

Watch. Practice. Understand. | Lesson 287

Calculus Section 3.6 Derivatives of Logarithmic Functions

Watch the matching video: <https://www.youtube.com/watch?v=QsQEXpGRli8>

Practice focus: Logarithmic differentiation

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Differentiate $y = \ln(x^2 + 1)$.

02 Differentiate $y = \log \text{ base } 3 \text{ of } x$.

03 Differentiate $y = x^x$ for $x > 0$.

04 Differentiate $y = \ln|x|$ for $x \neq 0$.

Worked answers | Lesson 287

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Practice focus: Logarithmic differentiation

Original extra practice matched to the listed lesson topic.

01 Differentiate $y = \ln(x^2 + 1)$.

$$y' = 2x/(x^2 + 1).$$

02 Differentiate $y = \log \text{ base } 3 \text{ of } x$.

$$y' = 1/(x \ln 3), \text{ for } x > 0.$$

03 Differentiate $y = x^x$ for $x > 0$.

$$\ln y = x \ln x, \text{ so } y'/y = \ln x + 1. \text{ Thus } y' = x^x(\ln x + 1).$$

04 Differentiate $y = \ln|x|$ for $x \neq 0$.

$$y' = 1/x \text{ on both intervals } x < 0 \text{ and } x > 0.$$