

WA6MPSP1

Probability

Core + Challenge

Chance from 0 to 1 — Marking Key

I can place chance events and chance words on a probability scale from 0 to 1.

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

Marks summary

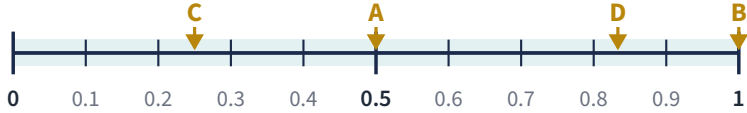
A Warm up: 16 B Practise: 23 C Think it through: 10 D Challenge: 9 **Total: 58**

Gold shading in this key shows what the child should have shaded or drawn. Accept any correct arrangement unless the question fixes it.

A

Warm up answers

/ 16 marks

Q	Answer	Model answer / notes	Marks
1	$\frac{1}{4}$	1 of the 4 equal parts are shaded: $\frac{1}{4}$.	1
2	$\frac{1}{2}$ (or $\frac{1}{2}$)	3 of the 6 equal parts are shaded: $\frac{3}{6}$. Accept $\frac{3}{6}$, $\frac{1}{2}$ or 0.5.	1
3	$\frac{3}{4}$ (or $\frac{3}{4}$)	6 of the 8 equal parts are shaded: $\frac{6}{8}$. Accept $\frac{6}{8}$, $\frac{3}{4}$ or 0.75.	1
4	$\frac{7}{10}$	7 of the 10 equal parts are shaded: $\frac{7}{10}$.	1
5	$\frac{3}{4}$	3 red out of 4 counters: $\frac{3}{4}$.	1
6	$\frac{1}{5}$	2 red out of 10 counters: $\frac{2}{10} = \frac{1}{5}$.	1
7	$\frac{1}{2}$	5 red out of 10 counters: $\frac{5}{10} = \frac{1}{2}$.	1
8	0	0 red out of 6 counters: $\frac{0}{6}$. No red counters, so it is impossible.	1
9	A at $\frac{1}{2} = 0.5$	 3 of the 6 numbers are even: $\frac{3}{6} = \frac{1}{2}$. Accept 0.45 to 0.55.	1
10	B at 1 = 1	Every counter is green, so it is certain: 1.	1
11	C at $\frac{1}{4} = 0.25$	1 of 4 equal parts: $\frac{1}{4} = 0.25$. Accept 0.2 to 0.3.	1
12	D at $\frac{5}{6} \approx 0.83$	5 of the 6 numbers are bigger than 1: $\frac{5}{6} \approx 0.83$. Accept between 0.8 and 0.9 (likely, close to certain).	1

Chance from 0 to 1 · WA6MPSP1

Q	Answer	Model answer / notes	Marks
13	Likely	4 of the 6 numbers (1, 2, 3, 4) are less than 5: $\frac{4}{6}$, more than $\frac{1}{2}$.	1
14	Even chance	Heads and tails are equally likely: $\frac{1}{2}$.	1
15	Certain	Monday, Tuesday, ... Sunday all end in "day": 7 out of 7 = 1.	1
16	Unlikely	Only 1 of the 6 numbers: $\frac{1}{6}$, less than $\frac{1}{2}$.	1

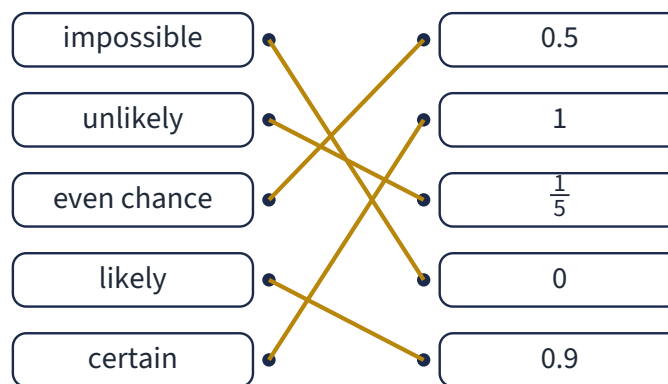
B

Practise *answers and working*

/ 23 marks

Q	Answer	Working / sample response	Marks
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1 See lines



2

impossible $\rightarrow$ 0, unlikely $\rightarrow \frac{1}{5}$, even chance $\rightarrow$ 0.5, likely $\rightarrow$ 0.9, certain $\rightarrow$ 1.

2 marks: all five correct. 1 mark: three or four correct.

2 See table

Event	Probability	Word
Student	$\frac{4}{10}$	unlikely
Senior	$\frac{1}{10}$	unlikely
Not senior	$\frac{9}{10}$	likely

3

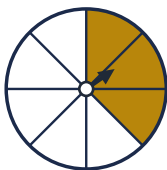
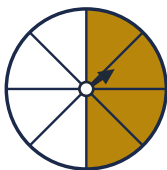
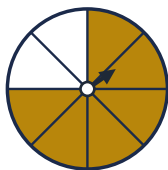
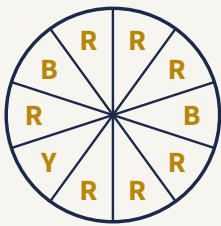
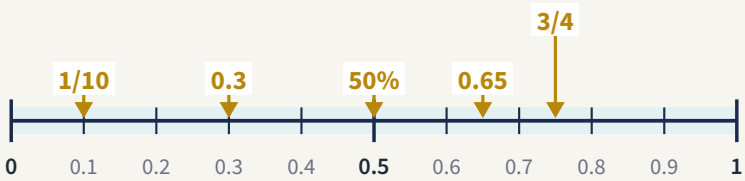
a) Student: $\frac{4}{10} = \frac{2}{5}$, unlikely.

b) Senior: $\frac{1}{10}$, unlikely (very unlikely).

c) Not senior: 9 of 10 cards, $\frac{9}{10}$, likely.

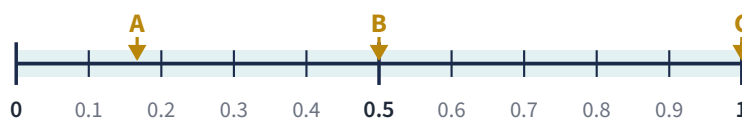
1 mark for each row (fraction and word). Accept "very unlikely" for b) and "very likely" for c).

Chance from 0 to 1 · WA6MPSP1

Q	Answer	Working / sample response	Marks
3	a) 3 parts b) 4 parts c) 6 parts	a)  b)  c)  Each spinner has 8 equal parts. a) $\frac{3}{8} \rightarrow 3$ parts. b) $0.5 = \frac{4}{8} \rightarrow 4$ parts. c) $0.75 = \frac{3}{4} = \frac{6}{8} \rightarrow 6$ parts. <i>1 mark for each spinner. Any parts may be shaded.</i>	3
4	7 R, 2 B, 1 Y (or 6 R, 3 B, 1 Y)	 Yellow $0.1 = \frac{1}{10}$: exactly 1 part is Y. Blue must be more than 1 part but less than half (5): so 2, 3 or 4 parts. Red must be more than half (6 or more). With 9 parts left for R and B: 7 R + 2 B, or 6 R + 3 B. Probability of red = $\frac{7}{10}$ (or $\frac{6}{10}$). <i>1 mark: exactly one Y.</i> <i>1 mark: all 10 parts labelled with 6 or 7 R and the rest B.</i> <i>1 mark: probability of red that matches their spinner.</i>	3
5	a) $\frac{10}{20} = 0.5$ b) $\frac{4}{20} = 0.2$	a) 10 of 20: $\frac{10}{20} = \frac{1}{2} = 0.5$. b) 4 of 20: $\frac{4}{20} = \frac{1}{5} = 0.2$. c) L at 0.5, P at 0.2. <i>1 mark: a) fraction and decimal.</i> <i>1 mark: b) fraction and decimal.</i> <i>1 mark: both marked correctly.</i>	3
6	$\frac{1}{10}$, 0.3, 50%, 0.65, $\frac{3}{4}$	 As decimals: 0.3, 0.75, 0.5, 0.1, 0.65. Order: $\frac{1}{10}$, 0.3, 50%, 0.65, $\frac{3}{4}$. <i>1 mark: all five marked in the right places.</i> <i>1 mark: correct order.</i>	2

Chance from 0 to 1 · WA6MPSP1

Q	Answer	Working / sample response	Marks
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7 A $\frac{1}{6}$ B $\frac{1}{2}$ C 1

A: one number out of six: $\frac{1}{6} \approx 0.17$.

B: 1, 3 and 5 are odd: $\frac{3}{6} = \frac{1}{2}$.

C: every number is less than 7: $\frac{6}{6} = 1$ (certain).

1 mark: all three fractions correct.

1 mark: A marked between 0.1 and 0.2 and B at 0.5.

1 mark: C at 1.

3

8 R $\frac{1}{2}$, B $\frac{1}{4}$, Y $\frac{1}{8}$, G $\frac{1}{8}$

Red is half the circle: $\frac{1}{2}$. Blue is a quarter: $\frac{1}{4}$.

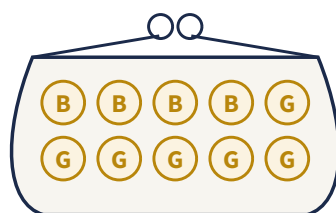
Yellow and green are each half of a quarter: $\frac{1}{8}$.

b) Red. c) Yellow and green.

1 mark: all four probabilities.

1 mark: red, and yellow with green.

2



9 4 B, 6 G; $\frac{6}{10} = \frac{3}{5}$

$\frac{2}{5} = \frac{4}{10}$, so 4 blue counters.

No red counters. $10 - 4 = 6$ green: probability $\frac{6}{10} = \frac{3}{5}$ (likely).

1 mark: 4 B and 6 G drawn (no R).

1 mark: $\frac{6}{10}$ or $\frac{3}{5}$ or 0.6.

2

C

Think it through sample answers and criteria

/ 10 marks

Q	Answer	Working / sample response	Marks
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1 False

The coin has no memory. Each toss is new.

Heads and tails are still equally likely: $\frac{1}{2}$ each.

1 mark: False.

1 mark: explains that every toss still has a $\frac{1}{2}$ chance of heads.

2

2 Sometimes

True for a coin: heads $\frac{1}{2}$, tails $\frac{1}{2}$.

Not true for a bag of 3 red and 1 blue counter: red $\frac{3}{4}$, blue $\frac{1}{4}$. So only sometimes.

1 mark: Sometimes.

1 mark: one example where it is true and one where it is not.

2

Chance from 0 to 1 · WA6MPSP1

Q	Answer	Working / sample response	Marks
3	D	A: $\frac{1}{4}$. B: $\frac{2}{8} = \frac{1}{4}$. C: $\frac{3}{12} = \frac{1}{4}$. D: $\frac{2}{10} = \frac{1}{5}$. D is the only one where shaded is not $\frac{1}{4}$. 1 mark: D. 1 mark: shows A, B and C are all $\frac{1}{4}$ and D is $\frac{1}{5}$. Accept another choice only with a correct reason.	2
4	Same chance: $\frac{2}{5} = \frac{4}{10}$	Different: Bag B has twice as many counters of each colour. Same: the probability of red is $\frac{2}{5}$ in A and $\frac{4}{10} = \frac{2}{5}$ in B. So Mia is wrong; the chances are equal. 1 mark: different: Bag B has more counters (twice as many of each colour). 1 mark: same: both probabilities are $\frac{2}{5}$ ($\frac{4}{10} = \frac{2}{5}$), so Mia is wrong.	2
5	No: red is $\frac{1}{2}$	The three colours are not equally likely because the parts are not the same size. Red covers half of the spinner, so its probability is $\frac{1}{2}$. Blue and yellow are $\frac{1}{4}$ each. 1 mark: disagrees. 1 mark: explains the parts are not equal and red is $\frac{1}{2}$.	2

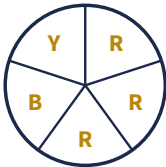
D

Challenge solutions and criteria

/ 9 marks

Q	Answer	Working / sample response	Marks
1	a) 7 or 8 b) $\frac{7}{12}, \frac{2}{3}$ c) No, it equals $\frac{3}{4}$	Likely means more than $\frac{6}{12}$. Less than $\frac{3}{4}$ means less than $\frac{9}{12}$. So 7 or 8 red. b) $\frac{7}{12}$ and $\frac{8}{12} = \frac{2}{3}$. c) $8 + 4 = 12$ red out of 16 counters: $\frac{12}{16} = \frac{3}{4}$. It is equal to $\frac{3}{4}$, not less. 1 mark: 7 and 8 (both, no others). 1 mark: $\frac{7}{12}$ and $\frac{2}{3}$. 1 mark: $\frac{12}{16} = \frac{3}{4}$, so not less.	3

Chance from 0 to 1 · WA6MPSP1

Q	Answer	Working / sample response	Marks
2	a) $R \frac{2}{5}, B \frac{2}{5}, Y \frac{1}{5}$ c) change one B to R	  a) The colours do not have the same number of parts. R has 2 of 5 parts: $\frac{2}{5} = 0.4$. B: $\frac{2}{5} = 0.4$. Y: $\frac{1}{5} = 0.2$. b) R and B at 0.4, Y at 0.2. c) Change one B to R: R R R B Y. Red $\frac{3}{5}$, blue $\frac{1}{5}$, yellow $\frac{1}{5}$. (This is the only way.) <i>1 mark: explains the colours have different numbers of parts, with $\frac{2}{5}, \frac{2}{5}, \frac{1}{5}$.</i> <i>1 mark: all three marked correctly.</i> <i>1 mark: R, R, R, B, Y (one B changed to R).</i>	3
3	a) 4 R, 2 B, 2 G, 4 Y b) 9 parts left	 a) Yellow: $\frac{1}{3}$ of 12 = 4 parts. That leaves 8 parts for red, blue and green. If blue is 1 “share”, green is 1 share and red is 2 shares: 4 shares = 8 parts, so 1 share = 2. Red 4, blue 2, green 2. b) Yellow $\frac{1}{4}$ of 12 = 3 parts, leaving 9. The other colours need 4 equal shares, and 9 cannot be split into 4 equal whole parts. <i>1 mark: 4 Y.</i> <i>1 mark: 4 R, 2 B, 2 G.</i> <i>1 mark: explains 9 does not divide into 4 equal shares (or shows each try fails).</i>	3