



Fórmulas de derivadas

Reglas generales

$$\frac{d}{dx}[f(x) + g(x)] = f'(x) + g'(x)$$

$$\frac{d}{dx}[f(x) - g(x)] = f'(x) - g'(x)$$

$$\frac{d}{dx}[cf(x)] = cf'(x)$$

$$\frac{d}{dx}[fg(x)] = f'(g(x))g'(x)$$

$$\frac{d}{dx}[f(x)g(x)] = f'(x)g(x) + f(x)g'(x)$$

$$\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

Reglas de potencias

$$\frac{d}{dx}(x^n) = nx^{n-1}$$

$$\frac{d}{dx}(c) = 0$$

$$\frac{d}{dx}(cx) = c$$

$$\frac{d}{dx}(\sqrt{x}) = \frac{1}{2\sqrt{x}}$$

Exponenciales

$$\frac{d}{dx}[e^x] = e^x$$

$$\frac{d}{dx}[a^x] = a^x \ln a$$

$$\frac{d}{dx}[e^{u(x)}] = e^{u(x)}u'(x)$$

$$\frac{d}{dx}[e^{rx}] = r e^{rx}$$

Trigonométricas

$$\frac{d}{dx}(\sin x) = \cos x$$

$$\frac{d}{dx}(\cos x) = -\sin x$$

$$\frac{d}{dx}(\tan x) = \sec^2 x$$

$$\frac{d}{dx}(\cot x) = -\csc^2 x$$

$$\frac{d}{dx}(\sec x) = \sec x \tan x$$

$$\frac{d}{dx}(\csc x) = -\csc x \cot x$$

Inversas trigonométricas

$$\frac{d}{dx}(\sin^{-1} x) = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}(\cos^{-1} x) = -\frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}(\tan^{-1} x) = \frac{1}{1+x^2}$$

$$\frac{d}{dx}(\cot^{-1} x) = -\frac{1}{1+x^2}$$

$$\frac{d}{dx}(\sec^{-1} x) = \frac{1}{|x|\sqrt{x^2-1}}$$

$$\frac{d}{dx}(\csc^{-1} x) = -\frac{1}{|x|\sqrt{x^2-1}}$$

Hiperbólicas

$$\frac{d}{dx}(\sinh x) = \cosh x$$

$$\frac{d}{dx}(\cosh x) = \sinh x$$

$$\frac{d}{dx}(\tanh x) = \operatorname{sech}^2 x$$

$$\frac{d}{dx}(\coth x) = -\operatorname{csch}^2 x$$

$$\frac{d}{dx}(\operatorname{sech} x) = -\operatorname{sech} x \tanh x$$

$$\frac{d}{dx}(\operatorname{csch} x) = -\operatorname{csch} x \coth x$$

Hiperbólicas inversas

$$\frac{d}{dx}(\sinh^{-1} x) = \frac{1}{\sqrt{1+x^2}}$$

$$\frac{d}{dx}(\cosh^{-1} x) = \frac{1}{\sqrt{x^2-1}}$$

$$\frac{d}{dx}(\tanh^{-1} x) = \frac{1}{1-x^2}$$

$$\frac{d}{dx}(\coth^{-1} x) = \frac{1}{1-x^2}$$

$$\frac{d}{dx}(\operatorname{sech}^{-1} x) = -\frac{1}{x\sqrt{1-x^2}}$$

$$\frac{d}{dx}(\operatorname{csch}^{-1} x) = -\frac{1}{|x|\sqrt{x^2+1}}$$



Tabla de integrales

Formas que involucran $a + bu$

1. $\int \frac{1}{a+bu} du = \frac{1}{b} \ln|a+bu| + c$
2. $\int \frac{u}{a+bu} du = \frac{1}{b^2} (a+bu - a \ln|a+bu|) + c$
3. $\int \frac{u^2}{a+bu} du = \frac{1}{2b^3} [(a+bu)^2 - 4a(a+bu) + 2a^2 \ln|a+bu|] + c$
4. $\int \frac{1}{u(a+bu)} du = \frac{1}{a} \ln \left| \frac{u}{a+bu} \right| + c$
5. $\int \frac{1}{u^2(a+bu)} du = \frac{b}{a^2} \ln \left| \frac{a+bu}{u} \right| - \frac{1}{au} + c$

Formas que involucran $(a+bu)^2$

6. $\int \frac{1}{(a+bu)^2} du = \frac{-1}{b(a+bu)} + c$
7. $\int \frac{u}{(a+bu)^2} du = \frac{1}{b^2} \left(\frac{a}{a+bu} + \ln|a+bu| \right) + c$
8. $\int \frac{u^2}{(a+bu)^2} du = \frac{1}{b^3} \left(a+bu - \frac{a^2}{a+bu} - 2a \ln|a+bu| \right) + c$
9. $\int \frac{1}{u(a+bu)^2} du = \frac{1}{a(a+bu)} + \frac{1}{a^2} \ln \left| \frac{u}{a+bu} \right| + c$
10. $\int \frac{1}{u^2(a+bu)^2} du = \frac{2b}{a^3} \ln \left| \frac{a+bu}{u} \right| - \frac{a+2bu}{a^2 u(a+bu)} + c$

Formas que involucran $\sqrt{a+bu}$

11. $\int u \sqrt{a+bu} du = \frac{2}{15b^2} (3bu - 2a)(a+bu)^{3/2} + c$
12. $\int u^2 \sqrt{a+bu} du = \frac{2}{105b^3} (15b^2 u^2 - 12abu + 8a^2)(a+bu)^{3/2} + c$
13. $\int u^n \sqrt{a+bu} du = \frac{2}{b(2n+3)} u^n (a+bu)^{3/2} - \frac{2na}{b(2n+3)} \int u^{n-1} \sqrt{a+bu} du$
14. $\int \frac{\sqrt{a+bu}}{u} du = 2\sqrt{a+bu} + a \int \frac{1}{u\sqrt{a+bu}} du$
15. $\int \frac{\sqrt{a+bu}}{u^n} du = \frac{-1}{a(n-1)} \frac{(a+bu)^{3/2}}{u^{n-1}} - \frac{(2n-5)b}{2a(n-1)} \int \frac{\sqrt{a+bu}}{u^{n-1}} du, n \neq 1$
- 16a. $\int \frac{1}{u\sqrt{a+bu}} du = \frac{1}{\sqrt{a}} \ln \left| \frac{\sqrt{a+bu} - \sqrt{a}}{\sqrt{a+bu} + \sqrt{a}} \right| + c, a > 0$
- 16b. $\int \frac{1}{u\sqrt{a+bu}} du = \frac{2}{\sqrt{-a}} \tan^{-1} \sqrt{\frac{a+bu}{-a}} + c, a < 0$
17. $\int \frac{1}{u^n \sqrt{a+bu}} du = \frac{-1}{a(n-1)} \frac{\sqrt{a+bu}}{u^{n-1}} - \frac{(2n-3)b}{2a(n-1)} \int \frac{1}{u^{n-1} \sqrt{a+bu}} du, n \neq 1$
18. $\int \frac{u}{\sqrt{a+bu}} du = \frac{2}{3b^2} (bu - 2a)\sqrt{a+bu} + c$
19. $\int \frac{u^2}{\sqrt{a+bu}} du = \frac{2}{15b^3} (3b^2 u^2 - 4abu + 8a^2)\sqrt{a+bu} + c$

$$20. \int \frac{u^n}{\sqrt{a+bu}} du = \frac{2}{(2n+1)b} u^n \sqrt{a+bu} - \frac{2na}{(2n+1)b} \int \frac{u^{n-1}}{\sqrt{a+bu}} du$$

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

21. $\int \sqrt{a^2+u^2} du = \frac{1}{2} u \sqrt{a^2+u^2} + \frac{1}{2} a^2 \ln|u + \sqrt{a^2+u^2}| + c$
22. $\int u^2 \sqrt{a^2+u^2} du = \frac{1}{8} u (a^2 + 2u^2) \sqrt{a^2+u^2} - \frac{1}{8} a^4 \ln|u + \sqrt{a^2+u^2}| + c$
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. $\int \frac{\sqrt{a^2+u^2}}{u^2} du = \ln|u + \sqrt{a^2+u^2}| - \frac{\sqrt{a^2+u^2}}{u} + c$
25. $\int \frac{1}{\sqrt{a^2+u^2}} du = \ln|u + \sqrt{a^2+u^2}| + c$
26. $\int \frac{u^2}{\sqrt{a^2+u^2}} du = \frac{1}{2} u \sqrt{a^2+u^2} - \frac{1}{2} a^2 \ln|u + \sqrt{a^2+u^2}| + c$
27. $\int \frac{1}{u \sqrt{a^2+u^2}} du = \frac{1}{a} \ln \left| \frac{u}{a + \sqrt{a^2+u^2}} \right| + c$
28. $\int \frac{1}{u^2 \sqrt{a^2+u^2}} du = -\frac{\sqrt{a^2+u^2}}{a^2 u} + c$

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

29. $\int \sqrt{a^2-u^2} du = \frac{1}{2} u \sqrt{a^2-u^2} + \frac{1}{2} a^2 \sin^{-1} \frac{u}{a} + c$
30. $\int u^2 \sqrt{a^2-u^2} du = \frac{1}{8} u (2u^2 - a^2) \sqrt{a^2-u^2} + \frac{1}{8} a^4 \sin^{-1} \frac{u}{a} + c$
31. $\int \frac{\sqrt{a^2-u^2}}{u} du = \sqrt{a^2-u^2} - a \ln \left| \frac{a + \sqrt{a^2-u^2}}{u} \right| + c$
32. $\int \frac{\sqrt{a^2-u^2}}{u^2} du = -\frac{\sqrt{a^2-u^2}}{u} - \sin^{-1} \frac{u}{a} + c$
33. $\int \frac{1}{\sqrt{a^2-u^2}} du = \sin^{-1} \frac{u}{a} + c$
34. $\int \frac{1}{u \sqrt{a^2-u^2}} du = -\frac{1}{a} \ln \left| \frac{a + \sqrt{a^2-u^2}}{u} \right| + c$
35. $\int \frac{u^2}{\sqrt{a^2-u^2}} du = -\frac{1}{2} u \sqrt{a^2-u^2} + \frac{1}{2} a^2 \sin^{-1} \frac{u}{a} + c$
36. $\int \frac{1}{u^2 \sqrt{a^2-u^2}} du = -\frac{\sqrt{a^2-u^2}}{a^2 u} + c$

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

37. $\int \sqrt{u^2-a^2} du = \frac{1}{2} u \sqrt{u^2-a^2} - \frac{1}{2} a^2 \ln|u + \sqrt{u^2-a^2}| + c$
38. $\int u^2 \sqrt{u^2-a^2} du = \frac{1}{8} u (2u^2 - a^2) \sqrt{u^2-a^2} - \frac{1}{8} a^4 \ln|u + \sqrt{u^2-a^2}| + c$

$$\begin{aligned}
39. \quad & \int \frac{\sqrt{u^2 - a^2}}{u} du = \sqrt{u^2 - a^2} - a \sec^{-1} \frac{|u|}{a} + c \\
40. \quad & \int \frac{\sqrt{u^2 - a^2}}{u^2} du = \ln|u + \sqrt{u^2 - a^2}| - \frac{\sqrt{u^2 - a^2}}{u} + c \\
41. \quad & \int \frac{1}{\sqrt{u^2 - a^2}} du = \ln|u + \sqrt{u^2 - a^2}| + c \\
42. \quad & \int \frac{u^2}{\sqrt{u^2 - a^2}} du = \frac{1}{2} u \sqrt{u^2 - a^2} + \frac{1}{2} a^2 \ln|u + \sqrt{u^2 - a^2}| + c \\
43. \quad & \int \frac{1}{u \sqrt{u^2 - a^2}} du = \frac{1}{a} \sec^{-1} \frac{|u|}{a} + c \\
44. \quad & \int \frac{1}{u^2 \sqrt{u^2 - a^2}} du = \frac{\sqrt{u^2 - a^2}}{a^2 u} + c
\end{aligned}$$

Formas que involucran $\sqrt{2au - u^2}$

$$\begin{aligned}
45. \quad & \int \sqrt{2au - u^2} du = \frac{1}{2} (u - a) \sqrt{2au - u^2} + \frac{1}{2} a^2 \cos^{-1} \left(\frac{a - u}{a} \right) + c \\
46. \quad & \int u \sqrt{2au - u^2} du = \frac{1}{6} (2u^2 - au - 3a^2) \sqrt{2au - u^2} \\
& + \frac{1}{2} a^3 \cos^{-1} \left(\frac{a - u}{a} \right) + c \\
47. \quad & \int \frac{\sqrt{2au - u^2}}{u} du = \sqrt{2au - u^2} + a \cos^{-1} \left(\frac{a - u}{a} \right) + c \\
48. \quad & \int \frac{\sqrt{2au - u^2}}{u^2} du = -\frac{2\sqrt{2au - u^2}}{u} - \cos^{-1} \left(\frac{a - u}{a} \right) + c \\
49. \quad & \int \frac{1}{\sqrt{2au - u^2}} du = \cos^{-1} \left(\frac{a - u}{a} \right) + c \\
50. \quad & \int \frac{u}{\sqrt{2au - u^2}} du = -\sqrt{2au - u^2} + a \cos^{-1} \left(\frac{a - u}{a} \right) + c \\
51. \quad & \int \frac{u^2}{\sqrt{2au - u^2}} du = -\frac{1}{2} (u + 3a) \sqrt{2au - u^2} + \frac{3}{2} a^2 \cos^{-1} \left(\frac{a - u}{a} \right) + c \\
52. \quad & \int \frac{1}{u \sqrt{2au - u^2}} du = -\frac{\sqrt{2au - u^2}}{au} + c
\end{aligned}$$

Formas que involucran $\sin u$ o $\cos u$

$$\begin{aligned}
53. \quad & \int \sin u du = -\cos u + c \\
54. \quad & \int \cos u du = \sin u + c \\
55. \quad & \int \sin^2 u du = \frac{1}{2} u - \frac{1}{2} \sin u \cos u + c \\
56. \quad & \int \cos^2 u du = \frac{1}{2} u + \frac{1}{2} \sin u \cos u + c \\
57. \quad & \int \sin^3 u du = -\frac{2}{3} \cos u - \frac{1}{3} \sin^2 u \cos u + c \\
58. \quad & \int \cos^3 u du = \frac{2}{3} \sin u + \frac{1}{3} \sin u \cos^2 u + c \\
59. \quad & \int \sin^n u du = -\frac{1}{n} \sin^{n-1} u \cos u + \frac{n-1}{n} \int \sin^{n-2} u du \\
60. \quad & \int \cos^n u du = \frac{1}{n} \cos^{n-1} u \sin u + \frac{n-1}{n} \int \cos^{n-2} u du \\
61. \quad & \int u \sin u du = \sin u - u \cos u + c
\end{aligned}$$

$$\begin{aligned}
62. \quad & \int u \cos u du = \cos u + u \sin u + c \\
63. \quad & \int u^n \sin u du = -u^n \cos u + n \int u^{n-1} \cos u du + c \\
64. \quad & \int u^n \cos u du = u^n \sin u - n \int u^{n-1} \sin u du + c \\
65. \quad & \int \frac{1}{1 + \sin u} du = \tan u - \sec u + c \\
66. \quad & \int \frac{1}{1 - \sin u} du = \tan u + \sec u + c \\
67. \quad & \int \frac{1}{1 + \cos u} du = -\cot u + \csc u + c \\
68. \quad & \int \frac{1}{1 - \cos u} du = -\cot u - \csc u + c \\
69. \quad & \int \sin(mu) \sin(nu) du = \frac{\sin(m-n)u}{2(m-n)} - \frac{\sin(m+n)u}{2(m+n)} + c \\
70. \quad & \int \cos(mu) \cos(nu) du = \frac{\sin(m-n)u}{2(m-n)} + \frac{\sin(m+n)u}{2(m+n)} + c \\
71. \quad & \int \sin(mu) \cos(nu) du = \frac{\cos(n-m)u}{2(n-m)} - \frac{\cos(m+n)u}{2(m+n)} + c \\
72. \quad & \int \sin^m u \cos^n u du = -\frac{\sin^{m-1} u \cos^{n+1} u}{m+n} + \frac{m-1}{m+n} \int \sin^{m-2} u \cos^n u du
\end{aligned}$$

Formas que involucran otras funciones trigonométricas

$$\begin{aligned}
73. \quad & \int \tan u du = -\ln|\cos u| + c = \ln|\sec u| + c \\
74. \quad & \int \cot u du = \ln|\sin u| + c \\
75. \quad & \int \sec u du = \ln|\sec u + \tan u| + c \\
76. \quad & \int \csc u du = \ln|\csc u - \cot u| + c \\
77. \quad & \int \tan^2 u du = \tan u - u + c \\
78. \quad & \int \cot^2 u du = -\cot u - u + c \\
79. \quad & \int \sec^2 u du = \tan u + c \\
80. \quad & \int \csc^2 u du = -\cot u + c \\
81. \quad & \int \tan^3 u du = \frac{1}{2} \tan^2 u + \ln|\cos u| + c \\
82. \quad & \int \cot^3 u du = -\frac{1}{2} \cot^2 u - \ln|\sin u| + c \\
83. \quad & \int \sec^3 u du = \frac{1}{2} \sec u \tan u + \frac{1}{2} \ln|\sec u + \tan u| + c \\
84. \quad & \int \csc^3 u du = -\frac{1}{2} \csc u \cot u + \frac{1}{2} \ln|\csc u - \cot u| + c \\
85. \quad & \int \tan^n u du = \frac{1}{n-1} \tan^{n-1} u - \int \tan^{n-2} u du, n \neq 1
\end{aligned}$$

$$\begin{aligned}
86. \quad \int \cot^n u \, du &= -\frac{1}{n-1} \cot^{n-1} u - \int \cot^{n-2} u \, du, n \neq 1 \\
87. \quad \int \sec^n u \, du &= \frac{1}{n-1} \sec^{n-2} u \tan u + \frac{n-2}{n-1} \int \sec^{n-2} u \, du, n \neq 1 \\
88. \quad \int \csc^n u \, du &= -\frac{1}{n-1} \csc^{n-2} u \cot u + \frac{n-2}{n-1} \int \csc^{n-2} u \, du, n \neq 1 \\
89. \quad \int \frac{1}{1 \pm \tan u} du &= \frac{1}{2} u \pm \ln |\cos u \pm \sin u| + c \\
90. \quad \int \frac{1}{1 \pm \cot u} du &= \frac{1}{2} u \mp \ln |\sin u \pm \cos u| + c \\
91. \quad \int \frac{1}{1 \pm \sec u} du &= u + \cot u \mp \csc u + c \\
92. \quad \int \frac{1}{1 \pm \csc u} du &= u - \tan u \pm \sec u + c
\end{aligned}$$

Formas que involucran funciones trigonométricas inversas

$$\begin{aligned}
93. \quad \int \sin^{-1} u \, du &= u \sin^{-1} u + \sqrt{1-u^2} + c \\
94. \quad \int \cos^{-1} u \, du &= u \cos^{-1} u - \sqrt{1-u^2} + c \\
95. \quad \int \tan^{-1} u \, du &= u \tan^{-1} u - \ln \sqrt{1+u^2} + c \\
96. \quad \int \cot^{-1} u \, du &= u \cot^{-1} u + \ln \sqrt{1+u^2} + c \\
97. \quad \int \sec^{-1} u \, du &= u \sec^{-1} u - \ln |u + \sqrt{u^2-1}| + c \\
98. \quad \int \csc^{-1} u \, du &= u \csc^{-1} u + \ln |u + \sqrt{u^2-1}| + c \\
99. \quad \int u \sin^{-1} u \, du &= \frac{1}{4} (2u^2-1) \sin^{-1} u + \frac{1}{4} u \sqrt{1-u^2} + c \\
100. \quad \int u \cos^{-1} u \, du &= \frac{1}{4} (2u^2-1) \cos^{-1} u - \frac{1}{4} u \sqrt{1-u^2} + c
\end{aligned}$$

Formas que involucran e^u

$$\begin{aligned}
101. \quad \int e^{au} \, du &= \frac{1}{a} e^{au} + c \\
102. \quad \int u e^{au} \, du &= \left(\frac{1}{a} u - \frac{1}{a^2} \right) e^{au} + c \\
103. \quad \int u^2 e^{au} \, du &= \left(\frac{1}{a} u^2 - \frac{2}{a^2} u + \frac{2}{a^3} \right) e^{au} + c \\
104. \quad \int u^n e^{au} \, du &= \frac{1}{a} u^n e^{au} - \frac{n}{a} \int u^{n-1} e^{au} \, du \\
105. \quad \int e^{au} \sin bu \, du &= \frac{1}{a^2 + b^2} (a \sin bu - b \cos bu) e^{au} + c \\
106. \quad \int e^{au} \cos bu \, du &= \frac{1}{a^2 + b^2} (a \cos bu + b \sin bu) e^{au} + c
\end{aligned}$$

Formas que involucran $\ln u$

$$\begin{aligned}
107. \quad \int \ln u \, du &= u \ln u - u + c \\
108. \quad \int u \ln u \, du &= \frac{1}{2} u^2 \ln u - \frac{1}{4} u^2 + c \\
109. \quad \int u^n \ln u \, du &= \frac{1}{n+1} u^{n+1} \ln u - \frac{1}{(n+1)^2} u^{n+1} + c \\
110. \quad \int \frac{1}{u \ln u} du &= \ln |\ln u| + c \\
111. \quad \int (\ln u)^2 du &= u (\ln u)^2 - 2u \ln u + 2u + c \\
112. \quad \int (\ln u)^n du &= u (\ln u)^n - n \int (\ln u)^{n-1} du
\end{aligned}$$

Formas que involucran funciones hiperbólicas

$$\begin{aligned}
113. \quad \int \sinh u \, du &= \cosh u + c \\
114. \quad \int \cosh u \, du &= \sinh u + c \\
115. \quad \int \tanh u \, du &= \ln(\cosh u) + c \\
116. \quad \int \coth u \, du &= \ln |\sinh u| + c \\
117. \quad \int \operatorname{sech} u \, du &= \tan^{-1} |\sinh u| + c \\
118. \quad \int \operatorname{csch} u \, du &= \ln \left| \tanh \frac{1}{2} u \right| + c \\
119. \quad \int \operatorname{sech}^2 u \, du &= \tanh u + c \\
120. \quad \int \operatorname{csch}^2 u \, du &= -\coth u + c \\
121. \quad \int \operatorname{sech} u \tanh u \, du &= -\operatorname{sech} u + c \\
122. \quad \int \operatorname{csch} u \coth u \, du &= -\operatorname{csch} u + c \\
123. \quad \int \frac{1}{\sqrt{a^2+1}} da &= \sinh^{-1} a + c \\
124. \quad \int \frac{1}{\sqrt{a^2-1}} da &= \cosh^{-1} a + c \\
125. \quad \int \frac{1}{1-a^2} da &= \tanh^{-1} a + c \\
126. \quad \int \frac{1}{|a|\sqrt{a^2+1}} da &= -\operatorname{csch}^{-1} a + c \\
127. \quad \int \frac{1}{a\sqrt{1-a^2}} da &= -\operatorname{sech}^{-1} a + c
\end{aligned}$$