Probability - Answers

Key Stage 2: 2004 Paper A

1.

22 20 **1m**

Key Stage 2: 2005 Paper A

1.

14 An explanation which recognises that 1m No mark is awarded for circling 'No' the numbers of odd and even cards alone. are not equal, eg (U1) Do not accept vague or arbitrary 'Because there are more odds than explanations, eg evens'; 'Because fair means half the time'; 'Because there are fewer evens 'Because there are 7 cards'; than odds'; 'Because Sapna scores on more 'Because there is an odd number than half of the cards'; of cards'; 'Because there are only three even 'Because the game is unfair'; numbers'; 'Because Sapna will always win'. 'Because Josh has 3 cards and Sapna has 4 cards'; If 'Yes' is circled but a correct, unambiguous explanation is given, 'Because Sapna has more chances'. then award the mark.

10

Accept for **TWO** marks any arrangement using one of the following sets of eight numbers:

1, 1, 1, 2, 2, 2, 3, 3

OR

1, 1, 1, 1, 2, 2, 2, 2

eg



If the answer is incorrect, award **ONE** mark for an arrangement such that:

■ the number of 1s and 2s is equal

OR

the number of 3s is less than the number of 2s AND the number of 3s is less than the number of 1s. Up to 2m



Numbers may be written in any order.

Do not accept answers that leave sections blank or include numbers other than 1, 2 or 3.

23	Award TWO marks for three rows ticked correctly as shown:	Up to 2m	Accept alternative unambiguous indications such as x or Y .
	If the answer is incorrect, award ONE mark for any two rows ticked correctly.		

Key Stage 2: 2008 Paper B

1.

20	Award TWO marks for boxes ticked and crossed as shown:	Up to 2m	Accept alternative unambiguous indications such as Y or N. For TWO marks accept:
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Key Stage 2: 2009 Paper A

15	8	1m

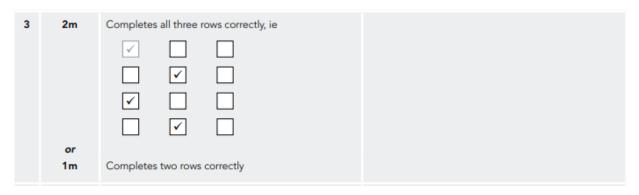
Key Stage 2: 2010 Paper B

1.

24 An explanation which correctly compares the 1m No mark is awarded for circling 'A' alone. contents of the two bags, eg: Do not accept vague or incomplete explanations, U1 ■ 'In bag A half of the marbles are blue, but in eg: bag B more are red than blue' ■ 'A is more likely even though there are more ■ 'In A it's fifty-fifty, but in B red is more likely' blues in B' ■ 'Less than half of the marbles in B are blue, but 'A has an even chance'. in A half are blue'. If 'B' is circled but a correct, unambiguous explanation is given, then award the mark.

Key Stage 2: 2011 Paper B L6

1.



Key Stage 2: 2011 Paper A

18 4 1m Accept 21 AND 22 AND 23 AND 24	
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Key Stage 2: 2011 Paper B

1.

21

An explanation which recognises that there are two counters labelled 35 and only one counter labelled 45, eg:

- 'For 35 there's a white and a green, but for 45 there's only a green'
- 'There are two 35s and one 45'
- 'There are twice as many 35s as 45s'
- 'The only 45 is green'
- 'There is only one 45'
- 'White counters only go up to 40, so 35 would be more likely to win'

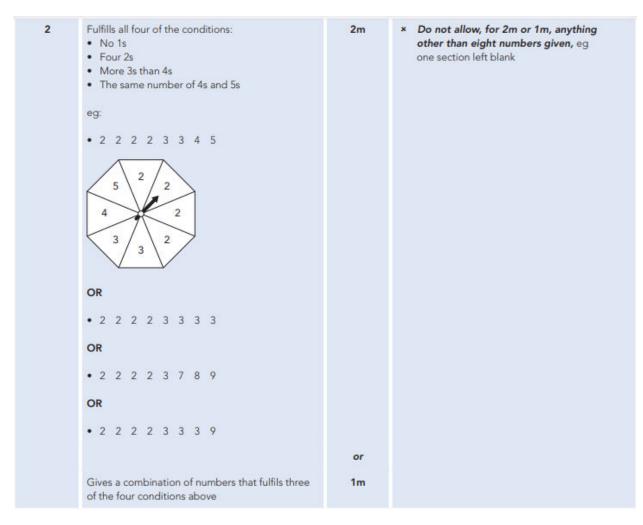
35 W 35 G 45 G

1m U1 No mark is awarded for circling 'Yes' alone.

Do not accept vague or incomplete explanations, eg:

- 'There are more counters below 40'
- '45 is green'
- 'White goes up to 40'
- 'There are more greens'.

If 'No' is circled but a correct, unambiguous explanation is given, then award the mark.

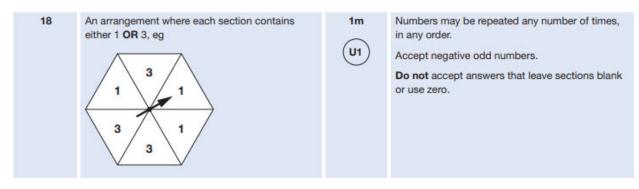


3b 4 1m	3a	Gives a correct probability, eg: 1/2 3/6 0.5 50% Half	1m	! A probability that is incorrectly expressed Condone eg: • 3 in 6 • 3 over 6 • 3 out of 6 • 3 from 6 * A probability expressed as a percentage without a percentage sign * A fraction with other than integers in the numerator and/or denominator * A probability expressed as a ratio eg: • 3:6 • 3:3 • 1 to 2 ! Do not accept 'equal' or 'even chance' without an acceptable answer eg, accept • equal, so half • evens, because it is 3 in 6 eg, do not accept • equal • even chance
	3b	4	1m	even chance
(111)	55		(U1)	

1	Gives a correct probability, eg: • 45% • 0.45 • $\frac{45}{100}$ • $\frac{9}{20}$	2m	1	Probability See guidance (page 8)
		or		
	Shows or implies a complete correct method, with not more than one computational error, eg: • $\frac{1}{4} = 100 \div 4 = 40\%$ (error) $40\% + 30\% = 70\%$ $100\% - 70\% = 30\%$ • $\frac{1}{4} = \frac{4}{20}$ (error) $30\% = \frac{6}{20}$ $\frac{4}{20} + \frac{6}{20} = \frac{10}{20}$ $1 - \frac{10}{20} = \frac{10}{20}$ • $1 - \frac{1}{4} - 30\%$ $1 - 0.25 - 0.30 = 0.55$ (error) • P(Salt & Vin) = $1 - P(Prawn) - P(Cheese)$ $100\% - 25\% - 30\%$	1m	! !	Probability expressed as a percentage without a percentage sign Condone for 1m, ie: • 45 Conversion between fractions, decimals and percentages Within a complete correct method, conversions must be correct and/or show the method of conversion Incomplete methods which do not convert the probabilities to a common format, eg: • 1 - \frac{1}{4} - 30\%

Key Stage 2: 2013 Paper B L6

11 ½ or equivalent	2m	! Algebra See guidance (page 9) ✓ Equivalent fractions or decimals
	or	
Shows or implies a correct first step manipulation that either reduces the terms or collects variables on one sequation and numbers on the other removes the brackets, eg: • 8y + 96 = 100 • y + 12 = 100 ÷ 8 • 8y = 4 OR Shows or implies a complete correct • 100 ÷ 8 = 12 (error) 12 - 12 = 0 • 25 × 4 = 100 12.5 × 8 = 100 12.5 - 12	e number of side of the or correctly	 X A first step of algebraic manipulation which has a conceptual error, eg: y + 12 = 100 y + 96 = 100 8y + 12 = 100 ! Correct embedded solutions Award 1m for a response which shows ½, or equivalent, as the embedded solution to their working

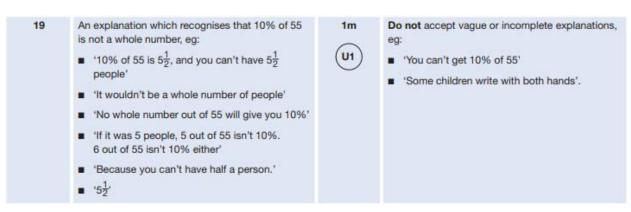


Key Stage 2: 2013 Paper A

25	An explanation which recognises that Chen is more likely than Megan to choose a 4, eg: 'Chen and Megan both have one 4, but Megan has more other numbers' 'Chen has 1 out of 4, but Megan only 1 out of 5' 'Megan has four counters that aren't 4 but Chen only has three' 'Megan has a 20% chance and Chen has a 25% chance'.	1m U1	No mark is awarded for circling 'Yes' alone. Do not accept vague or incomplete explanations, eg: 'Megan has more counters' 'Megan can choose a 5 but Chen can't' If 'No' is circled but a correct, unambiguous explanation is given, then award the mark.
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5a	15	1m	
5b	40	2m	√ For 2m, correct follow-through answer from their answer to part (a) as (4 × 'their a' - 20)
		or	
	45 seen (total number of black counters)	1m	✓ For 1m, correct follow-through from their answer to part (a) as (3 × 'their a') seen (total number of black counters)
	OR		OR
	60 seen (total number of counters)		(4 × 'their a') seen
	OR		(total number of counters)
	Shows or implies a complete, correct method, eg:		
	 0.75 of 20 = 15 (white) 20 - 15 = 5 (black) 15 × 4 = 50 (error) 50 - 15 = 35 (black) 35 - 5 		
	• $\frac{3}{4}$ of 20 is 15 15 x 4 - 20		
	• 15 × 4 – 20		

Key Stage 2: 2014 Paper A



Key Stage 2: 2015 Paper A L6

1.

7a	Gives a correct explanation that recognises 3 of the 10 number cards are factors of 14, eg: 1, 2 and 7 are factors of 14, so it is three out of ten	1m	! Minimally acceptable explanation: factors listed without a probability, eg: • 1, 2 and 7 ! Condone explanations that indicate that 1, 2 and 7 are the only factors of 14 ! Incomplete explanation with numbers indicated on cards [
			If the cards 1, 2 and 7 and no others are indicated on the diagram, award 1 mark for an incomplete explanation within the explain bubble X Incomplete explanation, eq:
			Three of the ten cards are a factor of 14 so the probability is three tenths Three of the cards are factors
7b	Gives a number that has four of its factors between 1 and 10 inclusive, eg: 6 50	dm	! Answers below 100 are as follows: 6, 8, 10, 16, 28, 32, 45, 50, 64, 66, 78 and 88

Key Stage 2: 2015 Paper B L6

5a	Gives a correct probability, eg:	1m	1	Probability
	• 1/85 or 2/170			See guidance (page 8)
	• 0.012 or 0.011()			
	• 1.2% or 1.1()%			
5b	Gives a correct probability, eg:	1m	1	Probability
	• 1/20			See guidance (page 8)
	• 0.05			
	• 5%			

8

Gives a correct explanation, which demonstrates that the likelihood for 9 is greater than the likelihood for 3, eg:

- There are only two ways to score 3
 (2 + 1, 1 + 2), but there are more ways to score 9, eg 4 + 5, 5 + 4, 3 + 6
- Jack is incorrect because there are two ways of making 3 with those dice (1 + 2 and 2 + 1) but there are 4 ways of making 9 (3 + 6, 4 + 5, 5 + 4 and 6 + 3)
- The probability of scoring 3 is ²/₃₆ but the probability of scoring 9 is ⁴/₃₆

•	+	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
- 10	4	5	6	7	8	9	10
- 55	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

1m

✓ Minimally acceptable explanation, eg:

- 3 is $\frac{2}{36}$, 9 is $\frac{4}{36}$
- 3 has 2 ways, 9 has 4 ways
- 1 + 2, 2 + 1 and 4 + 5, 5 + 4, 3 + 6

! Reversals not considered

Condone, provided a consistent approach is used for both totals, eg:

- There is one way to make 3 and two ways to make 9
- 1+2,4+5,6+3

Incomplete explanation in explain bubble

If the response in the explain bubble is incomplete and does not include any incorrect mathematics then working outside the bubble is considered

X Incomplete or incorrect explanation, eg:

- 9 is more likely than 3
- . There are more ways to make 9 than 3
- The probability of 3 is ¹/₃₆
- . There is only one way to score 3

x Incorrect mathematics, eg:

- The probability of 3 is ²/₁₂ and the probability of 9 is ⁴/₁₂
- 3 is 1 + 2 9 is 4 + 5, 6 + 3, 2 + 7, 8 + 1
- The probability of 9 is ²/₂₁ and 3 is ¹/₂₁

Key Stage 2: 2015 Paper B

1.

23

An explanation which recognises that they are equally likely to choose a blue counter, eq:

- 'Half the counters in each bag are blue'
- '5 out of 10 is the same as 10 out of 20'
- "Chen has twice as many blue counters but he also has twice as many counters altogether, so the chance is the same".

1m

U1

No mark is awarded for circling 'No' alone.



Do not accept vague or incomplete explanations, eq:

- 'There is an equal chance'
- 'If Chen has 10 blue and Megan has 5'.

If 'Yes' is circled but a correct, unambiguous explanation is given, then award the mark.

Key Stage 2: 2018 Paper 3 Reasoning

2	Two combinations, as shown:	1m	
	blue and red OR red and blue		
	AND		
	white and red OR red and white.		