

Grade 10 Math Formulas

Real Numbers Formulas

Based on Maharashtra Board Syllabus (NEP 2025-26)

Note:

This document contains key concepts and formulas related to Real Numbers for Grade 10.

Euclid's Division Lemma

- Given positive integers 'a' and 'b', there exist unique integers 'q' and 'r' satisfying $a = bq + r$, where $0 \leq r < b$.
- This lemma is the basis for Euclid's Division Algorithm, which is used to find the Highest Common Factor (HCF) of two positive integers.

Fundamental Theorem of Arithmetic

- Every composite number can be expressed (factorised) as a product of primes, and this factorisation is unique, apart from the order in which the prime factors occur.
- Example: $12 = 2$ multiplied by 2 multiplied by $3 = 2$ squared multiplied by 3 .

Relationship between HCF and LCM

- For any two positive integers 'a' and 'b':
 $\text{HCF}(a, b) \text{ multiplied by } \text{LCM}(a, b) = a \text{ multiplied by } b$
- This relationship is only true for two numbers.

Revisiting Rational and Irrational Numbers

- Rational Numbers: Terminating or non-terminating repeating decimals.
- Irrational Numbers: Non-terminating, non-repeating decimals.
- Theorem: If p is a prime number, then square root of p is irrational. Example: square root of 2, square root of 3, square root of 5 are irrational.
- Theorem: Let x be a rational number whose decimal expansion terminates. Then x can be expressed in the form p/q , where p and q are coprime, and the prime factorization of q is of the form $2 \text{ to the power of } n \text{ multiplied by } 5 \text{ to the power of } m$, where n and m are non-negative integers.
- Theorem: Let $x = p/q$ be a rational number, such that the prime factorization of q is not of the form $2 \text{ to the power of } n \text{ multiplied by } 5 \text{ to the power of } m$, where n and m are non-negative integers. Then x has a non-terminating repeating decimal expansion.

End of Formulas - Real Numbers Formulas

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