2 The continuous random variable H has cumulative distribution function given by

$$\mathrm{F}(h) = \begin{cases} 0 & h \leqslant 0 \\ \dfrac{h^2}{48} & 0 < h \leqslant 4 \\ \dfrac{h}{6} - \dfrac{1}{3} & 4 < h \leqslant 5 \\ \dfrac{3}{10}h - \dfrac{h^2}{75} - \dfrac{2}{3} & 5 < h \leqslant d \\ 1 & h > d \end{cases}$$

where d is a constant.

(a) Show that $2d^2 - 45d + 250 = 0$

(2)

(b) Find $\mathrm{P}(H < 1.5 \mid 1 < H < 4.5)$

(4)

(c) Find the probability density function $\mathrm{f}(h)$
You may leave the limits of h in terms of d where necessary.

(3)

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Question 2 continued

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Question 2 continued

(Total for Question 2 is 9 marks)