

Euclid's Division Lemma and HCF

Chapter 1: Real Numbers · Topic 1

Key Concept

To find the HCF of 96 and 404 using Euclid's algorithm: divide 404 by 96 ($404=96\times 4+20$), then divide 96 by the remainder 20 ($96=20\times 4+16$), continue dividing the previous divisor by the new remainder ($20=16\times 1+4$, then $16=4\times 4+0$) — when the remainder becomes 0, the last non-zero remainder (4) is the HCF. This method is more efficient than listing all factors, especially for very large numbers.

Quick Revision Notes

- Euclid's Division Lemma: $a = bq + r$, where $0 \leq r < b$.
- Euclid's algorithm repeatedly applies this lemma to find the HCF of two numbers.
- Continue dividing until the remainder is 0; the last non-zero remainder is the HCF.
- This method is more efficient than listing factors, especially for large numbers.

Practice Questions

- 1 Find the HCF of 60 and 100 using Euclid's division algorithm.
- 2 Use Euclid's algorithm to find the HCF of 96 and 404.
- 3 Explain why Euclid's algorithm is more efficient than listing all factors for large numbers.