AQA – Discrete random variable and expectation – A2 Further Mathematics Statistics

1.   June/2020/Paper_3/No.4

The discrete random variable X follows a discrete uniform distribution and takes values 1, 2, 3, ..., n.

The discrete random variable Y is defined by $Y = 2X$

(a)   Using the standard results for $\sum n$, $\sum n^2$ and $\text{Var}(aX + b)$, prove that

$$\text{Var}(Y) = \frac{n^2 - 1}{3}$$

[7 marks]

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(b)   A spinning toy can land on one of four values: 2, 4, 6 or 8

Using a discrete uniform distribution, find the probability that the next value the toy lands on is greater than 2

[1 mark]

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(c)   State an assumption that is required for the discrete uniform distribution used in part **(b)** to be valid.

[1 mark]

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2.   June/2019/Paper_3/No.1

The discrete random variable X has $\text{Var}(X) = 5$

Find $\text{Var}(4X - 3)$

Circle your answer.

[1 mark]

17   20   77   80