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# 1 Black Scholes Equation Check Solution Correctness

Cumulative normal distribution function, $\mathcal{N}(x) = \frac{1}{\sqrt{2\pi}} \int_x^{-\infty} e^{\frac{-y^2}{2}} dy$. $\mathcal{N}'(x) = \frac{1}{\sqrt{2\pi}} e^{\frac{-x^2}{2}}$.

$$\begin{aligned} d_2 &= d_1 - \sigma\sqrt{T-t} \\ \implies \frac{d_2^2}{2} &= \frac{d_1^2}{2} + \frac{\sigma^2(T-t)}{2} - d_1\sigma\sqrt{T-t} \\ S\mathcal{N}'(d_1) &= Ke^{-r(T-t)}\mathcal{N}'(d_2) \end{aligned}$$