Calculus I
Derivative of reciprocal of linear polynomial

Todor Milev

2019

$$\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$$

Example

Compute the derivative. Use the quotient rule.

$$\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{1}{2x-1}\right)$$

Product rule

$$\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$$

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$$\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{1}{2x-1}\right) \;=\; \textbf{?} \qquad\qquad \text{Product rule}$$

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$$\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{1}{2x-1}\right) \quad = \quad \frac{(1)'(2x-1) - 1\cdot(2x-1)'}{(2x-1)^2} \quad \Big| \quad \text{Product rule}$$

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&= \frac{?\cdot(2x-1) - ?}{(2x-1)^2}
\end{aligned}$$

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&= \frac{0\cdot(2x-1) - 2}{(2x-1)^2}
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&= \frac{-2}{(2x-1)^2}
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