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- $\frac{\mathrm{d}}{\mathrm{d}x}(\ln x) = \frac{1}{x}$

Sum/difference and Constant multiple rules

If $f(x)$ and $g(x)$ are differentiable functions, then

- **Derivative of a sum or difference:**
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- **Derivative of a constant multiple:** $\frac{\mathrm{d}}{\mathrm{d}x}(cf(x)) = c \cdot f'(x)$, where c is a constant.

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- **Quotient Rule:** $\dfrac{\mathrm{d}}{\mathrm{d}x}\left(\dfrac{T}{B}\right) = \dfrac{B \cdot T' - T \cdot B'}{B^2}$

Higher derivatives: Notation

- **The second derivative:** $f''(x)$ or $\dfrac{\mathrm{d}^2}{\mathrm{d}x^2}(f(x))$ or $\dfrac{\mathrm{d}^2 f}{\mathrm{d}x^2}$ is the derivative of the (first) derivative of f

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- Instead we use $f^{(4)}(x)$ or $\dfrac{\mathrm{d}^4}{\mathrm{d}x^4}(f(x))$ or $\dfrac{\mathrm{d}^4 f}{\mathrm{d}x^4}$ for the fourth derivative, which is the derivative of the third derivative of f, and similarly for the fifth, sixth, etc. derivatives.