Binomial distribution – 2023 AS Mathematics 9709

1. March/2023/Paper_9709/52/No.2

Alisha has four coins. One of these coins is biased so that the probability of obtaining a head is 0.6. The other three coins are fair. Alisha throws the four coins at the same time. The random variable X denotes the number of heads obtained.

(a) Show that the probability of obtaining exactly one head is 0.225. [3]

(b) Complete the following probability distribution table for X. [2]

x	0	1	2	3	4
$P(X = x)$	0.05	0.225			0.075

(c) Given that $E(X) = 2.1$, find the value of $Var(X)$. [2]

2. March/2023/Paper_9709/52/No.3

80% of the residents of Kinwawa are in favour of a leisure centre being built in the town.

20 residents of Kinwawa are chosen at random and asked, in turn, whether they are in favour of the leisure centre.

(a) Find the probability that more than 17 of these residents are in favour of the leisure centre. [3]

(b) Find the probability that the 5th person asked is the first person who is **not** in favour of the leisure centre. [1]

(c) Find the probability that the 7th person asked is the second person who is **not** in favour of the leisure centre. [2]