1 Number Systems

Objectives:

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| 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

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| Content | Teacher's Activity | Student's Activity | Assignments |
| Counting numbers to Integers (Directed Numbers)  NIOS: 1.2  IGCSE: 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 1.1  Relevant Terminal Ex problems  IG: Ex 1.12, 1.13 |
| Other common number types (classifications)  IGCSE: 1.1  Operations on various numbers  IGCSE: 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 - 1.16  Relevant Examination Practice problems |
| Rational Numbers  NIOS: 1.3 - 1.9  IG: 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 Numbers  NIOS: 1.10  IG: 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 9.5  Classroom problems |
| Rounding Numbers  NIOS: 1.13  IG: 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 1.7  IG: 1.17 |
| Catch-up class | * + Clear doubts | * + Complete CW and HW   + Prepare for test |  |
| Test |  |  |  |