3 The curve C has equation

$$9y^2 - 3\sinh^{-1}(xy) = 1 - 3\ln 3.$$

(a) Show that, at the point $(4, \frac{1}{3})$ on C, $\dfrac{\mathrm{d}y}{\mathrm{d}x} = -\dfrac{1}{2}$. [4]

(b) Find the value of $\dfrac{\mathrm{d}^2y}{\mathrm{d}x^2}$ at the point $(4, \frac{1}{3})$. [5]