

Question 1**(9 marks)**

(a) Differentiate $\frac{3x+1}{x^3}$ and simplify your answer.

(3 marks)

(b) Let $f'(x) = x \ln(2x)$. Determine a simplified expression for the rate of change of $f'(x)$.
(3 marks)

(c) Given that $g'(x) = 4e^{2x}$ and $g(1) = 0$, determine $g(5)$.

(3 marks)