

- 7 (a) Expand $\left(1 + \frac{x}{3}\right)^{-3}$ in ascending powers of x up to and including the term in x^3

Where appropriate express each coefficient as an exact fraction in its lowest terms.

(3)

- (b) Write down the range of values of x for which your expression is valid.

(1)

- (c) Express $(3 + x)^{-3}$ in the form $P(1 + Qx)^{-3}$ where P and Q are rational numbers whose values should be stated.

(2)

$$f(x) = \frac{(1 + 4x)}{(3 + x)^3}$$

- (d) Obtain a series expansion for $f(x)$ in ascending powers of x up to and including the term in x^2

(2)

- (e) Hence, using algebraic integration, obtain an estimate of $\int_0^{0.2} f(x) dx$

Give your answer to 5 significant figures.

(3)

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Question 7 continued

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(Total for Question 7 is 11 marks)

