CLASS 7 MATHS NCERT SOLUTIONS

NCERT Solutions for Class 7 Maths Chapter 11: Finding Common Ground – Ganita Prakash Part 2

Complete NCERT Solutions for Class 7 Maths Chapter 11 "Finding Common Ground" from the Ganita Prakash Part 2 textbook, covering HCF (Highest Common Factor), LCM (Least Common Multiple), prime factorization, and real-world applications.

Contents

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3.1 The Greatest of All – Finding HCF

Tiling a room: a 12 ft × 16 ft room is to be tiled using 4 ft × 4 ft square tiles with no cutting. Since 4 divides both 12 and 16 exactly, the tiles fit perfectly: (12÷4) × (16÷4) = 3 × 4 = **12 tiles.**

Bagging cement (largest equal bag size): two lots of cement, 84 kg and 108 kg, are to be packed into bags of equal weight with none left over, using the fewest bags possible — so the bag weight must be the HCF of 84 and 108. 84 = $2^2 \times 3 \times 7$ and 108 = $2^2 \times 3^3$; the common prime factors at their lowest powers are $2^2 \times 3$ = **12 kg per bag** (7 bags of 84÷12=7, and 9 bags of 108÷12=9).

Jump Jackpot (longest jump landing on both treasures): the longest jump size is the HCF of each pair — (a) 14, 30 → HCF = **2**; (b) 7, 11 → HCF = **1** (co-prime, only a 1-unit jump works); (c) 30, 50 → HCF = **10**; (d) 28, 42 → HCF = **14.**

HCF using prime factorisation (common primes at their lowest powers):

$24 = 2^3 \times 3$, $180 = 2^2 \times 3^2 \times 5$ → common = $2^2 \times 3$ = **12**

$240 = 2^4 \times 3 \times 5$, $378 = 2 \times 3^3 \times 7$ → common = 2×3 = **6**

$400 = 2^4 \times 5^2$, $2500 = 2^2 \times 5^4$ → common = $2^2 \times 5^2$ = **100**

3.2 Least, but not Last! – Finding LCM

Idli-Vada game (first shared serving number): the first number that is a multiple of both is their LCM — (a) 4, 6 → **12**; (b) 7, 11 → **77**; (c) 14, 30 → **210**; (d) 15, 55 → **165**.

LCM using prime factorisation (all primes involved, at their highest powers):

$30 = 2 \times 3 \times 5$, $72 = 2^3 \times 3^2$ → LCM = $2^3 \times 3^2 \times 5$ = **360**

$36 = 2^2 \times 3^2$, $54 = 2 \times 3^3$ → LCM = $2^2 \times 3^3$ = **108**

$105 = 3 \times 5 \times 7$, $195 = 3 \times 5 \times 13$, $65 = 5 \times 13$ → LCM = $3 \times 5 \times 7 \times 13$ = **1365**

$222 = 2 \times 3 \times 37$, $370 = 2 \times 5 \times 37$ → LCM = $2 \times 3 \times 5 \times 37$ = **1110**

3.3 Patterns, Properties, and a Pretty Procedure!

General patterns: HCF of two consecutive numbers is always **1** (they are co-prime); HCF of two consecutive even numbers is always **2**; LCM of two co-prime numbers always equals their **product**; LCM of numbers that are all multiples of 3 is itself always a **multiple of 3**.

HCF × LCM = product (for two numbers): for 84 and 180 — 84 = $2^2 \times 3 \times 7$, 180 = $2^2 \times 3^2 \times 5$, so HCF = $2^2 \times 3$ = 12 and LCM = $2^2 \times 3^2 \times 5 \times 7$ = 1260. Check: 12 × 1260 = 15,120, and 84 × 180 = 15,120 — **they match**, confirming the relationship.

Applications – Figure It Out (Pages 63–64)

Two numbers with HCF = 1 and LCM = 66: since the numbers are co-prime, their product equals the LCM. 6 × 11 = 66 and HCF(6,11) = 1, so a valid pair is **6 and 11**.

Cowherd folklore problem: a herd of cows can be grouped exactly into rows of 3, 5, or 7, and the herd size is less than 200. The herd size must be a common multiple of 3, 5, and 7 — LCM(3,5,7) = 105. The only such multiple below 200 is **105 cows**.

Cube packing: a box measuring 12 cm × 18 cm × 36 cm is to be filled exactly with equal cubes, no gaps. The cube edge must divide all three dimensions, so it must be a common factor of 12, 18, and 36 — HCF(12,18,36) = 6. So a **6 cm cube** fits perfectly — (12÷6)×(18÷6)×(36÷6) = 2×3×6 = **36 cubes** fill the box exactly; smaller common-factor sizes like 3 cm or 2 cm also fit exactly (with more, smaller cubes).

Largest number dividing both 306 and 36: 306 = $2 \times 3^2 \times 17$, 36 = $2^2 \times 3^2$ → common = 2×3^2 = **18**.

Smallest number divisible by 3, 4, 5, 7, leaving remainder 10 when divided by 11: LCM(3,4,5,7) = 420, so the number is 420k for some whole number k. 420 divided by 11 leaves remainder 2 (420 = 11×38 + 2), so 420k leaves remainder (2k mod 11); we need 2k ≡ 10 (mod 11), i.e. k ≡ 5 (mod 11). The smallest such k is 5, giving 420 × 5 = **2100**. Check: 2100 ÷ 11 = 190 remainder 10 — correct.

Smallest multiple of 1, 2, 3, 4, 5, 6, 8, 9, 10 (note: 7 is not in this list): taking the highest power of each prime among these numbers (2^3 from 8, 3^2 from 9, 5^1 from 5 or 10) gives LCM = $2^3 \times 3^2 \times 5$ = 8×9×5 = **360**.

Practice more: Extra Questions for Class 7 Maths Chapter 11

Quick revision: Revision Notes for Class 7 Maths Chapter 11

See the full book: NCERT Books for Class 7 Maths Part 2