6 In this question solutions relying entirely on calculator technology are not acceptable.

The continuous random variable X has the following probability density function

$$f(x) = \begin{cases} a + bx & -1 \leqslant x \leqslant 3 \\ 0 & \text{otherwise} \end{cases}$$

where a and b are constants.

(a) Show that $4a + 4b = 1$

(3)

Given that $E(X^2) = \frac{17}{5}$

(b) (i) find an equation in terms of a only

(5)

(ii) hence show that $b = 0.1$

(2)

(c) Sketch the probability density function $f(x)$ of X

(2)

(d) Find the value of k for which $P(X \geqslant k) = 0.8$

(4)

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Question 6 continued

Question 6 continued

(Total for Question 6 is 16 marks)

TOTAL FOR PAPER IS 75 MARKS

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