



The diagram shows part of the curve $f(x) = \frac{e^x}{4x^2 - 1} + 2$. The equation $f(x) = 0$ has a positive root α close to $x = 0.3$.

- (a) Explain why using the sign change method with $x = 0$ and $x = 1$ will fail to locate α . [1]
- (b) Show that the equation $f(x) = 0$ can be written as $x = \frac{1}{4}\sqrt{(4 - 2e^x)}$. [2]
- (c) Use the iterative formula $x_{n+1} = \frac{1}{4}\sqrt{(4 - 2e^{x_n})}$ with a starting value of $x_1 = 0.3$ to find the value of α correct to 4 significant figures, showing the result of each iteration. [3]
- (d) An alternative iterative formula is $x_{n+1} = F(x_n)$, where $F(x_n) = \ln(2 - 8x_n^2)$.

By considering $F'(0.3)$ explain why this iterative formula will not find α . [3]