

Self-assessment: 23 Discrete probability distributions

1. The random variable X has distribution shown in the table below:

x	1	3	4	6	7
$P(X = x)$	p	$\frac{1}{5}$	$\frac{1}{10}$	$2p$	$\frac{2}{5}$

- Find the value of p .
- Find $P(X \geq 4)$.
- Find the expected value of X .

(accessible to students on the path to grade 3 or 4) [8 marks]

2. Random variable X follows binomial distribution $B(6, p)$ and $P(X = 4) = 0.261$.

- Find the possible values of p .
- For the maximum value from (a), find $P(X \leq 2)$.
- For the maximum value from (a), find $E(X)$ and $\text{Var}(X)$.

(accessible to students on the path to grade 5 or 6) [8 marks]

3. Natasha receives postcards at a constant mean rate of 5 per week. The postcards arrive independently of each other.

- Find the probability that she receives 3 postcards in a particular week.
- Find the standard deviation of the number of postcards received per week.
- Find the probability that she receives fewer than 15 postcards in a four-week period.

(accessible to students on the path to grade 3 or 4)

- What is the probability that she receives more than 5 postcards in both of two consecutive weeks?
 - Find the probability that she receives more than 5 postcards in four out of eight consecutive weeks.

(accessible to students on the path to grade 5 or 6)

[14 marks]