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4 The continuous random variable X has a probability density function given by

$$f(x) = \begin{cases} \frac{1}{2}k(x-1) & 1 \leqslant x \leqslant 3 \\ k & 3 < x \leqslant 6 \\ \frac{1}{4}k(10-x) & 6 < x \leqslant 10 \\ 0 & \text{otherwise} \end{cases}$$

where k is a positive constant.

(a) Sketch $f(x)$ for all values of x

(2)

(b) Show that $k = \frac{1}{6}$

(2)

(c) Specify fully the cumulative distribution function $F(x)$ of X

(7)

Given that $E(X) = \frac{61}{12}$

(d) find $P(X > E(X))$

(2)

(e) Describe the skewness of the distribution, giving a reason for your answer.

(2)

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Question 4 continued

(Total 15 marks)

Q4