

Differentiation & Logarithmic Practice

Let b be a positive real number. Recall the properties of logarithms:

$$\log_b(xy) = \log_b x + \log_b y \qquad \log_b \left(\frac{x}{y} \right) = \log_b x - \log_b y$$

$$\log_b(x^y) = y \log_b x$$

Note: you need to *know* these for quizzes and exams as they will not be provided for you!!!

1. Find $\frac{dy}{dx}$ for each of the following *and simplify*:

$$y = \ln [(4x - 3) \sin(x)]$$

$$y = \ln [4x - 3] + \ln [\sin(x)]$$

2. Use any method you like to find $\frac{dy}{dx}$.

$$y = \sqrt{\frac{(x-1)\tan(x)}{e^{2x}(x^4+1)}}$$

$$y = x^{\sqrt{3x+5}}$$

3. Let $y = (\sin x)^{\ln x}$. Find $\frac{dy}{dx}$.