1 Number Systems

Objectives:

|  |
| --- |
| Review number systems from natural numbers to rational numbers with real-life examples to explain the transition from one to the next |
| Review various operations and terms related to number systems |
| Understand the need for irrational numbers as a new set of numbers |
| Define and understand real numbers as the set of all rational and irrational numbers |
| Discuss a few popular irrational numbers |
| Understand how to identify rational and irrational numbers  |
| Represent rational numbers on a number line |

Perform basic arithmetic operations on rational numbers

|  |  |  |  |
| --- | --- | --- | --- |
| Content | Teacher's Activity  | Student's Activity | Assignments |
| Counting numbers to Integers (Directed Numbers)NIOS: 1.2IGCSE: 1.1, 1.5  | * + Explain the evolution of numbers from counting numbers to integers
	+ Revise the four basic operations on each number system and the closure property, commutative and associative properties
	+ Review plotting each number type on a number line

  | * + Identify a number as belonging to one of the basic number systems (N, W, Z)
	+ Understand the meaning of the various properties of number systems
	+ Plot various number systems on a number line

  | NIOS: Ex 1.1Relevant Terminal Ex problemsIG: Ex 1.12, 1.13 |
| Other common number types (classifications)IGCSE: 1.1Operations on various numbersIGCSE: 1.2 - 1.4, 1.6 | * + Review the definitions of odd/even, prime, composite and perfect squares
	+ Review multiples and factors; how to calculate LCM and HCF
	+ Review prime factors of a number and their calculation
	+ Explain the concepts of squares and cubes and their computation
	+ Explain the concepts of square roots and cube roots using prime factorisation
	+ Review BODMAS/BIDMAS through problems
 | * + Identify and give examples for each number type: odd/even, prime, composite and perfect squares
	+ Find the prime factors for a given number
	+ Calculate square roots and cube roots of perfect squares/cubes using prime factorisation
	+ Solve arithmetic expressions (numeric) using BIDMAS
 | IG: Ex 1.1 - 1.16Relevant Examination Practice problems |
| Rational NumbersNIOS: 1.3 - 1.9IG: 5.1, 5.2 | * + Review the following for rational numbers (rational from ratio):
		- Standard form of a rational number
		- Equivalent fractions
		- Plotting rational numbers on a number line
		- Comparing rational numbers
		- Addition/Subtraction/Multiplication/Division of rational numbers
 | * + Convert a number (N, W, Z, Q) to a rational number in standard form
	+ Find equivalent forms of a given rational number
	+ Plot rational numbers on the number line
	+ Perform add/sub/mult/div/compare operations on rational numbers
 | NIOS: Ex 1.2 IG: 5.2 - 5.6: mixed fraction and decimal problems, word problems  |
|   | * + Review decimal representation of rational numbers
	+ Point out the two different types of decimals: terminating and non-terminating but repeating (recurring decimals)
	+ Explain how terminating decimals and non-terminating repeating decimals can be converted back to p/q rational number format
	+ Explain how an infinite number of rational numbers can be identified between any two rational numbers
 | * + Convert fractions to decimals and vice versa
	+ Find rational numbers between any two given rational numbers
 | NIOS: Ex 1.3, 1.4 |
| Irrational NumbersNIOS: 1.10IG: 9.2 | * + Introduce irrational numbers as numbers that cannot be represented as rational numbers (in a ratio): p/q - non-terminating non-repeating decimal numbers; square root of prime numbers/non-perfect squares
	+ Point out the confusion it caused during Pythagorean times (length of the diagonal of a square)
	+ Call out some popular irrational numbers: pi, phi
	+ Introduce the new set of numbers: Real numbers (R) = Rational (Q) + Irrational Numbers (I)
 | * + Understand all number systems up to Real numbers and their relationship
 |   |
|   | * + Through examples, help students identify rational and irrational numbers
	+ Explain the behaviour when simple arithmetic is performed on rational and irrational numbers
	+ Explain the calculation of square roots for common primes - 2, 3, 5, 7 using division method

  | * + Identify rational and irrational numbers from a given set of numbers
	+ Understand what type of answers to expect when operations are performed on irrational numbers
	+ Calculate square root of simple prime numbers using division method
 | IG: Ex 9.5Classroom problems |
| Rounding NumbersNIOS: 1.13IG: 1.7 | * + Explain the importance of rounding off, both as an estimation tool as well as to simplify calculations of non-terminating decimals
	+ Through examples, explain rounding off decimals to :
		- whole numbers
		- to n decimal places
		- to m significant figures
 | * + Round off decimal numbers to the expected decimal places/significant figures
 | NIOS: Ex 1.7IG: 1.17 |
| Catch-up class | * + Clear doubts
 | * + Complete CW and HW
	+ Prepare for test
 |   |
| Test |   |   |   |