Real Numbers - Complete Chapter Notes

This PDF contains: • Important notes and concepts
• Definitions and formulas
• Solved important questions
• Exercise answers and key points
• Exam revision notes

1. Important Notes

- Every composite number can be expressed as a product of prime numbers.
- This factorisation is unique except for the order of primes.
- HCF = Product of smallest powers of common prime factors.
- LCM = Product of greatest powers of all prime factors.
- For two numbers: HCF × LCM = Product of numbers.
- √2, √3, √5 are irrational numbers.
- A rational + irrational number is irrational.
- A non-zero rational × irrational number is irrational.

2. Important Formulas

Concept	Formula
HCF × LCM	HCF(a,b) × LCM(a,b) = a × b
Prime Factorisation	Every composite number = product of primes
LCM	Product of greatest powers of prime factors
HCF	Product of smallest powers of common factors

3. Important Solved Questions

Q1. Find HCF and LCM of 6 and 20.

6 = 2 × 3
20 = 2^2 × 5
HCF = 2
LCM = 2^2 × 3 × 5 = 60

Q2. Why can 4■ never end with digit 0?

4■ = 2^2■. It contains only factor 2 and not factor 5. Therefore it cannot end with 0.

Q3. Prove that √2 is irrational.

Assume √2 is rational. Let √2 = a/b where a and b are coprime.
Squaring gives $2b^2 = a^2$.
Thus a is divisible by 2.

Then b is also divisible by 2.
This contradicts that a and b are coprime.
Therefore $\sqrt{2}$ is irrational.

Q4. Prove that $\sqrt{3}$ is irrational.

Assume $\sqrt{3} = a/b$.
Squaring gives $3b^2 = a^2$.
Then a and b both become divisible by 3.
This contradicts coprime condition.
Hence $\sqrt{3}$ is irrational.

4. Exercise 1.1 Answers (Important)

- $140 = 2^2 \times 5 \times 7$
- $156 = 2^2 \times 3 \times 13$
- $3825 = 3^2 \times 5^2 \times 17$
- $5005 = 5 \times 7 \times 11 \times 13$
- $7429 = 17 \times 19 \times 23$
- LCM(26,91)=182 and HCF=13
- HCF(12,15,21)=3 and LCM=420

5. Quick Revision Points

• Prime numbers have only two factors: 1 and itself.
• Composite numbers have more than two factors.
• Fundamental Theorem of Arithmetic is very important for board exams.
• Irrational numbers cannot be written in p/q form.
• Decimal expansion of irrational numbers is non-terminating and non-repeating.