

Past-paper walk-through

Probability ■ 5.3

eXercise

Questions in this set

- 9709/51 N25 Q2 ■ 4 marks
- 9709/51 N25 Q4 ■ 5 marks
- 9709/52 N25 Q4 ■ 7 marks

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 2

9709/51 N25 ■ Q2 ■ 4 marks

A fair six-sided dice with faces labelled 1, 2, 3, 4, 5, 6 is thrown repeatedly until a 6 is obtained.

- (a) Find the probability that a 6 is obtained for the first time on the 8th throw. **[1]**
- (b) Find the probability that a 6 is obtained for the third time on the 7th throw. **[3]**

Solution 2

(a)

Mark scheme

- $\left(\frac{5}{6}\right)^7 \left(\frac{1}{6}\right) = 0.0465.$

Solution 2

(b)

Mark scheme

- $\binom{6}{2} \left(\frac{1}{6}\right)^2 \left(\frac{5}{6}\right)^4 \times \frac{1}{6} = \binom{6}{2} \left(\frac{5}{6}\right)^4 \left(\frac{1}{6}\right)^3 = 0.0335.$

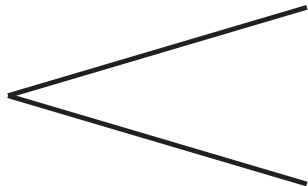
Question 4

9709/51 N25 ■ Q4 ■ 5 marks

Bag A contains 8 red marbles and 3 blue marbles.
Bag B contains 4 red marbles and 1 blue marble. A marble is chosen at random from bag A ; if red it is discarded, if blue it is placed in bag B . A marble is then chosen at random from bag B ; if red it is discarded, if blue it is placed in bag A . A marble is now chosen at random from bag A .

(a) Complete the tree diagram by entering all the remaining outcomes and probabilities. [3]

(b) Find the probability that all three marbles chosen are the same colour. [2]



Solution 4

(a) Mark scheme

- Bag B after a red: $R \frac{4}{5}$, $B \frac{1}{5}$. Final bag A draws — $R,R: \frac{7}{10}/\frac{3}{10}$; $R,B: \frac{7}{11}/\frac{4}{11}$; $B,R: \frac{8}{10}/\frac{2}{10}$; $B,B: \frac{8}{11}/\frac{3}{11}$.

Solution 4

(b) Mark scheme

$$\blacksquare P(RRR) + P(BBB) = \frac{8}{11} \cdot \frac{4}{5} \cdot \frac{7}{10} + \frac{3}{11} \cdot \frac{2}{6} \cdot \frac{3}{11} = \frac{224}{550} + \frac{18}{726} = \frac{1307}{3025} = 0.432.$$

Question 4

9709/52 N25 ■ Q4 ■ 7 marks

Gio has a pack of 18 cards and Ivy has a pack of x cards. Each card shows a bus, a car or a train. Gio's pack: bus 6, car 10, train 2. Ivy's pack: bus $x - 12$, car 9, train 3.

One card is chosen at random from each pack. The probability that the two cards both show buses is equal to twice the probability that they both show cars.

(a) Write down an equation in terms of x and hence find the value of x . **[4]**

(b) Find the probability that the two cards have pictures of the same type of vehicle on them. **[3]**

Question 4

	Bus	Car	Train
Gio's pack	6	10	2
Ivy's pack	$x - 12$	9	3

Solution 4

(a)

Mark scheme

$$\blacksquare \quad \frac{6}{18} \cdot \frac{x-12}{x} = 2 \cdot \frac{10}{18} \cdot \frac{9}{x} \Rightarrow 6(x-12) = 180 \Rightarrow x = 42.$$

Solution 4

(b) Mark scheme

■ With $x = 42$: $P(\text{same}) = \frac{6}{18} \cdot \frac{30}{42} + \frac{10}{18} \cdot \frac{9}{42} + \frac{2}{18} \cdot \frac{3}{42} = \frac{23}{63} \approx 0.365$.