STEP/Differentiation Q2 (15/6/23)

Find $\frac{d}{dx}(a^x)$

Solution

Method 1

Let $a = e^b$. Then $\frac{d}{dx}(a^x) = \frac{d}{dx}(e^{bx}) = be^{bx} = lna.a^x$

Method 2

Let $y = a^x$. Then $lny = xlna$,

and, differentiating wrt x gives $\frac{1}{y}\frac{dy}{dx} = lna$, so that $\frac{dy}{dx} = lna.a^x$