Exercise walk-through

Introduction to probability ▪ E8.1

eXercise

You must be able to

- find a probability and use $\mathrm{P}(A') = 1 - \mathrm{P}(A)$
- find an expected frequency
- use a tree diagram for combined events (with and without replacement)

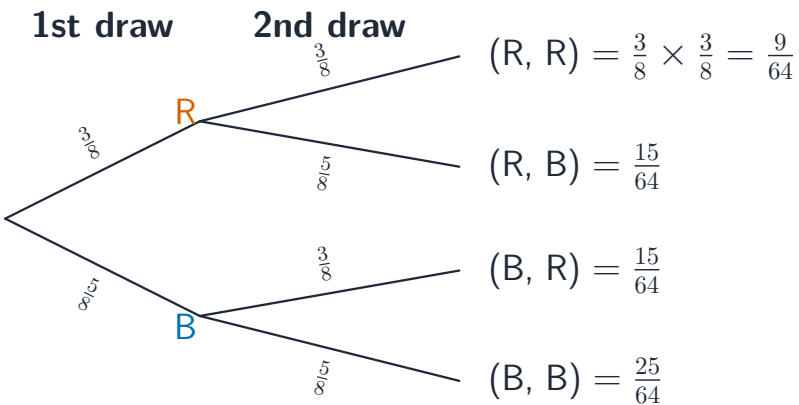
Method — Probability and tree diagrams

$$\mathrm{P}(\text{event}) = \frac{\text{favourable}}{\text{total}} \qquad \mathrm{P}(A') = 1 - \mathrm{P}(A) \qquad \text{expected} = \mathrm{P} \times n$$

- **Worked (bag: 3 red, 5 blue):** $\mathrm{P}(\text{not red}) = 1 - \frac{3}{8} = \frac{5}{8}$.
- **Tree (with replacement):** $\mathrm{P}(\text{red, red}) = \frac{3}{8} \times \frac{3}{8} = \frac{9}{64}$.

Answer shapes: M1 a correct method, **A1** the correct answer.

Method — Probability and tree diagrams



Multiply along the branches; the outcomes add to 1

Method — Probability and tree diagrams

	die 2					
+	**1**	**2**	**3**	**4**	**5**	**6**
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

die 1

the six highlighted cells all give a total of 7

A sample space lists all equally likely outcomes

Practice 2.1 ▪ 1 mark

A bag has 4 red and 6 green counters. Find the probability of drawing a red.

Solution 2.1

Worked steps

$\frac{4}{10} = \frac{2}{5}$ B1.

Practice 2.2 ▪ 1 mark

The probability of rain is 0.3. Find the probability of no rain.

Solution 2.2

Worked steps

$1 - 0.3 = 0.7$ B1.

Practice 2.3 ▪ 2 marks

The probability of a six is $\frac{1}{6}$. Find the expected number of sixes in 240 rolls.

Solution 2.3

Method: Probability and tree diagrams

Worked steps

$\frac{1}{6} \times 240 = 40$ **M1** **A1** *for* $\frac{1}{6} \times 240$*; for* 40.

Exam-style 3.1 ▪ 3 marks

A bag has 3 red and 5 blue counters. Two are drawn **without replacement**. Find the probability that both are red.

Solution 3.1

Method: Probability and tree diagrams

Worked steps

first red $\frac{3}{8}$; after a red is taken, 2 reds out of 7 remain $\rightarrow \frac{2}{7}$. P(red, red) $= \frac{3}{8} \times \frac{2}{7} = \frac{6}{56} = \frac{3}{28}$ **M1** **M1** **A1** *for* $\frac{3}{8} \times \frac{2}{7}$*; for the without-replacement* $\frac{2}{7}$*; for* $\frac{3}{28}$.

Exam-style 3.2 ▪ 2 marks

The probability that a train is late is 0.15. On 200 days, find the expected number of late days.

Solution 3.2

Method: Probability and tree diagrams

Worked steps

$0.15 \times 200 = 30$ days M1 A1 *for* 0.15×200*; for* 30.