AQA – Continuous random variables – AS Further Mathematics Statistics

1. June/2020/Paper_2/No.3

   The random variable X represents the value on the upper face of an eight-sided dice after it has been rolled. The faces are numbered 1 to 8

   The random variable X is modelled by a discrete uniform distribution with $n = 8$

   (a) Find E(X)

   [1 mark]

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   (b) Find Var(X)

   [1 mark]

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   (c) Find P$(X \geq 6)$

   [1 mark]

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(d)   The dice was rolled 800 times and the results below were obtained.

x	1	2	3	4	5	6	7	8
Frequency	103	63	84	110	74	41	85	240

State, with a reason, how you would refine the model for the random variable X.

[2 marks]

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2. June/2020/Paper_2/No.6

The continuous random variable X has probability density function

$$f(x) = \begin{cases} \dfrac{4}{45}(x^3 - 10x^2 + 29x - 20) & 1 \leq x \leq 4 \\ 0 & \text{otherwise} \end{cases}$$

(a) Find $P(X < 2)$

[2 marks]

(b) Verify that the median of X is 2.3, correct to two significant figures.

[4 marks]

(c)   Find the mean of X.

[2 marks]

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3. June/2019/Paper_2/No.4

The continuous random variable X has probability density function

$$f(x) = \begin{cases} \frac{4}{99}(12x - x^2 - x^3) & 0 \leq x \leq 3 \\ 0 & \text{otherwise} \end{cases}$$

(a)   Find $P(X > 1)$

[3 marks]

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(b) Show that $E(X^{-1}) = \dfrac{10}{11}$

[3 marks]

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(c) Find $E(2X^{-1} - 3)$

[2 marks]

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