

NUMBER BASES

Place Value, Digit Value and Number Value in Various Bases (< 10) Based on Grouping Process

Example: Number 2134_5

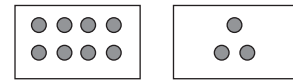
Place value	5^3	5^2	5^1	5^0
Digit	2	1	3	4

The value of the digit 2 is $2 \times 5^3 = 250_{10}$

$$2134_5 = (2 \times 5^3) + (1 \times 5^2) + (3 \times 5^1) + (4 \times 5^0)$$

$$= 294_{10}$$

Example of grouping process
 11_{10} can be grouped as follows:



Hence, $11_{10} = 13_8$

Changing Bases of Numbers

Any Base (< 10) → Base 10

Expand according to the place values of its digits

Base 10 → Any Base (< 10)

Use repeated division

Base 2 → Base 8
Base 8 → Base 2

Use the combination
4, 2, 1

Changing Numbers From one Base to Other Bases

- 1 Change the given number to base 10
- 2 Carry out repeated division to change back the number to the required base

Addition and Subtraction

- 1 Change the two numbers that are to be added or subtracted to base 10
- 2 Carry out the addition/subtraction in base 10
- 3 Carry out repeated division on the sum/difference at Step 2 to obtain back the original base

Solving Problems Involving Daily Real-Life Situations

Forming simultaneous linear equations involving numbers in various bases based on the given problem and solve the simultaneous equations