GCSE Maths – Number

Systematic Listing

Worksheet

NOTES

SOLUTIONS

This worksheet will show you how to work out different types of questions on systematic listing. Each section contains a worked example, a question with hints and then questions for you to work through on your own.

Section A

Worked Example

A cafe is selling drinks and snacks. Today the drinks they are selling are tea, coffee and orange juice. The snacks are apples, cake and crisps. How many possible combinations are there of one drink and one snack ?

Step 1: Create a table.

	Apples	Cakes	Crisps
Tea			
Coffee			
Orange juice			

Step 2: Read again, what is required in the question and mark the possible combinations/ outcomes.

*This question asks possible combinations of **1 drink and 1 snack**.*

Therefore, each drink will go with each of the snacks once.

The following diagram shows the equivalent of the following combinations.

- *Tea and an apple*
- *Tea and cake*
- *Tea and crisps*
- *Coffee and an apple*
- *Coffee and cake*
- *Coffee and crisps*
- *Orange juice and an apple*
- *Orange juice and cake*
- *Orange juice and crisps*

	Apples	Cakes	Crisps
Tea	✓	✓	✓
Coffee	✓	✓	✓
Orange juice	✓	✓	✓

Counting the number of ticks: 9 possible combinations

Guided Example

There are two groups of colours. First group has the colours blue and red. Second group has the colours green, purple, black and white. How many possible combinations are there of a colour from group 1 and a colour from group 2?

Step 1: Create a table

Step 2: Read again, what is required in the question and mark the possible combinations/ outcomes.

Now it's your turn!

If you get stuck, look back at the worked and guided examples.

1. A school plays different sports: cricket, football, basketball, table tennis, volleyball. How many possible combinations can be made from 1 person and 1 sport?

2. A person must take two subjects. They must choose one subject from Geography and History and one subject from Arts, Drama and German. List the possible combinations.

3. You roll a six sided dice and flip a coin at the same time. List all possible outcomes.

Section B – Higher only

Worked Example 1

At a restaurant there are 6 possible starters, 5 mains and 4 desserts on offer. Using the product rule, calculate how many possible combinations of starter, main course and dessert there are.

Step 1: Using the product rule, multiple the number of items from each group together.

We multiply the 'number of starters' x 'number of mains' x 'number of desserts:

$$6 \times 5 \times 4 = 120$$

*Therefore, there are **120** possible combinations.*

Guided Example 1

A person is grouping numbers and letters. There are 15 letters and the numbers are from 1 to 10. How many possible combinations can be made from 1 letter and 1 number?

Step 1: Using the product rule, multiple the number of items from each group together.

Worked Example 2

Work out the total number of ways 1, 2, 3, 4 and 5 can be ordered.

Step 1: Find the total options present for each item/number.

Starting from 1, it will have 5 options.
2 will have 4 options because a place is already used by 1.

By the same logic, 3 will have 3 options, 4 will have 2 options and 5 will have 1 option.

Step 2: Use the product rule with the possible options.

The total number of ways:

$$5 \times 4 \times 3 \times 2 \times 1 = 120$$

Guided Example 2

There are 4 people in a room and 4 chairs. Find the total number of different ways everyone can sit on the chairs.

Step 1: Find the total options present for each item/number.

Step 2: Use the product rule with the possible options.

Now it's your turn!

If you get stuck, look back at the worked and guided examples.

4. There are a group of boys and a group of girls auditioning to play Romeo and Juliet. There are 20 boys and 17 girls. Work out the total number of pairs that can be made for the role of Romeo and Juliet.

5. A bike has a two digit lock. The digits range from 1 to 9 including 1 and 9. How many possible combinations can be made in the lock?

6. How many possible ways of ordering the numbers 1, 5, 6, 7, 5?

7. A three-digit lock has numbers 3 to 8 including 3 and 8. How many possible combinations can be made without repeating a number?