

WA5MPSP2

Probability

Core + Challenge

NAPLAN-style

Chance Experiments — Marking Key

I can run a chance experiment, record the results as fractions and explain why results vary.

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	8	1 group of five (5) and 3 more.	1
2	13	2 groups of five (10) and 3 more.	1
3	17	3 groups of five (15) and 2 more.	1
4	24	4 groups of five (20) and 4 more.	1
5	6 in tally marks	 1 group of five (5) and 1 more.	1
6	11 in tally marks	 2 groups of five (10) and 1 more.	1
7	19 in tally marks	 3 groups of five (15) and 4 more.	1
8	22 in tally marks	 4 groups of five (20) and 2 more.	1
9	$\frac{9}{20}$	9 heads out of 20 tosses.	1
10	$\frac{5}{30}$	5 out of 30 rolls. Accept $\frac{1}{6}$.	1
11	$\frac{13}{40}$	The tally shows 13: 13 out of 40.	1
12	$\frac{38}{50}$	50 – 12 = 38 were not blue. Accept $\frac{19}{25}$.	1
13	9	One group of five and 4 more.	1
14	$\frac{12}{40}$	Red 12 out of 40. Accept $\frac{3}{10}$.	1

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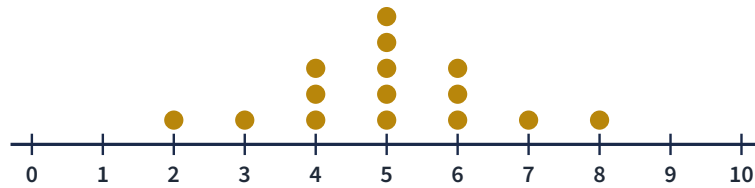
Q	Answer	Model answer / notes	Marks
15	Green	Green 8 (red 12, blue 9, yellow 11).	1
16	$\frac{32}{40}$	$40 - 8 = 32$. Accept $\frac{4}{5}$.	1

B

Practise *answers and working*

/ 23 marks

Q	Answer	Working / sample response	Marks
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1 b) 5 c) Results vary

- a) Dots: 2 (1), 3 (1), 4 (3), 5 (5), 6 (3), 7 (1), 8 (1).
 b) 5 students.
 c) Each spin is chance, so results vary. Most results are close to 5, but only some are exactly 5.

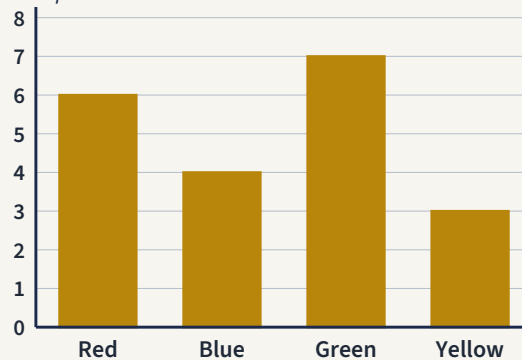
1 mark: dot plot.

1 mark: 5.

1 mark: results vary by chance.

3

Number of spins



2 b) $\frac{7}{20}$

- a) Columns: red 6, blue 4, green 7, yellow 3.
 b) Green 7 out of 20: $\frac{7}{20}$.

2 marks: all four columns the right height. 1 mark: three correct.

1 mark: $\frac{7}{20}$.

3

3 a) C b) D

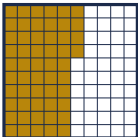
- a) C adds up to $14 + 10 + 8 = 32$, but there were only 30 spins.
 b) D: 30 ones and no 2s or 3s could happen, but it is very unlikely because 1, 2 and 3 are equally likely.

1 mark: C with the reason (total is not 30).

1 mark: D.

2

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Q	Answer	Working / sample response	Marks										
4	a) $\frac{27}{100}$ b) Results vary	a) 27 out of 100: $\frac{27}{100}$. b) Chance results vary. The results are close to 25 each, but not exactly. 1 mark: $\frac{27}{100}$. 1 mark: results vary by chance.	2										
5	a) 6, $\frac{13}{60}$ b) Results vary	a) The tallest column is 6 (13 times): $\frac{13}{60}$. b) Chance results vary. Each number is equally likely, but in 60 rolls they will not come up exactly the same number of times. 1 mark: 6 and $\frac{13}{60}$. 1 mark: explains that results vary by chance.	2										
6	b) $\frac{54}{100}$ c) closer to half	 a) 7 of the 10 parts; 54 of the 100 squares. b) $\frac{54}{100}$ is only 4 squares more than half (50). $\frac{7}{10}$ is 2 tenths (20 squares) more than half. c) With more tosses, the fraction of heads usually gets closer to half. 1 mark: both shaded correctly. 1 mark: $\frac{54}{100}$. 1 mark: more trials → closer to half.	3										
7	b) Cal c) 38; half is 40; close	<table border="1"><thead><tr><th>Name</th><th>Ana</th><th>Ben</th><th>Cal</th><th>Dee</th></tr></thead><tbody><tr><td>Fraction</td><td>$\frac{9}{20}$</td><td>$\frac{12}{20}$</td><td>$\frac{10}{20}$</td><td>$\frac{7}{20}$</td></tr></tbody></table> a) Ana $\frac{9}{20}$, Ben $\frac{12}{20}$, Cal $\frac{10}{20}$, Dee $\frac{7}{20}$. b) Cal: $\frac{10}{20}$ is half. c) $9 + 12 + 10 + 7 = 38$ reds out of 80. Half of 80 is 40. Put together, the results are close to half, even though some friends were further away on their own. 1 mark: all four fractions. 1 mark: Cal. 1 mark: 38 and 40 with a sensible comment.	Name	Ana	Ben	Cal	Dee	Fraction	$\frac{9}{20}$	$\frac{12}{20}$	$\frac{10}{20}$	$\frac{7}{20}$	3
Name	Ana	Ben	Cal	Dee									
Fraction	$\frac{9}{20}$	$\frac{12}{20}$	$\frac{10}{20}$	$\frac{7}{20}$									
8	a) 8 b) $\frac{9}{24}$	<table border="1"><thead><tr><th>Colour</th><th>Tally</th></tr></thead><tbody><tr><td>Blue</td><td> </td></tr></tbody></table> a) $24 - 7 - 9 = 8$ blue. b) Green 9 out of 24: $\frac{9}{24}$ (or $\frac{3}{8}$). 1 mark: 8 with the tally drawn. 1 mark: $\frac{9}{24}$ or $\frac{3}{8}$.	Colour	Tally	Blue		2						
Colour	Tally												
Blue													

Q	Answer	Working / sample response	Marks												
9	a) H 13 $\frac{13}{30}$, T 17 $\frac{17}{30}$ b) No; not surprising	<table border="1"> <thead> <tr> <th>Result</th><th>Tally</th><th>Freq.</th><th>Fraction</th></tr> </thead> <tbody> <tr> <td>Heads</td><td> </td><td>13</td><td>$\frac{13}{30}$</td></tr> <tr> <td>Tails</td><td> </td><td>17</td><td>$\frac{17}{30}$</td></tr> </tbody> </table> a) Heads 13 ($\frac{13}{30}$), tails 17 ($\frac{17}{30}$). b) No: 13 heads and 17 tails. This is not surprising: results vary, and with only 30 tosses they are rarely exactly 15 and 15. <i>1 mark: tallies and frequencies.</i> <i>1 mark: both fractions.</i> <i>1 mark: says results vary (not exactly equal) with a sensible reason.</i>	Result	Tally	Freq.	Fraction	Heads		13	$\frac{13}{30}$	Tails		17	$\frac{17}{30}$	3
Result	Tally	Freq.	Fraction												
Heads		13	$\frac{13}{30}$												
Tails		17	$\frac{17}{30}$												

C

Think it through *sample answers and criteria*

/ 10 marks

Q	Answer	Working / sample response	Marks
1	False	Each colour is equally likely, so we would get about 10 of each. But results vary, so it might be 12, 9, 8 and 11. Exactly 10 each is possible but not certain. <i>1 mark: False.</i> <i>1 mark: explains results vary around 10.</i>	2
2	$\frac{12}{20}$	$\frac{10}{20}$, $\frac{25}{50}$ and $\frac{50}{100}$ are each exactly half. $\frac{12}{20}$ is more than half (half of 20 is 10). <i>1 mark: $\frac{12}{20}$.</i> <i>1 mark: explains the others are exactly half. Accept another choice only with a correct reason.</i>	2
3	Sometimes	They might get the same results by chance, e.g. both get 5 heads in 10 tosses. Usually the results are different because chance results vary. So it is only sometimes true. <i>1 mark: Sometimes.</i> <i>1 mark: explains results can match but usually vary.</i>	2
4	The class's results	The class did many more trials (1000 compared with 10). More trials give more reliable results. 508 is very close to 500 (half of 1000), so heads and tails look equally likely. Jo's 8 in 10 happened by chance. <i>1 mark: the class's results.</i> <i>1 mark: explains more trials, and 508 is close to half.</i>	2
5	No	6 tosses is a very small number of trials, and results vary a lot. 5 heads in 6 tosses can happen with a fair coin. He should toss it many more times (e.g. 100) before deciding. <i>1 mark: disagrees (or says he cannot be sure).</i> <i>1 mark: explains 6 trials is too few / results vary.</i>	2

D

Challenge *solutions and criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	a) 10, 5, 9 b) $\frac{10}{24}, \frac{5}{24}, \frac{9}{24}$ c) 8; the number 2	a) Call the 2s one group. 1s = 2 groups, 3s = 1 group + 4. So 4 groups + 4 = 24, 4 groups = 20, 1 group = 5. So 1s: 10, 2s: 5, 3s: 9. b) $\frac{10}{24}, \frac{5}{24}, \frac{9}{24}$. c) $24 \div 3 = 8$ each. The number 2 (5 times) was 3 away; 1 was 2 away and 3 was 1 away. <i>1 mark: 10, 5, 9.</i> <i>1 mark: all three fractions.</i> <i>1 mark: 8 and the number 2.</i>	3
2	a) Cam 7, Dev 3 b) $\frac{20}{120}$ c) $120 \div 6 = 20$	a) $20 - 6 - 4 = 10$ for Cam and Dev. Split 10 so one is 4 more: 7 and 3. b) $4 \times 30 = 120$ rolls: $\frac{20}{120}$. c) $\frac{1}{6}$ of 120 is $120 \div 6 = 20$, so $\frac{20}{120} = \frac{1}{6}$. <i>1 mark: 7 and 3.</i> <i>1 mark: $\frac{20}{120}$.</i> <i>1 mark: shows $120 \div 6 = 20$ (or simplifies).</i>	3
3	a) 3 red, 1 blue b) Possible but very unlikely	a) 74 is close to 75, which is $\frac{3}{4}$ of 100. So about 3 of the 4 parts are red and 1 is blue. b) With 2 red and 2 blue we would get about 50 reds. 74 is a long way from 50, so it is very unlikely (but not impossible). <i>1 mark: 3 red parts with a reason.</i> <i>1 mark: spinner labelled 3 R and 1 B.</i> <i>1 mark: very unlikely, with 50 as the comparison.</i>	3