

- 7 The time, in minutes, taken by students to complete a test is modelled by the random variable X with probability density function

$$f(x) = \begin{cases} -\frac{3}{4}(x-3)(x-5) & 3 \leq x \leq 5, \\ 0 & \text{otherwise.} \end{cases}$$

- (a) Find the probability that a randomly chosen student takes longer than 4.5 minutes to complete the test. [4]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. At the bottom center, there is a small circle containing the number 1.

- (b) Write down the median of X . [1]

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- (c) Without performing an integration, use your answer to part (a) to find $P(3.5 < X < 4.5)$. [2]

[illegible]

Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

5 A random variable X has probability density function given by

$$f(x) = \begin{cases} k(2x^2 - x^3) & 0 \leq x \leq 2, \\ 0 & \text{otherwise.} \end{cases}$$

(a) Show that $k = \frac{3}{4}$.

[3]

This image shows a full page of primary-ruled paper. It features multiple sets of horizontal lines designed to guide handwriting. Each set consists of three lines: a solid top line, a dashed middle line, and a solid bottom line. These sets are repeated down the entire page, providing ample space for practicing letter formation and alignment. The paper is otherwise blank, with no margins or additional markings.

7 X is a random variable with probability density function given by

[1]

$$f(x) = \begin{cases} (1 + \cos \pi x) & 0 \leq x \leq 1, \\ 0 & \text{otherwise.} \end{cases}$$

[3]

[5]

Additional page

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