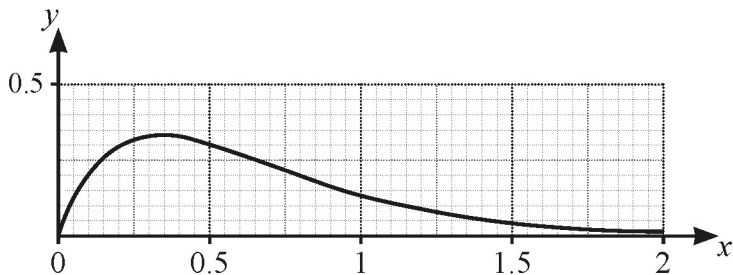


- 4 The diagram shows part of the graph of  $y = xe^{1-3x}$ .



- (a) Use the sign change method to determine, correct to **2** decimal places, the root of the equation  $xe^{1-3x} - 0.2 = 0$ , that lies between  $x = 0.5$  and  $x = 1$ . **[3]**
- (b) Determine the exact  $x$ -coordinate of the maximum point of the curve  $y = xe^{1-3x}$ . **[3]**
- (c) **In this question you must show detailed reasoning.**

Determine the exact area of the region enclosed by the curve  $y = xe^{1-3x}$ , the  $x$ -axis and the line  $x = 1$ . **[4]**