

Section 1: Differentiating exponentials and logarithms

Exercise level 1

1. Differentiate each of the following.

(i) $y = e^{4x}$

(ii) $y = e^{-2x}$

(iii) $y = e^{\frac{1}{2}x}$

2. Show that the derivative of $\ln 2x$ is the same as the derivative of $\ln x$.
By expressing $\ln 2x$ in terms of $\ln x$ and $\ln 2$, explain why this is.

3. Differentiate each of the following.

(i) $y = \ln 3x$

(ii) $y = \ln 5x$

(iii) $y = \ln 2x$

4. Differentiate

(i) xe^{2x}

(ii) $\frac{e^{-x}}{2x+1}$

(iii) e^{2x-x^2}

5. Differentiate:

(i) $x^2 \ln x$

(ii) $\frac{\ln x}{1+x}$

(iii) $\ln(1+x^2)$