

LOG PROPERTIES

1. $\text{LOG } M + \text{LOG } N = \text{LOG } (MN)$

2. $\text{LOG } M - \text{LOG } N = \text{LOG } \frac{M}{N}$

3. $P \text{LOG } M = \text{LOG } M^P$

7. $\text{LN } \frac{x^2 y^3}{z^8}$

$$\text{LN } (x^2 y^3) - \text{LN } z^8$$

$$\text{LN } x^2 + \text{LN } y^3 - \text{LN } z^8$$

$$\textcircled{2 \text{LN } x + 3 \text{LN } y - 8 \text{LN } z}$$

8. $\text{LN } \sqrt[4]{\frac{x^2}{x-3}}$

$$\text{LN } \left(\frac{x^2}{x-3} \right)^{\frac{1}{4}}$$

$$\frac{1}{4} \text{LN } \left(\frac{x^2}{x-3} \right)$$

$$\frac{1}{4} \text{LN } x^2 - \frac{1}{4} \text{LN } (x-3)$$

$$\frac{2}{4} \text{LN } x - \frac{1}{4} \text{LN } (x-3)$$

$$\textcircled{\frac{1}{2} \text{LN } x - \frac{1}{4} \text{LN } (x-3)}$$

9. $\text{LN } \frac{4x(x-5)}{(x+1)^3}$

$$\text{LN } [4x(x-5)] - \text{LN } (x+1)^3$$

$$\textcircled{\text{LN } 4 + \text{LN } x + \text{LN } (x-5) - 3 \text{LN } (x+1)}$$

10. $\text{LN } (5x-1) - \text{LN } (7x+8)$

$$\textcircled{\text{LN } \frac{5x-1}{7x+8}}$$

11.

$$5 \text{LN } (x+3) - 2 \text{LN } (3x) + 4 \text{LN } (x-7)$$

$$\text{LN } (x+3)^5 - \text{LN } (3x)^2 + \text{LN } (x-7)^4$$

$$\text{LN } \frac{(x+3)^5}{(3x)^2} + \text{LN } (x-7)^4$$

$$\textcircled{\text{LN } \frac{(x+3)^5 (x-7)^4}{9x^2}}$$

12.

$$\frac{1}{3} [2 \text{LN } (x-1) + \text{LN } (x-7)] - 3 \text{LN } (x+8)$$

$$\frac{1}{3} [\text{LN } (x-1)^2 + \text{LN } (x-7)] - \text{LN } (x+8)^3$$

$$\frac{1}{3} \text{LN } [(x-1)^2 (x-7)] - \text{LN } (x+8)^3$$

$$\text{LN } [(x-1)^2 (x-7)]^{\frac{1}{3}} - \text{LN } (x+8)^3$$

$$\textcircled{\text{LN } \frac{\sqrt[3]{(x-1)^2 (x-7)}}{(x+8)^3}}$$