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Maths Competency Analytical Test

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PATH TO EDUCATIONAL EXCELLENCE

MATHS MASTER

A comprehensive Guide for mastering Mathematical Concepts.

Syllabus - Grade 2

- ✓ Numbers
- ✓ Addition
- ✓ Subtraction
- ✓ Multiplication
- ✓ Division
- ✓ Measurements
- ✓ Time and Money
- ✓ Lines, Shapes and Solids
- ✓ Patterns And Pictograph

Syllabus - Grade 3

- ✓ Numbers
- ✓ Computation Operations
- ✓ Measurement
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- ✓ Fraction
- ✓ Geometry
- ✓ Data Handling

Syllabus - Grade 4

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- ✓ Data Handling

Syllabus - Grade 5

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Syllabus - Grade 8

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- ✓ Factorisation
- ✓ Introduction to Graphs
- ✓ Playing with Number

Chapter 1: Numbers

At a glance:

- Number Sense
- Before/After/Between
- Comparing Numbers
- Expanded Form of Numbers
- Place Value
- Even & Odd Numbers

1. NUMBER SENSE:

To read a number, we should know the position of its digits in the place value chart.

The ***place value chart*** consists of place value columns. A digit placed in a place value column gets the value of that position in the place value chart.

1.1 Place value chart for 3-digit numbers:

The position of the number ABC in the place value chart will be:

Hundreds	Tens	Ones
A	B	C

The position of the numbers 456 and 837 in the place value chart will be:

Hundreds	Tens	Ones
4	5	6
8	3	7

1.2 Number Name:

The number name for the given numbers in the above place value chart:

456 is read as “four hundred and fifty-six”.

837 is read as “eight hundred and thirty-seven”.

1.3 Real-Life Examples:

a. The daily needs shop is 500 m away from my house.
   The daily needs shop is five hundred meters away from my house.
b. Anuradha bought one dress for ₹ 999.
   Anuradha bought one dress for nine hundred and ninety-nine rupees.

2. EXPANDED FORM OF NUMBERS:

The expanded form of a number is written as the addition of the place values of all the digits of the given number.

ABC = (A x 100) + (B x 10) + (C x 1)

In words, the expanded form is written as:

ABC = A hundreds + B tens + C ones

Example:

The number 178 can be written in expanded form in the following ways:

178 = 1 x 100 + 7 x 10 + 8 x 1

178 = 100 + 70 + 8

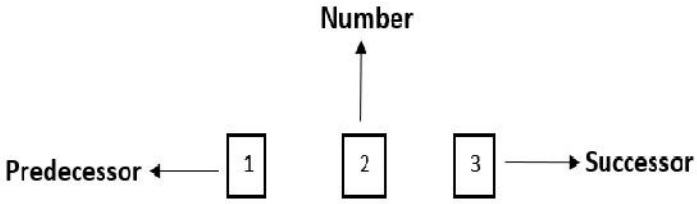
178 = 1 hundreds + 7 tens + 8 ones

3. BEFORE/AFTER/BETWEEN:

Before or Predecessor is the number immediately before a given number, that is,

Given number - 1

Therefore, the predecessor of 2 is 1.



After or Successor is the number immediately after a given number, that is,

Given number + 1

Therefore, the successor of 2 is 3.

Example:

a. What are the values of the predecessor and the successor of 56?

Predecessor = Number – 1
= 56 – 1
= 55

Successor = Number + 1
= 56 + 1
= 57

b. Find the predecessor and the successor of the given numbers.

Predecessor = Number - 1	Number	Successor = Number + 1
120 – 1 = 119	120	120 + 1 = 121
87 – 1 = 86	87	87 + 1 = 88
287 – 1 = 286	287	287 + 1 = 288
392 – 1 = 391	392	392 + 1 = 393
444 – 1 = 443	444	444 + 1 = 445

Between is the number that lies in the middle of the two given numbers, that is,

Given number 1 $\xrightarrow{+1}$ middle number $\xleftarrow{-1}$ Given number 2

Therefore, the number between 2 and 4 is 3.

Example:

a. Write the number that comes between 45 and 47.
Middle number = 46

b. Find the number between number 1 and number 2.

Number 1	Middle Number	Number 2
853	854	855
76	77	78
9	10	11
99	100	101
384	385	386

Difference between the predecessor and the successor of any given number = 2. The predecessor and the successor of any even number would be odd numbers and vice versa.

4. PLACE VALUE:

Place value is the value a digit carries for its position in the place value chart. Face value is the value of the digit itself.

Chapter 1: Numbers

At a glance:

- Number Sense
- Roman Numerals
- Prime Numbers

1. NUMBER SENSE:

A number is formed and read by placing the digits in the place value chart. The place value of digits keeps increasing as we move from right to left in a number.

Placing digits in the place value chart gives value to the digits, and helps you see how numbers are built.

Example:

Place Values	Thousands (T)	Hundreds (H)	Tens (T)	Ones (O)
Digit in the given place	**5**	**9**	**7**	**2**
	↓	↓	↓	↓
	5 thousands	9 hundreds	7 tens	2 ones
	5 x 1000	9 x 100	7 x 10	2 x 1

So, the **Expanded form** of the number = 5000 + 900 + 70 + 2

The **Short form** of the number = 5,972

In words = Five thousand nine hundred seventy-two

1.1 ABACUS:

We can also show numbers as the **beads** on the Abacus.

Here, each spike represents a **place value**, moving from right to left, ones (O), Tens (T), Hundreds (H) and Thousands (Th).

The number of beads on a spike represents the number in that place value and is read accordingly.

	Th	H	T	O
The number is	2	4	1	3

Expanded form of the number is = 2000 + 400 + 10 +3

In words, **Two thousand four hundred thirteen.**

Real Life Examples:

a. Mount Everest is the highest mountain peak in the world. Its height is 8848 metres.

Let us expand 8848.

8848 = (8 x 1000) + (8 x 100) + (4 x 10) + (8 x 1)

Let us write 8848 in words.

8848 = Eight thousand eight hundred and forty-eight.

b. River Ganga is the longest river in India. It is around 2525 kilometres long.

Fill in the blanks to complete the expanded form of 2525 and then write its short form.

Expanded form **Short form**

2000 + 500 + _____ +_____ = _____

1.2 Face Value & Place Value:

Face value is the value of a digit itself.

Example:

a. The face value of 7 in the number **7**,259 is 7.
b. The face value of 1 in the number 7,2**1**3 is 1.

Place value is the value a digit carries for its **place** in a number.

Example:

a. The place value of 8 in the number **8**,110 is 8,000.
b. The place value of 5 in the number 1,3**5**2 is 50.

Consider the number: **7,634**

Place in the number	**Thousands (T)**	**Hundreds (H)**	**Tens (T)**	**Ones (O)**
Digit in the given place	**7**	**6**	**3**	**4**
Face Value	**7**	**6**	**3**	**4**
Place Value	**7 x 1,000**	**6 x 100**	**3 x 10**	**4 x 1**

1.3 Predecessor & Successor:

Predecessor of a given number is one less than the given number. **Predecessor = Given number – 1**	The successor of a number is one more than the given number. **Successor = Given number + 1**

Example:

a. 10 is the successor of the number 9 as 9 + 1 = 10
b. 10 is the predecessor of the number 11 as 11 – 1 = 10
c. 1001 is the successor of 1000 as 1000 + 1 = 1001 and the predecessor of 1000 is 1000 – 1 = 999.

Sum of the predecessor and successor of any given number = 2 x (Given Number)

Example:

Let the given number be 5.
Predecessor of 5 = 4
Successor of 5 = 6
Sum = 4 + 6 = **10** ..... [2 × (Given Number) = 2 × 5 = 10]

Difference between the predecessor and the successor of any given number = 2

Example:

Let the given number be 13.
Predecessor of 13 = 12
Successor of 13 = 14
Difference = 14 - 12 = **2**

1.4 Comparing Numbers:

Step 1:

Check the number of digits in each number.

Number with more digits > Number with less digits

4 3 2 1 **>** 3 2 1

The number has four digits — The number has three digits

Chapter 1: Numbers

At a glance:

- Number Names
- Comparing & Ordering of Numbers
- Estimation
- Face Value & Place Value
- Sequence
- Roman Numerals

1. NUMBER NAMES:

A number is formed and read by placing the digits of the number in the place value chart. The place value keeps increasing as we move from right to left.

Placing the digits in the place value chart gives a value to the digits and the number is formed.

The place value chart is divided into periods. A comma (,) is placed between every period in short form to help us read the number easily.

For 5-digit numbers:

The place value chart is divided into two periods Ones and Thousands

The **Ones period** is divided into three columns: Ones, Tens and Hundreds

The **Thousands Period** is divided into two columns: Thousands and Ten Thousands

Periods	THOUSANDS		ONES		
Place in the number	**Ten Thousands (T Th)**	**Thousands (Th)**	**Hundreds (H)**	**Tens (T)**	**Ones (O)**
Digit in the given place	**6**	**3**	**2**	**1**	**4**
	6 Ten Thousands 6 x 10,000	3 Thousands 3 x 1000	2 Hundreds 2 x 100	1 Tens 1 x 10	4 Ones 4 x 1

So, the **Expanded form** of the number = 60,000 + 3000 + 200 + 10 + 4

The **Short form** of the number = 63,214

In words = Sixty-three thousand two hundred and fourteen

For 6-digit numbers:

The place value chart is divided into three periods: Ones, Thousands and Lakhs

The **Ones period** is divided into three columns: Ones, Tens and Hundreds

The **Thousands Period** is divided into two columns: Thousands and Ten Thousands

The Lakhs Period has one column: Lakhs

Periods	LAKHS	THOUSANDS		ONES		
Place in the number	**Lakhs (L)**	**Ten Thousands (T Th)**	**Thousands (Th)**	**Hundreds (H)**	**Tens (T)**	**Ones (O)**
Digit in the given place	**6**	**8**	**7**	**5**	**4**	**9**
	6 Lakhs 6 x 1,00,000	8 Ten Thousands 8 x 10,000	7 Thousands 7 x 1000	5 Hundreds 5 x 100	4 Tens 4 x 10	9 Ones 9 x 1

So, the **Expanded form** of the number = 6,00,000 + 80,000 + 7,000 + 500 + 40 + 9

The **Short form** of the number = 6,87,549

In words = Six lakh eighty-seven thousand five hundred and forty-nine

Note: Empty places in a place value chart are filled by 0. Hence, 0 is called a place holder.

L	T Th	Th	H	T	O
6	-	7	5	-	9
6	0	7	7	0	9

Real Life Examples:

a. The distance between Mumbai and New York city is 12,530 kilometres.

   OR

   The distance between Mumbai and New York city is twelve thousand five hundred and thirty kilometres.

b. The population of a certain town is 1,04,249.

   OR

   The population of a certain town is one lakh four thousand two hundred and forty-nine.

1.1 SPIKE ABACUS:

We can represent numbers using the beads on a spike Abacus.

Here, each spike represents a place value. Thus, moving from right to left, we have Ones (O), Tens (T), Hundreds (H), Thousands (Th), Ten Thousands (T Th) and Lakhs (L)

The number of beads on each spike represents the digit in that particular place value and we read the number accordingly.

	L	T Th	Th	H	T	O
The number is	4	3	7	3	6	5

The expanded form of the number = 400000 + 30000 + 7000 + 300 + 60 + 5

Short Form = 4,37,365

In words, we read the number as four lakh thirty-seven thousand three hundred and sixty-five.

2. FACE VALUE & PLACE VALUE:

Face value is the absolute value of a digit in a given number.

Example:

a. The face value of 4 in the number 23,456 is 4.
b. The face value of 2 in the number 182 is 2.

Place value is the value a digit carries for its place in a number.

Example:

a. The place value of 4 in the number 23,456 is 400.
b. The place value of 2 in the number 182 is 2.

Observe that the place value and the face value of a digit in the ones place are equal.

Chapter 1: Numbers

At a glance:

- Types of Numbers
- Expanded Form and Short Form
- Ascending and Descending Order
- Formation of Numbers
- System of Numeration
- Predecessor and Successor Numbers
- Estimation to Nearest 10's, 100's and 1000's
- Roman Numerals

We use numbers in our day-to-day life. Consider these examples.

- My best friend stays on the seventeenth floor of this building.
- Nisha sleeps eight hours daily.
- Mr. Tandon saves Rs. 5000 every month after his monthly expenditures.

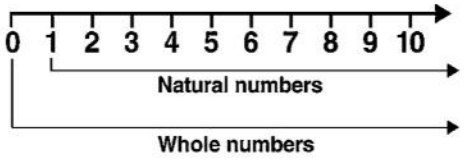
In all these cases, numbers are used to represent a quantity. They are used to calculate time, keep a track of monthly expenses, and a lot many things. In other words, we can say that numbers are used for counting, comparing and measuring.

Numbers are basic components of mathematics. There are different types of numbers depending on their properties.

1. TYPES OF NUMBERS:

a. NATURAL NUMBERS:

Natural numbers are a part of the number system which comprises all the positive integers from one to infinity.



b. WHOLE NUMBERS:

Whole numbers are the number 0 (zero) together with the natural numbers.

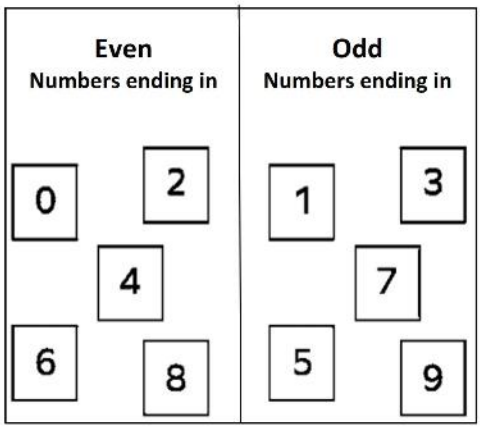
c. EVEN NUMBERS:

Whole number that are completely divisible by two (2) and generates a remainder of zero (0) are called even numbers. Even numbers have the digits "0," "2," "4," "6," or "8" in the ones place. For example: 234, 86, 83830, etc.

d. ODD NUMBERS:

The numbers which are not divisible by two (2) and leaves a remainder of one (1) are odd numbers. Odd numbers have the digits "1," "3," "5," "7," or "9" in the ones place.

For example: 23, 4785, 2469, etc.



2. SYSTEM OF NUMERATION:

To read or write a given number, we consider the position of digits in the place value chart.

Place Value depends on the position of the digit in the place value chart. The Face Value is the value of the number itself.

The representation of a number in place value system:

The number to be read is placed under each place value chart starting with extreme right digit at ones place followed by filling the rest.

The commas are used as separators to represent each period.

The place value chart can be represented in two systems:

a. Indian Place Value System
b. International Place Value System

a. Indian Place Value System:

In the Indian Place Value system, there are two places in each period, except the Ones Period that has three places.

The Indian Place Value System consist of the following periods:

Indian Place Value Chart								
CRORES		LAKHS		THOUSANDS		ONES		
TC	C	TL	L	TTH	TH	H	T	O

Ones Period – Ones(O), Tens (T), Hundreds (H)

Thousands Period – Thousands (Th), Ten Thousands (TTh)

Lakhs Period – Lakhs (L), Ten Lakhs (TL)

Crores Period – Crores (C), Ten Crores (TC)

Let's consider the number 711387905 placed in the Indian place value chart:

Crores Period		Lakhs Period		Thousands Period		Ones Period		
TC	C	TL	L	TTH	TH	H	T	O
7	1	1	3	8	7	9	0	5

The number 711387905, in the Indian place value system is represented as 71,13,87,905 and is read or written as:

Seventy-one crore thirteen lakh eighty-seven thousand nine hundred and five.

b. International Place Value System:

In the International Place Value system, there are three places in each period.

The International place value system consists of the following periods:

International Place Value Chart								
MILLIONS			THOUSANDS			ONES		
HM	TM	M	HTH	TTH	TH	H	T	O

Ones Period – Ones(O), Tens (T), Hundreds(H)

Thousands Period – Thousands (TH), Ten Thousands (TTH), Hundred Thousands

Millions Period – Millions (M), Ten Millions (TM), Hundreds Millions (HM)

Let's consider the number 711387905 placed in the International place value chart:

MILLIONS			THOUSANDS			ONES		
HM	TM	M	HTH	TTH	TH	H	T	O
7	1	1	3	8	7	9	0	5

The number 711387905 in International Place Value chart is represented as **711,387,905** can be read or written as:

Seven hundred eleven million three hundred and eighty-seven thousand nine hundred and five.

Chapter 1: Knowing Our Numbers

At a glance:

- System of Numeration
- Successor and Predecessor
- Estimation of Numbers
- Roman Numerals
- Formation of numbers
- Comparison of numbers
- VBODMAS

Imagine planning a school event where you're tasked with organising seating, snacks, and activities for hundreds of students! In such scenarios, understanding and managing large numbers becomes crucial. The system of numeration explains how numbers are structured and formed. Successors and predecessors teach us about the sequence of numbers, essential for organizing and planning. The skill of comparing numbers and estimating their magnitude helps in making quick decisions, like estimating the amount of supplies needed. Therefore, learning about numbers helps us tackle everyday challenges involving numbers.

1. SYSTEM OF NUMERATION:

1.1 VALUE:

- Place Value - It depends on the position of the digit in the place value chart according to the place value numeration system.
- Face Value – It is the value of the number itself.

1.2 TWO SYSTEMS OF NUMERATION:

a. Indian Place Value System:

Indian Place Value System for number: 14673215894

ARAB		CRORES		LAKHS		THOUSANDS		ONES		
TA	A	TC	C	TL	L	TTh	Th	H	T	O
1	4	6	7	3	2	1	5	8	9	4

- Placement of Commas between every period:

  TA A , TC C , TL L , TTh Th , H T O

  1 4 , 6 7 , 3 2 , 1 5 , 8 9 4
- The number 14,67,32,15,894 is written/read as:
  Fourteen arab sixty-seven crores thirty-two lakhs fifteen thousand eight hundred ninety-four
- Place Value of 7 in 14,67,32,15,894 is 7,00,00,000 or Seven crore.
- Face Value of 7 in 14,67,32,15,894 is 7.
- Expanded form of 14,67,32,15,894 according to the Indian Place Value System:
  10,00,00,00,000 + 4,00,00,00,000 + 60,00,00,000 + 7,00,00,000 + 30,00,000 + 2,00,000 + 10,000 + 5,000 + 800 + 90 + 4

b. International Place Value System:

International Place Value system for number: **286354729463**

BILLION			MILLION			THOUSAND			ONES		
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
2	8	6	3	5	4	7	2	9	4	6	3

- Placement of Commas:

  HB TB B HM TM M HTh TTh Th H T O

  2 8 6 , 3 5 4, 7 2 9 , 4 6 3
- The number 286,354,729,463 is written/read as:
  Two hundred eighty-six billion three hundred fifty-four million seven hundred twenty-nine thousand four hundred sixty-three
- Place value of 8 in 286,354,729,463 is 80,000,000,000 or eighty billion.
- Face Value of 8 in 286,354,729,463 is 8.
- Expanded form of 286,354,729,463 according to the International Place Value System:
  200,000,000,000 + 80,000,000,000 + 6,000,000,000 + 300,000,000 + 50,000,000 + 4,000,000 + 700,000 + 20,000 + 9,000 + 400 + 60 + 3

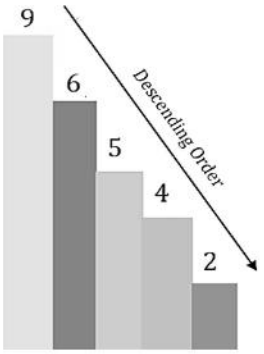
2. FORMATION OF NUMBERS:

The digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are arranged in a place value chart to form a number.

- **Greatest Number:**

  To form the greatest number, the given digits are arranged in a descending order i.e., in decreasing order.

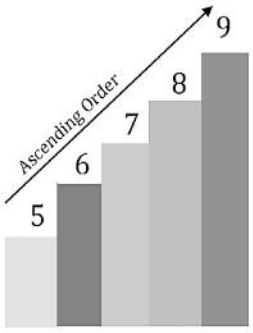
  For example, using digits 6, 9, 2, 4 and 5, the greatest number formed is 96542.



- **Smallest Number:**

  To form the smallest number, the digits are arranged in ascending order i.e., in increasing order.

  For example, using digits 7, 9, 6, 8, and 5, the smallest number formed is 56789.



3. SUCCESSOR AND PREDECESSOR:

- **Successor:** The successor of a number is obtained by adding 1 to the given number.
- **Predecessor:** The predecessor of a number is obtained by subtracting 1 from the given number.

  To form the greatest number, the given digits are arranged in a descending order i.e., in decreasing order.

Example:

Find the predecessor and successor of the given number 14,760.

Solution: The given number is = 14760

Predecessor = 14759 (14760 – 1 = 14759)

Successor = 14761 (14760 + 1 = 14761)

Chapter 1: Integers

At a glance:

- Integers
- Absolute Value of an Integer
- Multiplication of Integers
- Division of Integers
- Comparison of Integers
- Properties of Addition and Subtraction of Integers
- Properties of Multiplication of Integers
- Properties of Division of Integers

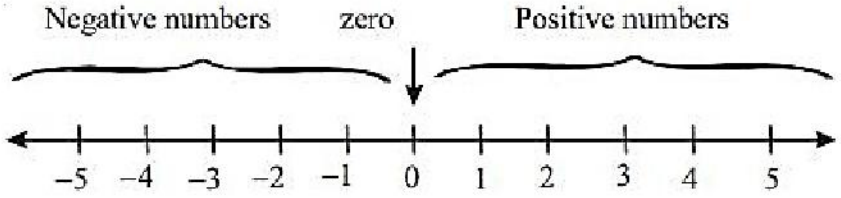
Imagine you're saving up for a new video game. Each week, you may either save some money (+) or you may spend a bit on snacks (−). This scenario is a perfect example of dealing with integers in real life. Integers are whole numbers that include positive numbers, negative numbers, and zero. In this chapter, we will explore how to add, subtract, multiply, and divide them, as well as understand their properties and how they are used in everyday situations.

1. INTEGERS:

An integer is a number that does not have a decimal or fractional part. Thus, the set of integers includes 0, all the positive numbers, and all the negative numbers. It is represented by Z.

We can represent integers on a number line. Observe how the integers are arranged on the number line. 0 is in the middle, the positive integers are to the right of 0 and the negative integers are to the left of 0.

0 is neither a positive number nor a negative number.



Number line

1.1 REPRESENTING INTEGERS:

We use a plus **(+)** or no sign in front of a number to indicate that it is a positive number. For example, +5 or just 5 both indicate the positive integer 5. We read it as five or positive five.

We use a minus **(–)** sign in front of a number to indicate that it is a negative number. Thus, we write the negative integer 5 as -5, and we read it as negative five.

2. TWO SYSTEMS OF NUMERATION:

We can use the number line to compare the values of two integers. Note that on the number line:

- As we move from 0 towards the right, the values of the integers keep increasing.
- As we move from 0 towards the left, the values of the integers keep decreasing.

Therefore:

1. Every positive integer is greater than 0.
   Example: 2 > 0
2. Every positive integer is greater than every negative integer.
   Example: 2 > -24

3. Every negative integer is less than 0.
   Example: -5 < 0
4. Every negative integer is less than every positive integer.
   Example: -93 < 1

Examples:

1. Compare 39 and -429.

Solution:

39 is a positive integer and -429 is a negative integer.

So, 39 > -429

2. Compare -523 and +1.

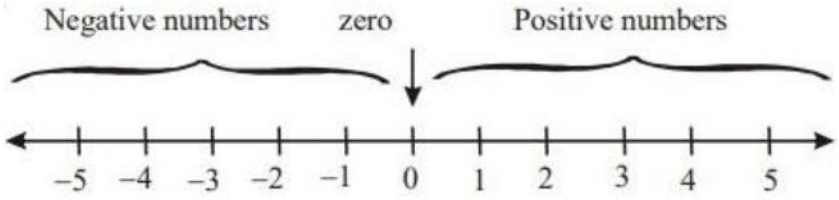
Solution:

-523 is a negative integer and +1 is a positive integer.

So, -523 < +1

3. ABSOLUTE VALUE OF AN INTEGER:

Let's refer to the number line again.



Number line

The absolute value of an integer is its distance from 0.

For Example:

+3 is at a distance of 3 units from 0, towards the right. So, the absolute value of +3 is 3.

Notice that -3 is at a distance of 3 units from 0, towards the left. So, the absolute value of -3 is also 3.

To find the absolute value of an integer, simply ignore its sign.

We write absolute value like this:

|-5| = 5

|5| = 5

Examples:

1. The absolute value of -765 is ___

Solution:

We drop the negative sign of -765 to find its absolute value.

So, the absolute value of -765 is 765.

We can also write this as:

|-765| = 765

2. Find the absolute value of 34.

Solution:

|34| = 34

So, -523 < +1

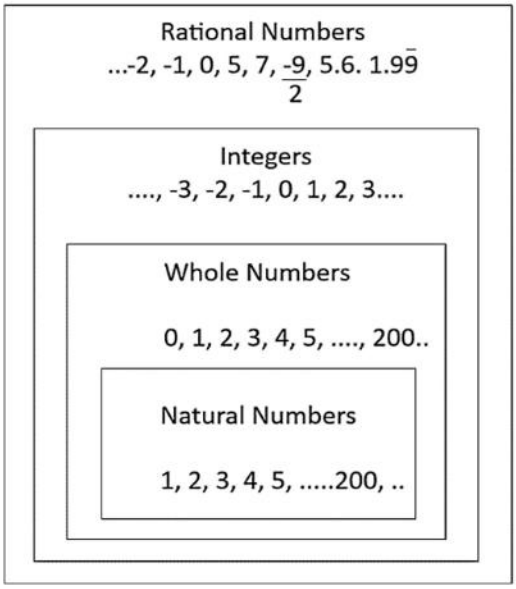
Chapter 1: Rational Numbers

At a glance:

- Rational Numbers
- Properties of Rational Numbers
  - Closure Property
  - Associative Property
  - Additive Property
  - Multiplicative Property
  - Distributivity Property
  - Commutative Property
  - Calculations using Commutativity and Associative Property
  - Additive Inverse Property
  - Multiplicative Inverse Property

1. RATIONAL NUMBERS:

Rational numbers are the numbers that can be expressed in the form of $\frac{a}{b}$, where both a and b are integers and $b \neq 0$.



For example, calculating discounts and sales tax involves rational numbers. if an item is discounted by 25%, you're essentially dealing with the rational number $\frac{1}{4}$ or 0.25. Sales tax is often a fraction of the total cost as well.

Expressing time in hours and minutes involves rational numbers. For example, 2 hours and 30 minutes can be represented as $2\frac{1}{2}$ hours, which is a rational number.

Also, when we follow a recipe, we often encounter rational numbers. For instance, a recipe might need $\frac{1}{2}$ cup of flour, $\frac{3}{4}$ teaspoon of salt, or $2\frac{1}{2}$ tablespoons of sugar.

So, these examples demonstrate how rational numbers are encountered in everyday life and used in various contexts.

We have already learned about the basic operations of rational numbers, now let's explore some properties of operations on the different types of numbers.

2. PROPERTIES OF RATIONAL NUMBERS:

Properties of rational numbers are important for understanding the operations of rational numbers. There are six properties of rational numbers:

a. Closure Property
b. Commutative Property
c. Associative Property
d. Additive Property
e. Multiplicative Property
f. Distributive Property

Let's apply these properties to different types of rational numbers.

2.1 CLOSURE PROPERTY:

1. Whole Numbers:

Operation	Numbers	Remarks
Addition	16 + 4 = **20** 9 + 0 = **9** Whole numbers $a + b$ is a whole number for any two whole numbers a and b.	Whole numbers are closed under addition.
Subtraction	10 – 15 = **–5**, which is not a whole number.	Whole numbers are **not** closed under Subtraction.
Multiplication	20 × 0 = **0** 12 × 4 = **48** Whole numbers $a \times b$ is a whole number for any two whole numbers a and b.	Whole numbers are closed under Multiplication.
Division	$6 \div 24 = \frac{1}{4}$, which is not a whole number.	Whole numbers are **not** closed under Division.

2. Natural Numbers:

Operation	Numbers	Remarks
Addition	8 + 4 = **12** 9 + 0 = **9** Natural numbers $a + b$ is a natural number for any two natural numbers a and b.	Natural numbers are closed under addition.
Subtraction	11 – 13 = **–2**, which is not a natural number.	Natural numbers are **not** closed under Subtraction.
Multiplication	2 × 3 = **6** 11 × 4 = **44** Natural numbers $a \times b$ is a natural number for any two natural numbers a and b.	Natural numbers are closed under Multiplication.
Division	$9 \div 27 = \frac{1}{3}$, which is not a natural number.	Natural numbers are **not** closed under Division.

3. Integers:

Operation	Numbers	Remarks
Addition	–8 + 4 = **–4** – 5 + 0 = **–5** Integers $a + b$ is an integer for any two integers a and b.	Integers are closed under addition.
Subtraction	–20 + 35 = **15** –12 – 14 = **–26** Integers $a - b$ is an integer for any two integers a and b.	Integers are closed under Subtraction.
Multiplication	(–8) × 5 = **–40** (–12) × (–3) = **36** Integers $a \times b$ is an integer for any two integers a and b.	Integers are closed under Multiplication.
Division	$6 \div 7 = \frac{6}{7}$, which is not an integer.	Integers are **not** closed under Division.