

ln and e^x Derivative Practice!

Date _____ Period _____

Differentiate each function with respect to x .

1) $y = \ln x^4$

2) $y = \ln 2x^4$

3) $y = e^{3x^3}$

4) $y = \ln 5x^5$

5) $y = \ln \left(\frac{4x^5}{x^2 + 2} \right)^4$

6) $y = \ln \left(\frac{2x^4}{3x^2 - 2} \right)^3$

$$7) y = e^{e^{3x^3}}$$

$$8) y = \sqrt[5]{\ln 2x^4}$$

$$9) y = e^{e^{4x^5}}$$

$$10) y = e^{(x^4 + 3)^5}$$

$$11) y = \ln(e^{4x^5} + 2)$$

$$12) y = e^{\cot 2x^3}$$

Answers to ln and e^x Derivative Practice! (ID: 1)

$$\begin{array}{llll}
 1) \frac{dy}{dx} = \frac{1}{x^4} \cdot 4x^3 & 2) \frac{dy}{dx} = \frac{1}{2x^4} \cdot 8x^3 & 3) \frac{dy}{dx} = e^{3x^3} \cdot 9x^2 & 4) \frac{dy}{dx} = \frac{1}{5x^5} \cdot 25x^4 \\
 = \frac{4}{x} & = \frac{4}{x} & & = \frac{5}{x} \\
 5) \frac{dy}{dx} = 4 \left(\frac{1}{4x^5} \cdot 20x^4 - \frac{1}{x^2+2} \cdot 2x \right) & 6) \frac{dy}{dx} = 3 \left(\frac{1}{2x^4} \cdot 8x^3 - \frac{1}{3x^2-2} \cdot 6x \right) \\
 = \frac{4(3x^2+10)}{x(x^2+2)} & = \frac{6(3x^2-4)}{x(3x^2-2)} \\
 7) \frac{dy}{dx} = e^{e^{3x^3}} \cdot e^{3x^3} \cdot 9x^2 & 8) \frac{dy}{dx} = \frac{1}{5} \cdot (\ln 2x^4)^{-\frac{4}{5}} \cdot \frac{1}{2x^4} \cdot 8x^3 \\
 = 9x^2 e^{e^{3x^3} + 3x^3} & = \frac{4}{5x \sqrt[5]{(\ln 2x^4)^4}} \\
 9) \frac{dy}{dx} = e^{e^{4x^5}} \cdot e^{4x^5} \cdot 20x^4 & 10) \frac{dy}{dx} = e^{(x^4+3)^5} \cdot 5(x^4+3)^4 \cdot 4x^3 \\
 = 20x^4 e^{e^{4x^5} + 4x^5} & = 20x^3 e^{(x^4+3)^5} \cdot (x^4+3)^4 \\
 11) \frac{dy}{dx} = \frac{1}{e^{4x^5} + 2} \cdot e^{4x^5} \cdot 20x^4 & 12) \frac{dy}{dx} = e^{\cot 2x^3} \cdot -\csc^2 2x^3 \cdot 6x^2 \\
 = \frac{20x^4 e^{4x^5}}{e^{4x^5} + 2} & = -6x^2 e^{\cot 2x^3} \cdot \csc^2 2x^3
 \end{array}$$