Very short answer questions

1. 2 marks  Let $f(x)$ be a function whose graph is given below. Assume that $f(x)$ is differentiable in its domain and make a sketch of the graph of $f'(x)$.

![Graph of a function](image)

2. 4 marks  Show that the equation $2 \log(x) = 2x^2 - 3$ has a solution.
Long answer questions - You must show your work

3. [4 marks] Using only the definition of the derivative, find \( f'(1) \), where \( f(x) = \sqrt{3x + 1} \) and write the line equation of the tangent to \( f(x) \) at \( x = 1 \). **Fully simplify your answer!**

Answer: