \frac{du}{\sqrt{a^2-u^2}} = \arcsin\frac{u}{a} + c, u^2 < a^2$

42. $\int \frac{du}{u\sqrt{a^2-u^2}} = \frac{1}{a}\operatorname{arcsec}\left|\frac{u}{a}\right| + c$

43. $\int \frac{1}{x}dx = \ln|x|$

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

45. $\int \frac{1}{ax+b}dx = \frac{1}{a}\ln|ax+b|$

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

47. $\int (x+a)^n dx = \frac{(x+a)^{n+1}}{n+1}, n \neq -1$

48. $\int x(x+a)^n dx = \frac{(x+a)^{n+1}((n+1)x-a)}{(n+1)(n+2)}$

49. $\int x(x+a)^n dx = \frac{(x+a)^{n+1}((n+1)x-a)}{(n+1)(n+2)}$

50. $\int \frac{1}{1+x^2} dx = \tan^{-1} x$

51. $\int \frac{1}{a^2+x^2} dx = \frac{1}{a} \tan^{-1} \frac{x}{a}$

52. $\int \frac{x}{a^2+x^2} dx = \frac{1}{2} \ln|a^2+x^2|$

53. $\int \frac{x^2}{a^2+x^2} dx = x - a\tan^{-1} \frac{x}{a}$

54. $\int \frac{x^3}{a^2+x^2} dx = \frac{1}{2}x^2 - \frac{1}{2}a^2 \ln|a^2+x^2|$

55. $\int \frac{1}{ax^2+bx+c} dx = \frac{2}{\sqrt{4ac-b^2}} \tan^{-1} \frac{2ax+b}{\sqrt{4ac-b^2}}$

56. $\int \frac{1}{(x+a)(x+b)} dx = \frac{1}{b-a} \ln \frac{a+x}{b+x}, \ a \neq b$

57. $\int \frac{x}{(x+a)^2} dx = \frac{a}{a+x} + \ln|a+x|$

58. $\int \sqrt{x-a}\, dx = \frac{2}{3}(x-a)^{3/2}$

59. $\int \frac{1}{\sqrt{x \pm a}} dx = 2\sqrt{x \pm a}$

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

61. $\int x\sqrt{x-a}\, dx = \frac{2}{3}a(x-a)^{3/2} + \frac{2}{5}(x-a)^{5/2}$

62. $\int x\sqrt{x-a}\, dx = \frac{2}{3}a(x-a)^{3/2} + \frac{2}{5}(x-a)^{5/2}$

63. $\int \sqrt{ax+b}\, dx = \left(\frac{2b}{3a} + \frac{2x}{3}\right)\sqrt{ax+b}$

64. $\int (ax+b)^{3/2} dx = \frac{2}{5a}(ax+b)^{5/2}$

65. $\int \frac{x}{\sqrt{x \pm a}} dx = \frac{2}{3}(x \mp 2a)\sqrt{x \pm a}$

66. $\int x\sqrt{x^2 \pm a^2}\, dx = \frac{1}{3}\left(x^2 \pm a^2\right)^{3/2}$

67. $\int x\sqrt{x^2 \pm a^2}\, dx = \frac{1}{3}\left(x^2 \pm a^2\right)^{3/2}$

68. $\int \frac{1}{\sqrt{x^2 \pm a^2}} dx = \ln\left|x + \sqrt{x^2 \pm a^2}\right|$

69. $\int \frac{1}{\sqrt{a^2-x^2}} dx = \sin^{-1} \frac{x}{a}$

70. $\int \frac{1}{\sqrt{a^2-x^2}}dx = \sin^{-1}\frac{x}{a}$

71. $\int \frac{x}{\sqrt{x^2\pm a^2}}dx = \sqrt{x^2 \pm a^2}$

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

73. $\int \frac{dx}{(a^2+x^2)^{3/2}} = \frac{x}{a^2\sqrt{a^2+x^2}}$

Integral com função logarítmica ("int ln", etc)

74. $\int \ln ax \, dx = x\ln ax - x$

75. $\int \frac{\ln ax}{x}dx = \frac{1}{2}\left(\ln ax\right)^2$

76. $\int \ln(ax + b)dx = \left(x + \frac{b}{a}\right)\ln(ax + b) - x, a \neq 0$

Integrais envolvendo funções exponenciais

77. $\int xe^x dx = (x - 1)e^x$

78. $\int e^{ax}dx = \frac{1}{a}e^{ax}$

79. $\int x^2 e^x dx = \left(x^2 - 2x + 2\right)e^x$

80. $\int xe^{ax}dx = \left(\frac{x}{a} - \frac{1}{a^2}\right)e^{ax}$

81. $\int x^2 e^{ax}dx = \left(\frac{x^2}{a} - \frac{2x}{a^2} + \frac{2}{a^3}\right)e^{ax}$

82. $\int x^3 e^x dx = \left(x^3 - 3x^2 + 6x - 6\right)e^x$

83. $\int x^n e^{ax}\,dx = \frac{x^n e^{ax}}{a} - \frac{n}{a}\int x^{n-1}e^{ax}\,dx$

84. $\int e^{ax^2}\,dx = -\frac{i\sqrt{\pi}}{2\sqrt{a}}\mathrm{erf}\left(ix\sqrt{a}\right)$

85. $\int e^{-ax^2}\,dx = \frac{\sqrt{\pi}}{2\sqrt{a}}\mathrm{erf}\left(x\sqrt{a}\right)$

86. $\int xe^{-ax^2}\,dx = -\frac{1}{2a}e^{-ax^2}$

87. $\int x^2 e^{-ax^2} \ \mathrm{dx} = \frac{1}{4}\sqrt{\frac{\pi}{a^3}}\mathrm{erf}(x\sqrt{a}) - \frac{x}{2a}e^{-ax^2}$

Integrais envolvendo funções trigonomátrica

88. $\int \sin ax dx = -\frac{1}{a}\cos ax$

89. $\int \cos ax dx = \frac{1}{a}\sin ax$

90. $\int \sin^2 ax dx = \frac{x}{2} - \frac{\sin 2ax}{4a}$

91. $\int \cos^2 ax dx = \frac{x}{2} + \frac{\sin 2ax}{4a}$

92. $\int \sin^3 ax dx = -\frac{3\cos ax}{4a} + \frac{\cos 3ax}{12a}$

93. $\int \cos^3 ax dx = \frac{3\sin ax}{4a} + \frac{\sin 3ax}{12a}$

94. $\int \sin^2 x \cos x dx = \frac{1}{3}\sin^3 x$

95. $\int \cos^2 ax \sin ax dx = -\frac{1}{3a}\cos^3 ax$

96. $\int \sin^2 ax \cos^2 ax dx = \frac{x}{8} - \frac{\sin 4ax}{32a}$

97. $\int \tan ax dx = -\frac{1}{a}\ln \cos ax$

98. $\int \tan^2 ax dx = -x + \frac{1}{a}\tan ax$

99. $\int \tan^3 ax dx = \frac{1}{a}\ln \cos ax + \frac{1}{2a}\sec^2 ax$

100. $\int \sec^2 ax dx = \frac{1}{a}\tan ax$

101. $\int \sec^3 x \ \mathrm{dx} = \frac{1}{2}\sec x \tan x + \frac{1}{2}\ln|\sec x + \tan x|$

102. $\int \sec x \tan x dx = \sec x$

103. $\int \sec^2 x \tan x dx = \frac{1}{2}\sec^2 x$

104. $\int \sec^n x \tan x dx = \frac{1}{n}\sec^n x, n \neq 0$

105. $\int \csc x dx = \ln\left|\tan\frac{x}{2}\right| = \ln|\csc x - \cot x| + C$

106. $\int \csc^2 ax dx = -\frac{1}{a}\cot ax$

107. $\int \csc^3 x dx = -\frac{1}{2}\cot x \csc x + \frac{1}{2}\ln|\csc x - \cot x|$

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108. $\int \csc^n x \cot x dx = -\frac{1}{n} \csc^n x, n \neq 0$

109. $\int \sec x \csc x dx = \ln|\tan x|$

Integrais envolvendo produto de funções trigonométricas e monômios

110. $\int x \cos x dx = \cos x + x \sin x$

111. $\int x \cos ax dx = \frac{1}{a^2} \cos ax + \frac{x}{a} \sin ax$

112. $\int x^2 \cos x dx = 2x \cos x + (x^2 - 2) \sin x$

113. $\int x^2 \cos ax dx = \frac{2x \cos ax}{a^2} + \frac{a^2 x^2 - 2}{a^3} \sin ax$

114. $\int x^2 \cos ax dx = \frac{2x \cos ax}{a^2} + \frac{a^2 x^2 - 2}{a^3} \sin ax$

115. $\int x \sin x dx = -x \cos x + \sin x$

116. $\int x \sin ax dx = -\frac{x \cos ax}{a} + \frac{\sin ax}{a^2}$

117. $\int x^2 \sin x dx = (2 - x^2) \cos x + 2x \sin x$

118. $\int x^2 \sin ax dx = \frac{2 - a^2 x^2}{a^3} \cos ax + \frac{2x \sin ax}{a^2}$

Integrais envolvendo produto de funções trigonométricas e exponenciais

119. $\int e^x \sin x dx = \frac{1}{2} e^x (\sin x - \cos x)$

120. $\int e^{bx} \sin ax dx = \frac{1}{a^2+b^2} e^{bx} (b \sin ax - a \cos ax)$

121. $\int e^x \cos x dx = \frac{1}{2} e^x (\sin x + \cos x)$

122. $\int e^{bx} \cos ax dx = \frac{1}{a^2+b^2} e^{bx} (a \sin ax + b \cos ax)$

123. $\int x e^x \sin x dx = \frac{1}{2} e^x (\cos x - x \cos x + x \sin x)$

124. $\int x e^x \cos x dx = \frac{1}{2} e^x (x \cos x - \sin x + x \sin x)$

Integrais de funções hiperbólicas

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125. $\int \cosh ax\, dx = \frac{1}{a} \sinh ax$

126. $\int \sinh ax\, dx = \frac{1}{a} \cosh ax$

127. $\int \tanh ax\, dx = \frac{1}{a} \ln \cosh ax$

128. $\int \sinh ax \cosh ax\, dx = \frac{1}{4a} \left[-2ax + \sinh 2ax \right]$