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5. The continuous random variable X is uniformly distributed over the interval $[a, b]$ where $0 < a < b$

Given that $P(X < b - 2a) = \frac{1}{3}$

(a) (i) show that $E(X) = \frac{5a}{2}$

(3)

(ii) find $P(X > b - 4a)$

(1)

The continuous random variable Y is uniformly distributed over the interval $[3, c]$ where $c > 3$

Given that $\text{Var}(Y) = 3c - 9$, find

(b) (i) the value of c

(3)

(ii) $P(2Y - 7 < 20 - Y)$

(3)

(iii) $E(Y^2)$

(3)

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Question 5 continued

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