CLASS 8 MATHS NCERT SOLUTIONS

NCERT Solutions for Class 8 Maths Chapter 3: A Story of Numbers – Free PDF Download

Chapter 3 — A Story of Numbers — is a history-of-mathematics chapter, not a number-theory chapter. It traces how number systems evolved: tally counting, Roman numerals, the Gumulgal (Pacific islander) base-2 counting system, the Egyptian additive base-10 system, the idea of 'base' and 'landmark numbers',...

Contents

Chapter 3 — A Story of Numbers — is a history-of-mathematics chapter, not a number-theory chapter. It traces how number systems evolved: tally counting, Roman numerals, the Gumulgal (Pacific islander) base-2 counting system, the Egyptian additive base-10 system, the idea of 'base' and 'landmark numbers', the Mesopotamian base-60 place-value system, the Chinese rod-numeral system, and finally the Hindu (Indian) place-value system and the invention of zero. Below are complete, verified answers to the Figure It Out questions, cross-checked across independent sources. These Class 8 Mathematics Chapter 3 solutions are also useful as quick revision notes before exams.

NCERT Solutions for Class 8 Maths Chapter 3: A Story of Numbers

Early Counting & Roman Numerals

Devise addition, subtraction, multiplication and division methods using only sticks/pebbles (no number names or Hindu numerals).
Addition = combine both groups of sticks into one. Subtraction = remove sticks equal to the smaller group from the larger. Multiplication = repeat a group's sticks the required number of times and combine. Division = distribute sticks one by one into equal groups (or repeatedly remove a group of the divisor's size); the count in one group (or number of removals) is the quotient.

Represent in Roman numerals: (i) 1222 (ii) 2999 (iii) 302 (iv) 715
(i) MCCXXII (ii) MMCMXCIX (iii) CCCII (iv) DCCXV.

Why does a Pacific-island group use different counting sequences for different objects?
In early counting systems numbers weren't abstract — they were tied to the specific objects being counted (and how those objects were naturally grouped or traded), so different objects got different counting sequences.

Gumulgal system (urapon=1, ukasar=2): evaluate combinations like (ukasar-ukasar-ukasar-ukasar-urapon)+(ukasar-ukasar-ukasar-urapon), and similarly for −, ×, ÷.
Converting to values (9, 7, 6, 4, 2 respectively): 9+7=16; 9−6=3; 9×4=36; 16÷4=4 — each then re-expressed back in ukasar/urapon terms.

What makes the Hindu number system more efficient than Roman numerals?
It uses a **positional place-value system** and has a symbol for **zero**; only 10 symbols are needed to write any number, unlike Roman numerals, which lack both place value and zero and become unwieldy for large numbers or calculation.

Egyptian System, Base & Landmark Numbers

Represent 10458, 1023, 2660, 784, 1111, 70707 in the Egyptian system.
Break each number into Egyptian place values (1, 10, 100, 1000, 10000…) and repeat the matching symbol that many times (maximum 9 of each before regrouping into the next symbol).

Write 15, 50, 137, 293, 651 in a base-5 landmark system (landmarks: 1, 5, 25, 125, 625).
15 = 3×5; 50 = 2×25; 137 = 1×125+2×5+2×1; 293 = 2×125+1×25+3×5+3×1; 651 = 1×625+1×25+1×1.

Is there a number that cannot be represented in this base-5 landmark system?
Yes — zero. Like the Egyptian system, this is an additive/landmark system with no symbol or placeholder for 'nothing', exactly the gap that place-value systems (and eventually zero) were later invented to solve.

Find the landmark numbers of a base-7 system. In general, what are the landmark numbers of a

base-n system?
Base-7: 7^0=1, 7&sup9;=7, 7^2=49, 7^3=343, 7^4=2401… In general, the landmark numbers of a base-n system are n^0=1, n, n^2, n^3, …

Can an Egyptian numeral have one symbol repeated 10 or more times?
No — ten of any symbol always equals one of the next landmark symbol, so it would immediately be regrouped/simplified.

Create a base-4 number system and represent 1 to 16.
Using symbols for 0–3 (place values 1, 4, 16…): 1 to 15 follow directly from base-4 place value, and **16** is the first number needing a third place (equivalent to 100 in base-4 notation).

Rule to multiply by 5 in a base-5 landmark/place system.
Append a zero-placeholder at the end of the numeral — exactly like appending 0 to multiply by 10 in base-10, since it shifts every digit up one place value.

Mesopotamian, Chinese & Hindu Place-Value Systems

Represent 63, 132, 200, 60, 3605 in the Mesopotamian (base-60) system.
63 = 1×60+3; 132 = 2×60+12; 200 = 3×60+20; 60 = 1×60+0; 3605 = 1×3600+0×60+5. Note that 60 and 3605 both need an empty/placeholder position — a clear illustration of the ambiguity problem a system without zero runs into.

Why did the Chinese alternate orientation between place-value symbols (Zong/Heng)?
To avoid visual ambiguity between adjacent place values in a place-value rod-numeral system — without alternating orientation or a gap, groups of strokes from neighbouring places could be misread as one another.

Build a base-2 place-value system using ukasar/urapon as digits, and compare it to the Gumulgal system.
Let ukasar=0, urapon=1, with place values 1, 2, 4, 8… (true positional binary). This differs fundamentally from the original Gumulgal system, which is purely additive/non-positional (repeatedly summing groups of 2 and 1) rather than place-value based.

Where do Hindu numerals and zero matter in daily life and professions? How would life differ without them?
They're used everywhere — time, money, measurement, banking, engineering, computing. Without zero and place value, calculation would be far more cumbersome, and modern computing (whose binary logic depends on 0) would not exist as we know it.

Write the base-10 number 25 in base-8, base-5 and base-2.
Base 8: 25 = 3×8+1 → **31**. Base 5: 25 = 1×25+0×5+0 → **100**. Base 2: 25 = 16+8+1 → **11001**.

Why This Chapter Matters

Understanding place value and the role of zero — the central idea of this chapter — underlies all arithmetic done in later chapters, and directly connects to the base conversions and exponent ideas explored in Chapter 2 (Power Play).

Class 8 Mathematics Chapter 3 – Notes and Extra Questions

Along with these NCERT Solutions, students can also use the Class 8 Mathematics Chapter 3 Extra Questions and Class 8 Mathematics Chapter 3 Revision Notes for quick revision and extra practice.