

WA7MPSP1

Probability and statistics

Core + Challenge

Sample Spaces and Probability — Marking Key

I can list the sample space for a single-stage chance experiment and assign probabilities as fractions, decimals and percentages.

For tutors and parents. Award method marks for correct working even if the final answer is wrong.

Marks summary

Section A Fluency: 16 Section B Core: 21 Section C Reasoning: 9 Section D Challenge: 9 **Total: 55**

Fluency: 1 mark each; accept an equivalent unsimplified answer for half credit at tutor's discretion.

A Fluency *answers and working*

/ 16 marks

Q	Answer	Working
1	$\frac{1}{6}$	favourable ÷ total
2	$\frac{1}{2}$	favourable ÷ total
3	$\frac{1}{3}$	favourable ÷ total
4	0	favourable ÷ total
5	1	favourable ÷ total
6	$\frac{1}{2}$	favourable ÷ total
7	$\frac{3}{8}$	favourable ÷ total
8	$\frac{5}{8}$	favourable ÷ total
9	$\frac{3}{10}$	favourable ÷ total
10	$\frac{4}{5}$	favourable ÷ total
11	$\frac{4}{5}$	favourable ÷ total
12	$\frac{2}{11}$	favourable ÷ total
13	$\frac{4}{11}$	favourable ÷ total
14	$\frac{1}{5}$	favourable ÷ total
15	6	1, 2, 3, 4, 5, 6
16	heads, tails	two outcomes

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B

Core *answers, working and marks*

/ 21 marks

Q	Answer	Working / sample response	Marks
1	(a) {1, 2, 3, 4, 5} (b) $\frac{3}{5} = 0.6 = 60\%$	Odd: 1, 3, 5 1 mark: sample space 1 mark: $\frac{3}{5}$ 1 mark: 0.6 and 60%	3
2	4	$\frac{1}{3} \times 12$ 1 mark: working 1 mark: 4	2
3	$\frac{3}{7}$	$\frac{12}{28} = \frac{3}{7}$ 1 mark: $\frac{12}{28}$ 1 mark: $\frac{3}{7}$	2
4	(a) impossible (b) even chance (c) likely	$P = 0, \frac{1}{2}, \frac{5}{6}$ 2 marks: all three (1 mark for two)	2
5	2	$\frac{1}{4} \times 8 = 2$ 1 mark: working 1 mark: 2	2
6	$\frac{1}{100} = 1\%$	$\frac{5}{500}$ 1 mark each	2
7	$\frac{1}{3}$	Primes: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29 $\rightarrow \frac{10}{30}$ 1 mark: 10 primes 1 mark: $\frac{1}{3}$	2
8	$\frac{3}{5}$	Blue = $\frac{3}{5}$ of the marbles (12 of 20) 1 mark: 12 1 mark: $\frac{3}{5}$	2
9	0.65	$1 - 0.35$ 1 mark: complement 1 mark: 0.65	2
10	$\frac{2}{7}$	Tuesday, Thursday 1 mark: both days 1 mark: $\frac{2}{7}$	2

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C Reasoning *sample answers and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	Favourable $\leq$ total	The number of favourable outcomes can't be more than the total number of outcomes; 1 means certain. <i>2 marks</i>	2
2	No	Each toss is independent; P(tails) is still $\frac{1}{2}$. <i>1 mark: no</i> <i>1 mark: reason</i>	2
3	Yes	$\frac{1}{6}$ describes the long run; short runs vary. <i>1 mark: yes</i> <i>1 mark: reason</i>	2
4	$P(\text{red}) = \frac{3}{4}$	The outcomes are not equally likely; probability depends on the size of each sector, not the number of colours. <i>1 mark: not equally likely</i> <i>1 mark: explanation</i> <i>1 mark: $\frac{3}{4}$</i>	3

D Challenge *solutions and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	15 (6 red, 9 blue)	Red : blue = 2 : 3. Try 6 red, 9 blue: $\frac{6}{15} = \frac{2}{5}$; add 3 red: $\frac{9}{18} = \frac{1}{2} \checkmark$ <i>1 mark: 2 : 3</i> <i>1 mark: trial or equation</i> <i>1 mark: 15</i>	3
2	$\frac{1}{10}$	1, 4, 9, ..., 100 $\rightarrow$ 10 numbers <i>1 mark: 10</i> <i>1 mark: $\frac{1}{10}$</i>	2
3	A: 3 sectors, B: 2, C: 1	$\frac{1}{2} \times 6 = 3$, $\frac{1}{3} \times 6 = 2$, $\frac{1}{6} \times 6 = 1$ <i>2 marks</i>	2
4	34	$0.15 \times 40 = 6$ green; $40 - 6$ <i>1 mark: 6</i> <i>1 mark: 34</i>	2