SmartKalike

CBSE Class 10 · Maths

Real Numbers

10 most probable questions for Boards 2027

Q1. 1 mark · Multiple choice

Which statement about the prime factorisation of a natural number is correct?
(A) It is unique only when the prime factors are written in descending order.
(B) It is unique except for the order of its factors.
(C) It is never unique if a prime factor occurs more than once.
(D) It is unique only for prime numbers.

Answer

(B) It is unique except for the order of its factors — the prime factorisation of a natural number is unique, except for the order of its factors.

Q2. 2 marks · Short answer

State the Fundamental Theorem of Arithmetic, including what it says about the uniqueness of prime factorisation.

Answer

Every composite number can be expressed as a product of primes, and this factorisation is unique, apart from the order in which the prime factors occur.

Q3. 5 marks · Long answer

(5 marks) Explain why the prime factorisation of a composite number is unique apart from the order of its prime factors, and state how writing the factors in ascending order expresses this uniqueness. State whether there are finitely or infinitely many primes. Then explain why 4^n cannot end in zero for any natural number n, using prime factorisation.

Answer

The Fundamental Theorem of Arithmetic gives a unique prime factorisation for every composite number, except for the order of the prime factors.

1. Every composite number can be expressed as a product of primes. The factorisation is unique apart from the order in which the prime factors occur.
2. Writing the prime factors in ascending order, $p_1 \le p_2 \le \ldots \le p_n$, fixes their order. Once this order is chosen, the factorisation is unique.
3. There are infinitely many primes. Combining repeated prime factors gives powers of primes, such as $32760 = 2^3 \times 3^2 \times 5 \times 7 \times 13$.
4. For any natural number n, $4^n = 2^{2n}$, so its only prime factor is 2. A number ending in zero is divisible by 5, and its prime factorisation must contain 5; therefore, 4^n cannot end in zero.
Thus, unique prime factorisation establishes the result for 4^n.

Q4. 1 mark · Very short answer

State how the prime powers are selected when finding the HCF and the LCM of two positive integers.

Answer

For the HCF, select the smallest powers of common prime factors; for the LCM, select the greatest powers of all prime factors involved.

Q5. 2 marks · Short answer

Write the relation connecting the HCF, LCM and the product of two positive integers. Explain what it allows you to find if the HCF and the two integers are known.

Answer

For two positive integers a and b, HCF(a, b) × LCM(a, b) = a × b. If the HCF and both integers are known, divide their product by the HCF to find the LCM.

Q6. 5 marks · Long answer

Let q be a non-zero rational number and x an irrational number. Prove that qx and x/q are irrational. Use a contradiction argument, explaining why assuming either result is rational would conflict with the irrationality of x.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/real-numbers

Q7. 1 mark · Multiple choice

If a prime number p divides a^2, which conclusion follows?
(A) p divides a.
(B) a divides p.
(C) p^2 divides a.
(D) a^2 is prime.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/real-numbers

Q8. 2 marks · Short answer

When is a real number called irrational? State the condition on the integers in the form p/q used to define a rational number.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/real-numbers

Q9. 5 marks · Long answer

Explain how the Fundamental Theorem of Arithmetic is used to study the decimal expansion of a rational number and to prove that numbers such as $\sqrt{2}$ are irrational. Also state Euclid's division algorithm.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/real-numbers

Q10. 1 mark · Multiple choice

In the contradiction proof that $\sqrt{3}$ is irrational, assuming $\sqrt{3} = a/b$ in lowest terms leads to which conclusion?

(A) Neither a nor b is divisible by 3.

(B) Both a and b are divisible by 3.

(C) a is divisible by 3 but b is not.

(D) b is divisible by 3 but a is not.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/real-numbers

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