

WA5MPSP1

Probability

Core + Challenge

NAPLAN-style

Equally Likely or Not? — Marking Key

I can decide if the outcomes of a chance event are equally likely or not, and say if a game is fair.

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: 21 C Think it through: 10 D Challenge: 9 **Total: 56**

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

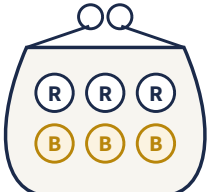
A

Warm up *answers*

/ 16 marks

Q	Answer	Model answer / notes	Marks
1	Yes	4 equal parts, one of each colour.	1
2	No	Red has 2 parts; blue and green have 1 each.	1
3	No	3 red counters but only 1 blue.	1
4	Yes	2 red and 2 blue counters.	1
5	No	Red 4 parts, blue 3, green 1.	1
6	Yes	Two halves: red $\frac{1}{2}$, blue $\frac{1}{2}$.	1
7	Yes	One counter of each colour.	1
8	No	The parts are different sizes: 1 is half the spinner, 3 is the smallest.	1
9	E	Heads and tails each have 1 of the 2 sides.	1
10	N	A 6 is 1 number; not a 6 is 5 numbers (1, 2, 3, 4, 5).	1
11	E	Odd: 1, 3, 5. Even: 2, 4, 6. Three numbers each.	1
12	N	Only E is a vowel. P, R, T, H are not: 1 letter against 4.	1
13	3 parts shaded	 6 equal parts: shade 3, leave 3 white. Any 3 parts.	1

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Q	Answer	Model answer / notes	Marks
14	1 or 3 parts shaded	 Any number of parts except 2 (usually 1 or 3). Accept all 4 shaded. A blank spinner gets no mark.	1
15	2 R, 2 B, 2 G	 6 parts ÷ 3 colours = 2 parts each, in any places.	1
16	3 blue drawn	 There are 3 red counters, so draw 3 blue.	1

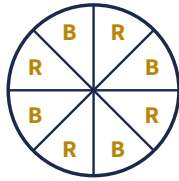
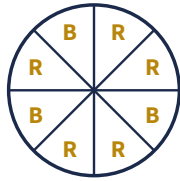
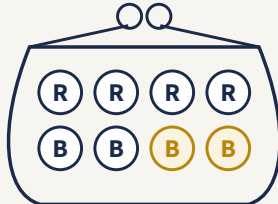
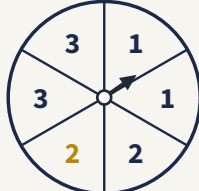
B

Practise *answers and working*

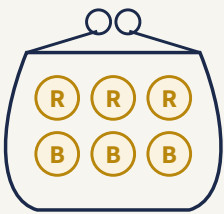
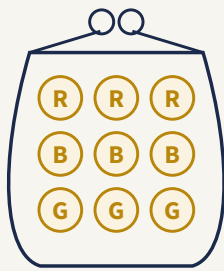
/ 21 marks

Q	Answer	Working / sample response	Marks				
1	a) No b) e.g. 12 girls' names and 12 boys' names	a) No: there are more girls' names (14) than boys' names (12). b) Make the numbers the same, e.g. take out 2 girls' names so there are 12 of each. <i>1 mark: No, 14 is more than 12.</i> <i>1 mark: any change that gives the same number of girls' and boys' names.</i>	2				
2	B	B has 3 red and 3 blue parts, all the same size, so red and blue are equally likely. A has 3 red parts and only 1 blue part, so Tom is more likely to win. <i>1 mark: B.</i> <i>1 mark: A has more red parts than blue parts (3 and 1).</i>	2				
3	E: C, E, F N: A, B, D	<table><tr><th>Equally likely</th><th>Not equally likely</th></tr><tr><td>C, E, F</td><td>A, B, D</td></tr></table> A: odd is 1, 3, 5 but even is only 2, 4, so not equally likely. B: 5 weekdays, 2 weekend days: not. C: 5 cards each way: equally likely. D: Perth is dry in summer, so no rain is much more likely: not. E: 5 of each colour: equally likely. F: less than 4 is 1, 2, 3 and more than 3 is 4, 5, 6: equally likely. <i>3 marks: all six correct. 2 marks: five correct. 1 mark: four correct.</i>	Equally likely	Not equally likely	C, E, F	A, B, D	3
Equally likely	Not equally likely						
C, E, F	A, B, D						

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Q	Answer	Working / sample response	Marks												
4	a) 4 R, 4 B b) 5, 6 or 7 R	a)  b)  a) 8 parts: 4 red and 4 blue, in any places. b) More than 4 red parts and at least 1 blue: 5 R and 3 B, 6 R and 2 B, or 7 R and 1 B. <i>1 mark: a) 4 R and 4 B.</i> <i>1 mark: b) 5, 6 or 7 R with the rest B.</i>	2												
5	a) No b) add 2 blue	 a) No: there are 4 red but only 2 blue counters. b) Add 2 blue counters: then 4 red and 4 blue. <i>1 mark: No, with a reason.</i> <i>1 mark: exactly 2 blue counters drawn, and no other counters.</i>	2												
6	Fair, not fair, fair	<table><tr><th>Game</th><th>Fair?</th><th>Reason</th></tr><tr><td>Coin</td><td>Fair</td><td>1 side each</td></tr><tr><td>Die</td><td>Not fair</td><td>2 numbers v 4 numbers</td></tr><tr><td>Cards</td><td>Fair</td><td>5 even, 5 odd</td></tr></table> Coin: heads and tails are equally likely, so it is fair. Die: Tom has 2 numbers, Ava has 4 numbers, so it is not fair (Ava is more likely to win). Cards: even is 2, 4, 6, 8, 10 and odd is 1, 3, 5, 7, 9. Five each, so it is fair. <i>1 mark for each row: the correct answer with a reason.</i>	Game	Fair?	Reason	Coin	Fair	1 side each	Die	Not fair	2 numbers v 4 numbers	Cards	Fair	5 even, 5 odd	3
Game	Fair?	Reason													
Coin	Fair	1 side each													
Die	Not fair	2 numbers v 4 numbers													
Cards	Fair	5 even, 5 odd													
7	a) 3 b) No c) change a 3 to a 2 a 2	 a) 3 has 3 parts, the most. b) No: 1 has 2 parts and 2 has only 1 part. c) Change one 3 into a 2: then 1, 2 and 3 have 2 parts each. This is the only way. <i>1 mark each part.</i>	3												

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Q	Answer	Working / sample response	Marks
8	a) R b) B and G c) Y	Red is the biggest part, so red is most likely. Blue and green are both quarter turns, so they are equally likely. Yellow is the smallest part. <i>1 mark: a) and c) both correct.</i> <i>1 mark: b) blue and green.</i>	2
9	A: 3 R, 3 B B: 3 R, 3 B, 3 G	A  B  A: $6 \div 2 = 3$ of each colour. B: $9 \div 3 = 3$ of each colour. <i>1 mark for each bag.</i>	2

C

Think it through *sample answers and criteria*

/ 10 marks

Q	Answer	Working / sample response	Marks
1	No	There are 5 red counters but only 2 blue counters. Red is more likely, so they are not equally likely. Having two colours is not enough; the numbers must be the same. <i>1 mark: disagrees.</i> <i>1 mark: explains there are more red counters than blue (5 and 2).</i>	2
2	False	It depends on the size of the parts. A spinner with one half and three smaller parts has 4 parts, but the half is much more likely. <i>1 mark: False.</i> <i>1 mark: explains (or draws) that the parts may be different sizes.</i>	2
3	Sometimes	True for 3 red and 3 blue: the same number of each. Not true for 3 red and 1 blue: red is more likely. So it is only sometimes true. <i>1 mark: Sometimes.</i> <i>1 mark: one example where it is true and one where it is not.</i>	2
4	D	In A, B and C, red and blue are equally likely (the same amount of each). D has 2 red parts and only 1 blue part, so red is more likely. <i>1 mark: D.</i> <i>1 mark: explains D is the only spinner where red and blue are not equally likely.</i> <i>Accept another choice only with a correct reason (e.g. C has only 2 parts).</i>	2

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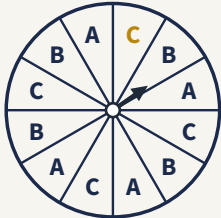
Q	Answer	Working / sample response	Marks
5	No	Kai wins on 5 or 6: 2 numbers. Lily wins on 1, 2 or 3: 3 numbers. Lily is more likely to win, so the game is not fair. (A 4 is a win for nobody.) <i>1 mark: disagrees.</i> <i>1 mark: lists the numbers (5, 6 and 1, 2, 3) to show Lily has more.</i>	2

D

Challenge *solutions and criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks															
1	1, 1, 10; 2, 2, 8; 3, 3, 6; 5, 5, 2	<table><thead><tr><th>Red</th><th>Blue</th><th>Green</th></tr></thead><tbody><tr><td>1</td><td>1</td><td>10</td></tr><tr><td>2</td><td>2</td><td>8</td></tr><tr><td>3</td><td>3</td><td>6</td></tr><tr><td>5</td><td>5</td><td>2</td></tr></tbody></table> Red and blue are the same number. Green is what is left: $12 - \text{red} - \text{blue}$. Red 1 $\rightarrow$ green 10. Red 2 $\rightarrow$ green 8. Red 3 $\rightarrow$ green 6. Red 4 $\rightarrow$ green 4 (all equally likely, so not allowed). Red 5 $\rightarrow$ green 2. Red 6 would leave no green. So there are 4 bags. <i>3 marks: all four bags and no others. 2 marks: three correct. 1 mark: two correct. Do not accept 4, 4, 4.</i>	Red	Blue	Green	1	1	10	2	2	8	3	3	6	5	5	2	3
Red	Blue	Green																
1	1	10																
2	2	8																
3	3	6																
5	5	2																

2	a) 4 b) No, A c) change one A to C	 a) $12 \text{ parts} \div 3 \text{ players} = 4 \text{ parts each}$. b) A has 5 parts, B has 4, C has 3. Not fair: A is most likely to win. c) Change just one A into a C: A 4, B 4, C 4. One change is the fewest, because the game is not fair now. <i>1 mark: 4.</i> <i>1 mark: not fair, A.</i> <i>1 mark: one A changed to C.</i>	3
3	a) 3 b) 1, 3, 6; 1, 4, 5; 2, 3, 5	a) $6 \text{ numbers} \div 2 \text{ players} = 3 \text{ numbers each}$. b) Three numbers adding to 10: $1 + 3 + 6$, $1 + 4 + 5$, $2 + 3 + 5$. There are no others. c) $1 + 2 + 3 + 4 + 5 + 6 = 21$, which is odd. Two equal totals would make an even number, so it cannot be done. <i>1 mark: 3.</i> <i>1 mark: all three ways (no others).</i> <i>1 mark: total 21 is odd, so it cannot be split into two equal totals.</i>	3