

St. Andrews Scots Sr. Sec. School

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Session: 2025–26 Notes

Class: VI	Subject: Mathematics	Topic: Number Play	Notes
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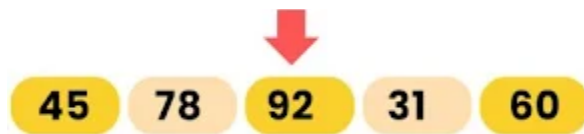
Introduction

Numbers play a vital role in our daily lives, helping us organize and manage various tasks. We've used them for counting, as well as performing basic operations like addition, subtraction, multiplication, and division to solve everyday problems.

Supercell

A **supercell** is a number in a grid that is larger than all of its neighbouring numbers. The neighbours of a cell are the numbers directly to the left, right, above, and below it. Let's say we have a grid of numbers, and our task is to find the supercells.

Example: Imagine a grid with the numbers 45, 78, 92, 31, and 60 arranged in a row.

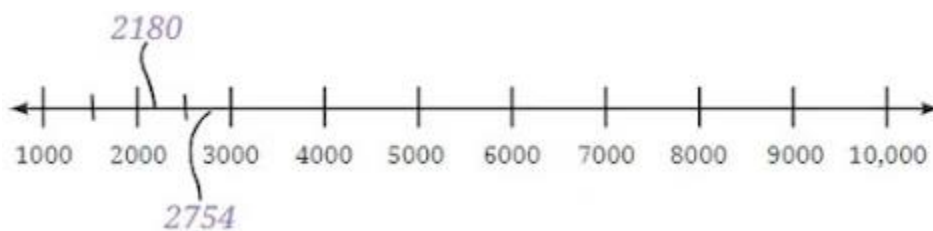


92 would be a supercell if it's greater than **78** (to its left) and **31** (to its right).

Patterns of Numbers on the Number Line

Let's practice placing some numbers on them. Imagine you have the following numbers: **2180, 2754, 1500, 3600, 9950, 9590, 1050, 3050, 5030, 5300, and 8400**. These numbers need to be positioned correctly on the number line.

Here's a basic number line to help you visualize:



- **2180** would be placed slightly after **2000** but before **3000**.
- **9950** would be very close to **10,000**.
- **3050** would be just after **3000**, and so on.

Playing with Digits

When we start counting numbers, we write them in order: 1, 2, 3, and so on. Let's explore how many numbers exist with different digit lengths.

1-digit numbers: These are the numbers from **1 to 9**, so there are **9** one-digit numbers.

2-digit numbers: These numbers range from **10 to 99**. To find out how many there are:

- Subtract the smallest two-digit number (10) from the largest (99) and add 1.
- $99 - 10 + 1 = 90$
- So, there are **90** two-digit numbers.

3-digit numbers: These numbers range from **100 to 999**.

- $999 - 100 + 1 = 900$
- So, there are **900** three-digit numbers.

4-digit numbers: These numbers range from **1000 to 9999**.

- $9999 - 1000 + 1 = 9000$
- So, there are **9000** four-digit numbers.

5-digit numbers: These numbers range from **10,000 to 99,999**.

- $99,999 - 10,000 + 1 = 90,000$

- So, there are **90,000** five-digit numbers.

Pretty Palindromic Patterns

Palindromic numbers are numbers that read the same forward and backward. For example, numbers like **66**, **848**, **575**, **797**, and **1111** are all palindromes because they look the same whether you read them from left to right or right to left.

Creating 3-Digit Palindromes

Let's explore how to create all possible 3-digit palindromes using the digits **1**, **2**, and **3**. A 3-digit palindrome has the same first and third digits. Here's how they look:

- **121**: The first and last digits are 1, and the middle digit is 2.
- **131**: The first and last digits are 1, and the middle digit is 3.
- **212**: The first and last digits are 2, and the middle digit is 1.
- **232**: The first and last digits are 2, and the middle digit is 3.

The Magic Number of Kaprekar

D.R. Kaprekar was a mathematics teacher from Devlali, Maharashtra, who had a deep love for numbers. He discovered many interesting patterns in numbers that had never been seen before. One of his most famous discoveries is the **Kaprekar constant**, a magical number associated with 4-digit numbers.

Steps to Discover the Magic:

Pick any 4-digit number (e.g., 6382).

Arrange the digits to form the largest possible number. Call this **A**.

- For 6382, the largest number is **8632**.

Rearrange the digits to form the smallest possible number. Call this **B**.

- For 6382, the smallest number is **2368**.

Subtract B from A to get a new number, **C**.

- **Subtract:** $8632 - 2368 = 6264$.

What Happens Next?

Take the number C and repeat the process:

Start with 6264:

- **Largest number (A):** 6642
- **Smallest number (B):** 2466
- **Subtract:** $6642 - 2466 = 4176$

Continue with 4176:

- **Largest number (A):** 7641
- **Smallest number (B):** 1467
- **Subtract:** $7641 - 1467 = 6174$

No matter what 4-digit number you start with, if you repeat these steps, you will always eventually reach the number **6174**. This number is called the **Kaprekar constant**.