

MATHEMATICS
WORKSHEET_110925
CHAPTER 03 THE STORY OF NUMBERS (Ganita Prakashan)

SUBJECT: MATHEMATICS

MAX. MARKS : 40

CLASS : VIII

DURATION : 1½ hr

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
- (iii). **Section A** comprises of 10 MCQs of 1 mark each. **Section B** comprises of 4 questions of 2 marks each. **Section C** comprises of 3 questions of 3 marks each. **Section D** comprises of 1 question of 5 marks each and **Section E** comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

- 1. The oldest known mathematical artifact, the Lebombo bone, has how many notches?
(a) 15 (b) 29 (c) 44 (d) 60
- 2. The system of numerals used throughout the world today is the:
(a) Roman number system. (b) Egyptian number system.
(c) Hindu number system. (d) Mayan number system.
- 3. What is the Roman numeral for 1000?
(a) D (b) C (c) M (d) L
- 4. A number system that uses the position of a symbol to determine its value is called a:
(a) Subtractive system (b) Additive system (c) Place value system (d) Tally system
- 5. In the Hindu number 7,082, the value of the digit 0 is:
(a) 0 (b) 10 (c) 100 (d) 1000
- 6. The Babylonian system is called a sexagesimal system because its base is:
(a) 10 (b) 50 (c) 60 (d) 100
- 7. Which of the following is an example of the Subtractive Principle in Roman numerals?
(a) VI (b) CV (c) CD (d) CL
- 8. A number system whose landmark numbers are 1, 3, 9, 27, etc., is a base:
(a) 1 system (b) 3 system (c) 9 system (d) 27 system

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

9. Assertion (A): The Roman numeral XC is 90.

Reason (R): The XC uses the subtractive principle, $100-10=90$.

10. Assertion (A): The Hindu number system enables efficient computation.

Reason (R): The Hindu system uses a place value system and a symbol for zero.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Convert the Roman numeral CD to its equivalent in the Hindu number system.
12. Convert the binary number 1111 to its decimal (Hindu) equivalent. Show your working.
13. Convert the Hindu number 63 into its Roman numeral equivalent.
14. In a base-10 number system, what would be the value of the landmark number 10^5 ?

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Calculate the difference between the Roman numerals L and XXX. Write the answer in Roman numerals and Hindu numerals.
16. An Egyptian scribe adds two groups: Group 1 has 5 symbols for 10, and Group 2 has 6 symbols for 10 and 3 symbols for 1. What is the total sum in the Hindu number system?
17. Convert the Hindu number 13 into the base-4 number system.

SECTION – D

Questions 18 carry 5 marks each.

18. A farmer counts DCL chickens and CX ducks. How many total animals does the farmer have? Write your final answer in both Roman and Hindu numerals, showing the addition process in Hindu numerals.

SECTION – E (Case Study Based Question)

Question 19 to 20 carry 4 mark

19. Case Study-1: The Place Value Problem

Dr. Sunita Verma was explaining the elegance of the Hindu number system to her students, noting that the same numeral can hold vastly different values depending on its position. She wrote a seemingly simple number on the board: 5,005. She challenged the class to analyze this number, highlighting how the placeholders (the zeros) and the position of the two fives showcase the system's efficiency. Understanding this fundamental concept is crucial, she stressed, because it is the key reason why this system is considered one of history's greatest mathematical inventions and why it enables unambiguous writing and easy computation.



Consider the Hindu number 5,005.

- (i) What is the place value of the leftmost digit 5? (1)
- (ii) What is the actual value of the rightmost digit 5? (1)
- (iii) What is the actual value of the digit 0? (1)
- (iv) How many times greater is the value of the leftmost 5 than the value of the rightmost 5? (2)

20. Case Study-2: Base-8 Number System

Dr. Arjun then introduced the concept of different counting bases, shifting the focus from the familiar decimal system. He noted that while their everyday mathematics was in base-10, ancient systems often used other bases. To illustrate this, he proposed a thought experiment involving a base-8 system. He explained that any base system must define its landmark numbers and the digits it uses. He challenged the students to convert a regular number, 20 apples, into this new base by grouping them into powers of eight, thereby demonstrating the flexible nature of positional number systems.



A new base system is created with a base of 8.

- (i) What is the value of the landmark number 82? (1)
- (ii) Which digits would be used in a base-8 system to represent all numbers? (1)
- (iii) Convert the Hindu number 20 into this base-8 system. (2)