

Systematic listing and counting

Exam questions

Foundation and Higher tiers

Please write clearly in block capitals.

Name

Class

Teacher

Time allowed: 60 minutes

Materials

For this booklet you need a black pen, a pencil, a ruler, a rubber and a calculator for Section B.

Instructions

- Use black ink or black ballpoint pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions in the spaces provided.
- **Section A** (questions 1 to 11): you must not use a calculator.
- **Section B** (questions 12 to 18): you may use a calculator.
- Do all rough work in this booklet. Cross through any work you do not want marked.

For teacher's use

Q	Mark	Q	Mark
1		10	
2		11	
3		12	
4		13	
5		14	
6		15	
7		16	
8		17	
9		18	
TOTAL			

Information

- The marks for each question are shown in brackets.
- The maximum mark for this booklet is 53.

Advice

- Read each question carefully.
- In all calculations, show clearly how you work out your answer.

Section A**You must not use a calculator**Do not
write
outside
the box

- 1** Ivy is choosing a phone case.
She can choose green, purple or grey.
She can choose plain or striped.

List all the possible combinations of colour and pattern she can choose.

[2 marks]

- 2** Here are three number cards.

3

5

8

Jake uses two of the cards to make a two-digit number.

- (a)** List all the two-digit numbers Jake can make.

[2 marks]

- (b)** How many of these numbers are odd?

Answer _____

[1 mark]

- 3** A ferry ticket costs £4 for an adult and £3 for a child.
A group of adults and children pays £29 altogether.
There is at least one adult and at least one child in the group.

Work out all the possible numbers of adults and children in the group.

[2 marks]

- 4** Four friends run a race: Amir (A), Bella (B), Cal (C) and Dina (D).
The winner gets a gold medal and second place gets a silver medal.
There are no draws.

- (a)** List all the different ways the gold and silver medals could be given out.
The first one has been done for you.

Gold A, Silver B

[2 marks]

- (b)** In how many of these ways does Amir get a medal?

Answer _____

[1 mark]

- 5** A bike shop lets customers build their own bike.
They choose one of 5 frame colours, one of 3 handlebars and one of 4 saddles.

How many different bikes can be built?

Answer _____

[2 marks]

- 6** A sandwich bar offers some types of bread, 7 fillings and 3 sauces.
A sandwich is one type of bread, one filling and one sauce.
There are 84 different sandwiches.

How many types of bread does the sandwich bar offer?

Answer _____

[2 marks]

- 7** A PIN has 4 digits. Each digit can be any of 0 to 9
Digits can be used more than once.
Lewis says,
“There are 10 choices for each of the 4 digits, so there are $10 \times 4 = 40$ possible PINs.”

(a) Explain why Lewis is wrong.

[1 mark]

(b) Work out the number of possible PINs.

Answer _____

[1 mark]

- 8** Three-digit numbers are made using the digits 1, 2, 3, 4, 5, 6 and 7
No digit can be used more than once in a number.

How many of these three-digit numbers are odd?

Answer _____

[3 marks]

- 9** There are 12 teams in a netball league.
Each team plays every other team once.
How many matches are played altogether?

Answer _____
[2 marks]

- 10** Five friends stand in a line for a photo.

(a) How many different orders can they stand in?

Answer _____
[1 mark]

(b) Two of the friends, Ali and Bea, must stand next to each other.
How many different orders are there now?

Answer _____
[2 marks]

- 11** How many whole numbers from 100 to 999 have at least one digit that is a 7?

Answer _____
[3 marks]

Section B



You may use a calculator

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the box

- 12** At a theatre, visitors can buy these extras.

Programme	Drink	Ice cream
£4.75	£3.40	£2.85

Ezra chooses one, two or all three of the extras. He never has more than one of any extra.

- (a)** List all the different amounts of money Ezra could spend.

[2 marks]

- (b)** Ezra hands over a £10 note.
He receives less than £2 back.
Which extras has he chosen?

Answer _____

[1 mark]

13

A café sells these snacks.

Crisps	Flapjack	Fruit pot	Smoothie	Cookie
85p	£1.35	£1.69	£2.05	£1.18

Mo has £3

He buys two different snacks.

- (a) List all the pairs of snacks Mo can afford.

[2 marks]

- (b) Mo wants his change to be as small as possible.
Which two snacks should he buy, and how much change does he get?

[2 marks]

Do not
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the box

14

Here are three number cards.

2

5

7

Ola uses all three cards to make three-digit numbers.

(a) List all the three-digit numbers Ola can make.

[2 marks]

(b) Exactly one of the numbers is a prime number.
Which number is it? You must show your working.

Answer _____

[2 marks]**15**

A class of 28 students chooses a leader, a deputy and a treasurer for a charity event.
Each student can do only one of the jobs.

The teacher says,

“There are more than 20 000 different ways to choose the three students.”

Is the teacher correct?

You must show your working.

[3 marks]

16

Asha has these four cards.



She uses all four cards to make a number.

The decimal point cannot be the first card or the last card.

(a) List all the numbers Asha can make.**[2 marks]****(b)** Which of Asha's numbers is closest to 5.15^2 ?
You must show your working.

Answer _____

[2 marks]

17

Zoe is at a farm park. She will start at the entrance, visit the aviary, the barn and the café once each, then go back to the entrance.

The table shows the walking distances, in kilometres, between these places.

	Entrance	Aviary	Barn	Café
Entrance		0.62	1.15	0.94
Aviary	0.62		0.85	0.48
Barn	1.15	0.85		1.37
Café	0.94	0.48	1.37	

- (a) Zoe always walks to the nearest place she has not visited yet.
Work out the total distance she walks.

Answer _____ km

[2 marks]

- (b) Show that Zoe could have walked a shorter distance.

[2 marks]

18

Ellie has five parcels, A, B, C, D and E.

Parcel	A	B	C	D	E
Mass (kg)	1.85	2.40	0.95	3.15	1.60

She puts all five parcels into two boxes.

Each box can hold at most 6 kg.

- (a) Show one way Ellie can put the parcels into the two boxes.

[2 marks]

- (b) Ellie wants the masses in the two boxes to be as close as possible.
Which parcels should go in each box?
You must show your working.

[2 marks]

END OF QUESTIONS