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Proof without Words: Integration by Parts

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where  $A_0, \dots, A_{m_1-1}$  are arbitrary constants and the functions  $\phi_1, \{C_k\}_{k=0}^{m_1-1}$  and  $f_{m_1}$  are defined by the formulas

$$\phi_1(x) = \int_c^x \frac{b_1(t)}{a_1(t)} dt, C_0(x) = 1, f_{m_1}(x) = \frac{1}{(m_1-1)!} \int_c^x (x-t)^{m_1-1} \frac{f(t)}{a_1(t)} dt$$

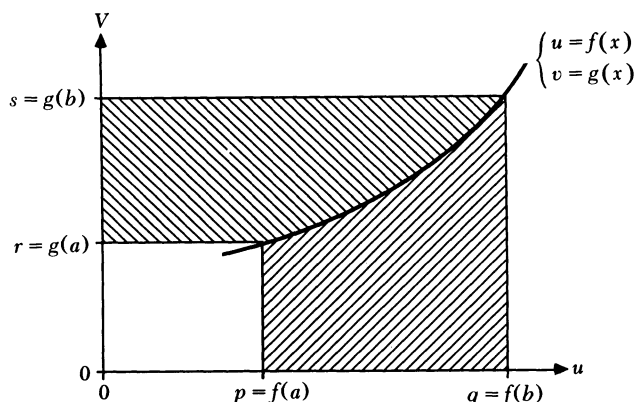
and for  $k \geq 1$ ,

$$C_k(x) = \frac{1}{(k-1)!} \int_c^x \frac{(x-t)^{k-1}}{a_1(t)} dt.$$

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## Proof without Words: Integration by Parts



$$\text{Area} \left( \begin{array}{|c|} \hline \text{Shaded} \\ \hline \end{array} \right) + \text{Area} \left( \begin{array}{|c|} \hline \text{Shaded} \\ \hline \end{array} \right) = qs - pr$$

$$\int_r^s u dv + \int_p^q v du = uv \Big|_{(p,r)}^{(q,s)}$$

$$\int_a^b f(x) g'(x) dx = f(x) g(x) \Big|_a^b - \int_a^b g(x) f'(x) dx$$

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