A curve has equation $e^{2x}y - e^{y} = 100$.

(a) Show that $\frac{dy}{dx} = \frac{2e^{2x}y}{e^{y} - e^{2x}}$. [3]

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(b) Show that the curve has no stationary points. [2]

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It is required to find the x-coordinate of P, the point on the curve at which the tangent is parallel to the y-axis.

(c) Show that the x-coordinate of P satisfies the equation

$$x = \ln 10 - \tfrac{1}{2}\ln(2x - 1).$$ [4]

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(d) Use an iterative formula, based on the equation in part **(c)**, to find the x-coordinate of P correct to 3 significant figures. Use an initial value of 2 and give the result of each iteration to 5 significant figures. [3]

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