

SUMMARY OF CONCEPTS & DEFINITIONS

CHAPTER 1 LARGE NUMBERS AROUND US

1. WHAT IS MATHEMATICS?

- Mathematics is the search for **patterns** and the **explanations** for why those patterns exist.
- Patterns exist all around us—in nature, in our homes, in activities and in the motion of the sun, moon and stars.
- Understanding patterns helps us in many real-life situations and in advancing science, technology and humanity.

Examples



2. LARGE NUMBERS – INDIAN & AMERICAN SYSTEMS

	Indian System	American (International) System
Thousand	1,000 One thousand	1,000 One thousand
Lakh	1,00,000 One lakh	100,000 Hundred thousand
Ten lakh	10,00,000 Ten lakh	1,000,000 One million
Crore	1,00,00,000 One crore	10,000,000 Ten million
Ten crore	10,00,00,000 Ten crore	100,000,000 Hundred million
Arab (Hundred crore)	1,00,00,00,000 One arab	1,000,000,000 One billion

- Indian system follows 3-2-2-2... pattern (thousand, lakh, crore, arab...)
- American system follows 3-3-3-3... pattern (thousand, million, billion...)

3. ROUNDING & NEAREST NEIGHBOURS

- We often use approximate values.
- Rounding up → use a larger value.
- Rounding down → use a smaller value.

Nearest Neighbours

(Example: 6,72,85,183)

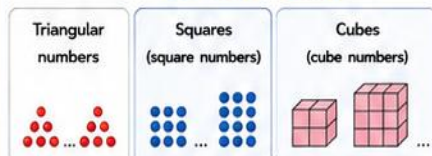
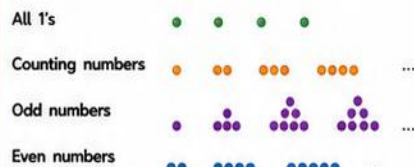
Nearest thousand	→ 6,72,85,000
Nearest ten thousand	→ 6,72,90,000
Nearest lakh	→ 6,73,00,000
Nearest ten lakh	→ 6,70,00,000
Nearest crore	→ 7,00,00,000



Rounding helps us quickly estimate and compare large numbers.

4. VISUALISING NUMBER SEQUENCES

Numbers can be shown using pictures to see patterns clearly.



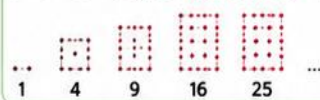
Example: $1 + 3 + 5 + 7 + 9 + 11 = 36 = 6^2$
(Sum of first n odd numbers = n^2)

5. RELATIONS AMONG NUMBER SEQUENCES

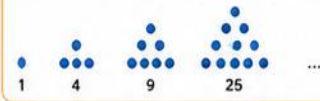
- Number sequences are often related in beautiful and surprising ways.

Examples:

$$1 + 3 + 5 + \dots \text{(first } n \text{ odd numbers)} = n^2$$



$$1 + 2 + \dots + n + (n-1) + \dots + 2 + 1 = n^2$$



- Visualisation helps us understand why such patterns exist.
- Adding 1 to powers of 2 gives: 2, 4, 8, 16, ...

6. PATTERNS IN SHAPES (GEOMETRY)

Shapes also follow patterns.

	Sequence	Pattern
Regular Polygons		Number of sides = 3, 4, 5, 6, ...
Complete Graphs		Number of lines = 1, 3, 6, 10, ... (triangular numbers)
Stacked Squares		Number of dots = 1, 4, 9, 16, ... (square numbers)
Stacked Triangles		Number of dots = 1, 3, 6, 10, ... (triangular numbers)
Koch Snowflake		Total line segments = 3, 12, 48, ... (= 3 × powers of 4)

7. MULTIPLICATION SHORTCUTS & PATTERNS

Shortcut Examples

$$116 \times 5 = 116 \times 10 \div 2 = 58 \times 10 = 580$$

$$824 \times 25 = 824 \times 100 \div 4 = 206 \times 100 = 20600$$

Patterns in Products

1-digit × 1-digit → 1-digit or 2-digit

2-digit × 1-digit → 2-digit or 3-digit

2-digit × 2-digit → 3-digit or 4-digit

3-digit × 3-digit → 5-digit or 6-digit

In general:

(m -digit) × (n -digit) → ($m + n - 1$)

or ($m + n$)-digit



8. INTERESTING LARGE NUMBER FACTS



Purandaradāsa composed 4,75,000 (475 thousand) kīrtanas.



Average distance between the Earth and the Sun is about 14,70,00,000 km.



Amazon river discharges about 4,00,00,000 litres of water every second.



Longest train journey in the world: 9,288 km.



Weight of an adult blue whale can be more than 1,50,00,000 kg.

9. KEY TAKEAWAYS

- Patterns are everywhere—in numbers, shapes and in real life.
- Large numbers are written and read using Indian and American systems.
- Rounding and estimation help us deal with large numbers easily.
- Visualisation (pictures, diagrams) helps us understand patterns better.
- Number sequences and shape sequences are connected in many beautiful ways.
- Mathematics makes us curious, creative and helps solve real-life problems.



10. THINK & EXPLORE!

Ask questions, look for patterns, try different methods, make connections and enjoy the beauty of mathematics!



Practice more. Share your ideas. Challenge your classmates!

LARGE NUMBERS AROUND US

WORKSHEET-1

Section A: MCQs (PART-1) ($10 \times 1 = 10$ marks)

1. One crore is equal to:
a) 10,00,000 b) 1,00,00,000 c) 1,00,000 d) 10,000
2. The place value of 7 in 45,67,890 is:
a) 7,00,000 b) 70,000 c) 7,000 d) 700
3. Which of the following is the smallest number?
a) 1,23,456 b) 12,34,560 c) 1,23,45,600 d) 12,34,56,000
4. 5 million is equal to how many lakhs?
a) 5 lakh b) 50 lakh c) 500 lakh d) 5,000 lakh
5. The successor of 99,99,999 is:
a) 1,00,00,000 b) 99,99,998 c) 1,00,00,001 d) 10,00,000
6. In the International system, 1,23,45,678 is written as:
a) 123,456,78 b) 12,345,678 c) 1,2345,678 d) 12345678
7. The number of zeroes in one crore is:
a) 6 b) 7 c) 8 d) 5
8. Which is the correct expanded form of 8,76,54,321?
a) $8,00,00,000 + 70,00,000 + 6,00,000 + 50,000 + 4,000 + 300 + 20 + 1$
b) $80,00,000 + 7,00,000 + \dots$ c) 8 crore + 76 lakh + ... d) Both a and c are suitable
9. Approximate 4,56,789 to the nearest lakh:
a) 4,00,000 b) 5,00,000 c) 4,60,000 d) 4,57,000
10. The smallest 8-digit number is:
a) 99,99,999 b) 1,00,00,000 c) 10,00,000 d) 1,00,00,001

MCQs (PART-2) ($10 \times 1 = 10$ marks)

11. One million is equal to how many lakhs?

- a) 10 b) 100 c) 1,000 d) 10,000

12. The place value of 6 in 56,78,901 is:

- a) 6,00,000 b) 60,000 c) 6,000 d) 600

13. The smallest 8-digit number is:

- a) 99,99,999 b) 1,00,00,000 c) 10,00,000 d) 1,00,00,001

14. 1 crore is equal to:

- a) 10 million b) 100 million c) 1 million d) 10 billion

15. Which is the correct International numeral for 2,34,56,789?

- a) 23456789 b) 23,456,789 c) 2,34,56,789 d) 234,56,789

16. A wildlife sanctuary recorded 9,87,654 visitors in a year. Which of the following is the nearest lakh?

- a. 9,00,000 b. 10,00,000 c. 9,50,000 d. 8,00,000

17. Which of the following numbers is greater than 75 lakhs but less than 8 crores?

- a. 6,75,00,000 b. 82,00,000 c. 7,25,00,000 d. 65,00,000

18. A calculator has only +1000 and +100 buttons. What is the minimum number of button presses needed to display 24,700?

- a. 247 b. 31 c. 43 d. 52

19. Which of the following can be calculated most quickly using the multiplication shortcut discussed in the chapter?

- a. 48×15 b. 256×125 c. 147×17 d. 93×19

20. The population of a town increased from 4,98,200 to 5,27,600. Approximately, the increase is:

- a. 20,000 b. 25,000 c. 30,000 d. 35,000

WORKSHEET-2

Section B: Short Answer ($10 \times 2 = 20$ marks)

1. Write the number name of 2,34,56,789 in the Indian system.

2. Write 75,00,000 in the International system and its number name.

3. Find the place value of 9 and 4 in the number 9,87,65,432.

4. Compare: 1,23,45,678 and 1,23,46,789 using $>$, $<$ or $=$.

5. Convert 3,45,67,890 into expanded form (Indian system).

6. Estimate the sum of $4,56,789 + 3,45,678$ by rounding to nearest lakh.

7. How many thousands make one crore? Show calculation.

8. Write any two properties observed while adding large numbers.

9. A farmer harvested 12,45,678 kg of rice. Write this number in words.

10. Insert commas in 98765432 according to Indian and International systems.

Section C: Short Answer ($6 \times 3 = 18$ marks)

11. Write the place value chart for 5,67,89,432 (Indian system) and its expanded form.

12. Add: $23,45,678 + 45,67,890 + 12,34,567$. Show steps.

13. Subtract 15,67,890 from 98,76,543.

14. A city has a population of 1,25,67,890. Round it to the nearest ten lakh and write in words.

15. Find the product of 1,234 and 5,678 (use estimation first).

16. Convert 450 lakhs into crores and also write in International system.

Section D: Long Answer ($4 \times 5 = 20$ marks)

17. The population of a state is 8,76,54,321. If it increases by 12,34,567 next year, what will be the new population? Write in both Indian and International systems.

18. A company earned ₹ 45,67,89,012 last year. This year it earned ₹ 52,34,56,789. How much more did it earn this year? Estimate first, then calculate exactly.

19. Draw a place value chart (up to crore) and mark the digits for the number 7,89,01,234. Also write its number name.

20. During a book fair, 2,34,567 people visited on Day 1, 3,45,678 on Day 2 and 1,98,765 on Day 3. Find the total visitors and estimate the total to the nearest lakh.

Case Study Based Questions ($2 \times 4 = 8$ marks)

21. A seed bank has collected 1,25,678 varieties of seeds so far. If they aim to collect 5 lakh varieties, how many more varieties do they need? Write the target in International system.

22. India's population is approximately 1.4 billion. Express 1.4 billion in Indian system (crores) and estimate how many crores that is.

Self Assessment:

I understood all the concepts

☐ Yes

☐ No

I need more practice

☐ Yes

☐ No

Name of Concepts having doubts/Not Cleared: _____

Parent's Assessment:

My ward understood all the concepts

☐ Yes

☐ No

He/She needs more practice

☐ Yes

☐ No

Name of Concepts having doubts/Not Cleared: _____

Signature of Parent:

Teacher's Assessment:

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Answers of Worksheet-1:

Q	1	2	3	4	5	6	7	8	9	10
Ans	b	a	a	b	a	b	b	d	b	b
Q	11	12	13	14	15	16	17	18	19	20
Ans	b	a	b	a	b	b	c	b	b	c

Answers of Worksheet-2:

Q	1	2	3	4
Ans		7500000	9000000,4,000	1,23,45,678< 1,23,46,789
	5	6	7	8
	3,00,00,000+45,00,000+ 67,000+800+90	8,00,000	10,000	Commutative Associative Additive Identity
Q	9	10	11	12
Ans		Indian: 9,87,65,432 International: 98,765,432		81,48,135
Q	13	14	15	16
Ans	83,08,653	1,30,00,000	7,00,6652	4.5 crore
Q	17	18	19	20
Ans	8,88,88,888(Indian) , 88,888,888 (International)	Rs 6,66,67,777		7,80,000
Q	21	22		
Ans	Target : 500,000	140 crore		