Table of derivatives

1. $(C)' = 0,\ C$ is a constant,
2. $(x)' = 1$,
3. $(x^2)' = 2x$,
4. $(x^n)' = nx^{n-1}$,
5. $(\ln x)' = \dfrac{1}{x}$,
6. $(\log_a x)' = \dfrac{1}{x \ln a}$,
7. $(\mathrm{e}^x)' = \mathrm{e}^x$,
8. $(\mathrm{a}^x)' = \mathrm{a}^x \ln \mathrm{a}$,
9. $(\sin x)' = \cos x$,
10. $(\cos x)' = -\sin x$,
11. $(\tan x)' = \sec^2 x$,
12. $(\cot x)' = -\csc^2 x$,
13. $(\sec x)' = \sec x \tan x$,
14. $(\csc x)' = -\csc x \cot x$,
15. $(\sin^{-1} x)' = \frac{1}{\sqrt{1-x^2}}$,
16. $(\cos^{-1} x)' = -\dfrac{1}{\sqrt{1-x^2}}$,
17. $(\tan^{-1} x)' = \dfrac{1}{1+x^2}$,
18. $(\cot^{-1} x)' = -\dfrac{1}{1+x^2}$,
19. $(\sec^{-1} x)' = \dfrac{1}{x\sqrt{x^2-1}}$,
20. $(\csc^{-1} x)' = -\dfrac{1}{x\sqrt{x^2-1}}$.

Differentiation formulas

Suppose c is a constant and both functions $f(x)$ and $g(x)$ are differentiable.

(a) $(cf(x))' = cf'(x)$,

(b) $(f(x) + g(x))' = f'(x) + g'(x)$,

(c) $(f(x) - g(x))' = f'(x) - g'(x)$,

(d) $(f(x)g(x))' = f'(x)g(x) + f(x)g'(x)$,

(e) $\left(\dfrac{f(x)}{g(x)}\right)' = \dfrac{f'(x)g(x) - f(x)g'(x)}{g^2(x)}$.

The Chain Rule

If the derivatives $g'(x)$ and $f'(g(x))$ both exist, and $F(x) = f(g(x))$, then $F'(x)$ exist and $F'(x) = f'(g(x))g'(x)$.