

8. A curve C is defined in the largest real domain by the equation,

$$y = \log_x 3$$

The point P , where $x = 3$, lies on C .

The normal to C at P meets C again at the point Q .

- (a) Show that the x -coordinate of Q is a solution to the equation,

$$\ln 3 = \ln x (1 + x \ln 27 - 3 \ln 27)$$

(9)

- (b) Use an iterative formula of the form $x_{n+1} = e^{f(x_n)}$, with a suitable starting value, to find the coordinates of Q , correct to 3 decimal places.

(4)