Calculus I
Miscellaneous derivatives involving logarithms, part 3

Todor Milev

2019

Example

Compute the given derivative.

$$\frac{\mathrm{d}}{\mathrm{d}x}\left(\ln \sqrt[3]{4x-1}\right)$$

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$$\frac{\mathrm{d}}{\mathrm{d}x}\left(\ln \sqrt[3]{4x-1}\right) \quad = \quad \frac{\mathrm{d}}{\mathrm{d}x}\left(\ln(4x-1)^{\frac{1}{3}}\right)$$

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Compute the given derivative.

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}x}\left(\ln\sqrt[3]{4x-1}\right) &= \frac{\mathrm{d}}{\mathrm{d}x}\left(\ln(4x-1)^{\frac{1}{3}}\right)\\ &= \frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{1}{3}\ln(4x-1)\right)\end{aligned}$$

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&= \frac{1}{3}\frac{\mathrm{d}}{\mathrm{d}x}\left(\ln(4x-1)\right) \\
&= \frac{1}{3}\textbf{?}
\end{aligned}$$

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&= \frac{1}{3}\frac{\mathrm{d}}{\mathrm{d}x}\left(\ln(4x-1)\right) \\
&= \frac{1}{3}\frac{(4x-1)'}{4x-1}
\end{aligned}$$

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