

Systematic listing and counting

Foundation and Higher tiers | Total marks: 53

Marks

- M** Method mark, for a correct method. It can be implied by a correct answer.
- A** Accuracy mark, for a correct answer. It needs the method mark before it.
- B** A mark for a correct value or statement, with or without working.
- ft** Follow through: the mark is given for using an earlier wrong answer correctly.
- oe** Or equivalent.
- [a, b]** Any value from a to b inclusive.

Questions

Q	Skill	Spec	Tier	Grade	Calculator	Marks
1	Listing combinations	N5	Foundation	2	No	2
2	Listing numbers from digit cards	N5	Foundation	2	No	3
3	Systematic listing with a total	N5	Foundation	3	No	2
4	Listing ordered outcomes	N5	Foundation	3	No	3
5	The product rule	N5	Higher	5	No	2
6	The product rule, working backwards	N5	Higher	5	No	2
7	The product rule: correcting a claim	N5	Higher	5	No	2
8	The product rule with a condition	N5	Higher	6	No	3
9	Counting pairs	N5	Higher	6	No	2
10	Arrangements with a condition	N5	Higher	7	No	3
11	Counting by taking away	N5	Higher	7	No	3
12	Every total from one, two or three extras	N5	Foundation	3	Yes	3
13	Listing pairs within a budget	N5	Foundation	4	Yes	4
14	Listing numbers, then testing for a prime	N5 N4	Foundation	4	Yes	4
15	The product rule without repeats	N5	Higher	5	Yes	3
16	Listing numbers made with a decimal point	N5 N1	Foundation	5	Yes	4
17	Listing routes to find the shortest	N5	Foundation	5	Yes	4
18	Listing ways to share with a limit	N5	Foundation	5	Yes	4
	Total					53

Question 1 N5 · Foundation · Grade 2 · 2 marks

Q	Answer	Mark	Comments
1	green plain, green striped, purple plain, purple striped, grey plain, grey striped	B2	all 6 with no repeats or extras. B1 for at least 4 correct combinations

Question 2 N5 · Foundation · Grade 2 · 3 marks

Q	Answer	Mark	Comments
2(a)	35, 38, 53, 58, 83, 85	B2	B1 for at least 4 correct, with no more than one wrong
2(b)	4	B1ft	ft their list

Question 3 N5 · Foundation · Grade 3 · 2 marks

Q	Answer	Mark	Comments
3	2 adults, 7 children and 5 adults, 3 children	B2	B1 for one correct pair, or both with one wrong extra

Question 4 N5 · Foundation · Grade 3 · 3 marks

Q	Answer	Mark	Comments
4(a)	AB, AC, AD, BA, BC, BD, CA, CB, CD, DA, DB, DC	B2	gold first, all 12 with no repeats. B1 for at least 8 correct
4(b)	6	B1ft	ft their list

Question 5 N5 · Higher · Grade 5 · 2 marks

Q	Answer	Mark	Comments
5	$5 \times 3 \times 4$	M1	oe, or a correct systematic list started
	60	A1	

Question 6 N5 · Higher · Grade 5 · 2 marks

Q	Answer	Mark	Comments
6	$84 \div (7 \times 3)$ or $84 \div 21$	M1	oe
	4	A1	

Question 7 N5 · Higher · Grade 5 · 2 marks

Q	Answer	Mark	Comments
7(a)	the choices should be multiplied: $10 \times 10 \times 10 \times 10$	B1	oe, or a counterexample such as 0000 to 0099 is already 100 PINs
7(b)	10 000	B1	accept 10^4

Question 8 N5 · Higher · Grade 6 · 3 marks

Q	Answer	Mark	Comments
8	4 choices for the last digit	M1	oe, 1, 3, 5 or 7
	$4 \times 6 \times 5$	M1	oe, the product with the last digit chosen first
	120	A1	

Question 9 N5 · Higher · Grade 6 · 2 marks

Q	Answer	Mark	Comments
9	$12 \times 11 \div 2$ or $11 + 10 + 9 + \dots + 1$	M1	oe. 12×11 or 132 alone is M0 (each match counted twice)
	66	A1	

Question 10 N5 · Higher · Grade 7 · 3 marks

Q	Answer	Mark	Comments
10(a)	120	B1	accept $5 \times 4 \times 3 \times 2 \times 1$
10(b)	$4 \times 3 \times 2 \times 1$ or 24	M1	oe, Ali and Bea treated as one, or 4 positions for the pair $\times 2 \times 3 \times 2 \times 1$
	48	A1	

Question 11 N5 · Higher · Grade 7 · 3 marks

Q	Answer	Mark	Comments
11	$8 \times 9 \times 9$ or 648, the count with no 7	M1	Alternative by cases with a 7 first in the hundreds, tens or units: one of 100, 8×10 or 8×9
	900 – their 648	M1	Alternative: $100 + 8 \times 10 + 8 \times 9$
	252	A1	

Question 12 N5 · Foundation · Grade 3 · 3 marks

Q	Answer	Mark	Comments
12(a)	£2.85, £3.40, £4.75, £6.25, £7.60, £8.15, £11.00	B2	all 7 and no others. B1 for at least 5 correct with no more than one wrong
12(b)	programme and drink	B1	oe, with no others

Question 13 N5 · Foundation · Grade 4 · 4 marks

Q	Answer	Mark	Comments
13(a)	crisps and flapjack, crisps and fruit pot, crisps and smoothie, crisps and cookie, flapjack and cookie, fruit pot and cookie	B2	all 6 and no others. B1 for at least 4 correct pairs with no more than one wrong
13(b)	crisps and smoothie	B1	
	10p	B1	

Question 14 N5 N4 · Foundation · Grade 4 · 4 marks

Q	Answer	Mark	Comments
14(a)	257, 275, 527, 572, 725, 752	B2	and no others. B1 for at least 4 correct with no more than one wrong
14(b)	shows $527 = 17 \times 31$, or tests 257 by dividing by primes up to at least 13	M1	oe, the even numbers and those ending in 5 may be ruled out with a reason
	257 with working	A1	

Question 15 N5 · Higher · Grade 5 · 3 marks

Q	Answer	Mark	Comments
15	28×27 or 756	M1	oe, the first two jobs
	$28 \times 27 \times 26$	M1	oe
	No with 19 656	A1	

Question 16 N5 N1 · Foundation · Grade 5 · 4 marks

Q	Answer	Mark	Comments
16(a)	2.47, 2.74, 4.27, 4.72, 7.24, 7.42, 24.7, 27.4, 42.7, 47.2, 72.4, 74.2	B2	all 12 and no others. B1 for at least 8 correct with no more than one wrong
16(b)	$5.15^2 = 26.5225$	M1	oe, 26.5
	27.4 with 26.5225 or differences 0.8775 and 1.8225	A1	

Question 17 N5 · Foundation · Grade 5 · 4 marks

Q	Answer	Mark	Comments
17(a)	the route Entrance, Aviary, Café, Barn, Entrance	M1	oe, or $0.62 + 0.48 + 1.37 + 1.15$
	3.62	A1	
17(b)	the total for a different route	M1	such as Entrance, Aviary, Barn, Café, Entrance = 3.78; Entrance, Barn, Aviary, Café, Entrance = 3.42; Entrance, Café, Aviary, Barn, Entrance = 3.42; Entrance, Café, Barn, Aviary, Entrance = 3.78
	Entrance, Barn, Aviary, Café, Entrance with 3.42 km	A1	or the reverse route

Question 18 N5 · Foundation · Grade 5 · 4 marks

Q	Answer	Mark	Comments
18(a)	the total mass of the parcels in one box, 6 kg or less	M1	oe, or the total of all five, 9.95 kg
	a correct split with both totals	A1	such as AD and BCE; ABC and DE; ACE and BD; AB and CDE; ABE and CD; ACD and BE
18(b)	the totals for at least two different ways	M1	oe
	A and D in one box and B, C, E in the other, with 5.00 kg and 4.95 kg	A1	