

MATHEMATICS
WORKSHEET_260426
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 tally stick, the Ishango bone, has a series of notches believed to represent which of the following?
(a) The number of days in a year (b) A lunar calendar
(c) The number of hunting trips (d) The total number of items in a collection
- 2. Which of the following numbers would be the most difficult to perform subtraction on using the Roman number system?
(a) V – I (b) L – X (c) M – I (d) D – C
- 3. The number system of the Gumulgal people, who counted in twos, would likely have a landmark number of 8, which could be represented as:
(a) four groups of two (b) three groups of two and a one
(c) eight ones (d) a special symbol for eight
- 4. A number system that relies on repeating symbols to add up to a value is called a(n):
(a) subtractive system (b) positional system (c) additive system (d) base-n system
- 5. The number 10101 in a binary (base-2) system is equivalent to what number in the decimal system?
(a) 10 (b) 12 (c) 21 (d) 16
- 6. The Roman numeral for the number 900 is CM. This is an example of which principle?
(a) an additive principle. (b) a subtractive principle.
(c) a place value system. (d) a decimal system.
- 7. In the number 8,629, the value of the digit 6 is determined by its position. This is an example of which concept?
(a) a base-n system (b) a positional number system
(c) a tally system (d) a landmark number
- 8. A group of archaeologists discover an ancient bone with 35 notches carved into it. This is an example of which counting method?
(a) a tally system (b) a base-10 system
(c) one-to-one mapping (d) both (a) and (c)

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 XLV is 45.

Reason (R): The Roman number system uses both the additive and subtractive principles.

10. **Assertion (A):** The Hindu number system is a positional number system.

Reason (R): The Hindu number system uses a base of 10.

SECTION – B

Questions 11 to 14 carry 2 marks each.

- 11. An ancient Egyptian uses a system where a single symbol represents a value. He has 8 symbols for 100, and 12 symbols for 1. What is the total number he has? Show your working.
- 12. What is the Roman numeral for the year 1995? Show your working.
- 13. In a fictional number system with a base of 8, what would be the first three landmark numbers?
- 14. Convert the binary number 1101 to its decimal equivalent.

SECTION – C

Questions 15 to 17 carry 3 marks each.

- 15. Explain how the Hindu number system's use of zero allows for the unambiguous writing of all numbers. Use the numbers 3, 30, and 300 as examples.
- 16. The Roman numeral system is not as efficient for complex calculations as the Hindu number system. Explain why this is so, using the subtraction of LXXX from C as an example.
- 17. A Mesopotamian scribe uses two vertical wedges to represent 2, and four horizontal wedges to represent 40. How would the scribe represent the number 164? Explain the process of grouping.

SECTION – D

Questions 18 carry 5 marks each.

- 18. Design a number system with a base of 5. Create a set of symbols for the numbers 1, 5, and 25. Then, use these symbols to represent the number 142. Explain how this process demonstrates the efficiency of a base-n system.

SECTION – E (Case Study Based Question)

Question 19 to 20 carry 4 mark

19. Case Study-1: The Abacus Master

Rohan's grandfather, a retired accountant, shows him an old abacus. He tells Rohan, "This was my calculator before you had a phone." He explains that the abacus is a form of a place value system. On the board, the first line from the right represents ones (10^0), the next line represents tens (10^1), and so on. A single bead on a line has a value of one times the line's value, while a special bead, a "five-bead," has a value of 5 times the line's value. He challenges Rohan to represent numbers on the abacus. Rohan realizes how this simple tool made complex calculations possible for people who did not have calculators.



- (i) On this abacus, what is the value of a bead on the fifth line from the right? (1)
- (ii) How would you represent the number 39 on this abacus, using the beads described? (1)
- (iii) If there is one five-bead on the thousands line, what is its value? (1)
- (iv) How would you represent the number 17 on this abacus? (1)

20. Case Study-2: The Hindu Numerals

A historian, Dr. Priya, is researching the spread of the Hindu numeral system. She finds that the system, with its ten digits, including zero, was so powerful that it enabled a new way of doing mathematics. Unlike the Roman system, it was perfect for performing multiplication and division. She discovers that the word "algorithm" is named after the Persian mathematician Al-Khwarizmi, who wrote a book explaining the system. This system's efficiency ultimately led to it becoming the global standard for mathematics and science, a testament to its elegance and power.



- (i) What is the base of the Hindu number system? (1)
- (ii) What is a key arithmetic operation that the Hindu numeral system made easy, but was difficult in the Roman system? (1)
- (iii) Convert the number 4,321 to the Roman number system. (1)
- (iv) The word "algorithm" is named after which mathematician? (1)