8 (a) (i) Expand $\left(1+\frac{x}{2}\right)^{-3}$ in ascending powers of x up to and including the term in x^3, expressing each coefficient as an exact fraction in its lowest terms.

(ii) Find the range of values for which your expression is valid.

(4)

(b) Express $(2 + x)^{-3}$ in the form $A(1 + Bx)^{-3}$ where A and B are rational numbers whose values should be stated.

(2)

$$f(x) = \frac{(1+4x)}{(2+x)^3}$$

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

(2)

(d) Hence obtain an estimate, to 3 significant figures, of $\int_0^{0.2} \frac{(1+4x)}{(2+x)^3}\,dx$

(3)

Question 8 continued

Question 8 continued

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Question 8 continued

(Total for Question 8 is 11 marks)