1. Given that $y = \ln(5 + 3x)$

(a) determine, in simplest form, $\dfrac{\mathrm{d}^3y}{\mathrm{d}x^3}$

(3)

(b) Hence determine the Maclaurin series expansion of $\ln(5 + 3x)$, in ascending powers of x up to and including the term in x^3, giving each coefficient in simplest form.

(2)

(c) Hence write down the Maclaurin series expansion of $\ln(5 - 3x)$, in ascending powers of x up to and including the term in x^3, giving each coefficient in simplest form.

(1)

(d) Use the answers to parts (b) and (c) to determine the first 2 non-zero terms, in ascending powers of x, of the Maclaurin series expansion of

$$\ln\left(\frac{5 + 3x}{5 - 3x}\right)$$

(2)

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