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GUJARAT TET-1
ENGLISH MEDIUM SERIES

BOOK 04

Mathematics

Concepts, Reasoning and Step-by-step Solutions

Numbers, Measurement and Geometry

Worked Problems and Higher-level Connections

Chapter Practice with Explained Solutions

First Edition · November 2026

Topic-wise study with explained practice
and solved earlier examination questions.

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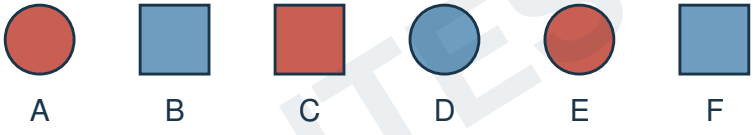
CHAPTER 01

Number Sense and Place Value

Before numerals: comparing and organising objects

Classification means putting objects together by a stated property. A collection can be sorted by colour, shape, size or material. Changing the rule changes the groups without changing the objects. A red circle and a red square belong together under a colour rule but not under a shape rule.

Sort the same six objects in different ways



By colour: A, C, E | B, D, F

By shape: A, D, E | B, C, F

The letters identify objects. Use the stated sorting rule, not the order in which the objects are drawn.

The six objects form two colour groups: A, C, E are red; B, D, F are blue. They also form two shape groups: A, D, E are circles; B, C, F are squares. There are three objects in each group under either rule, but the membership differs.

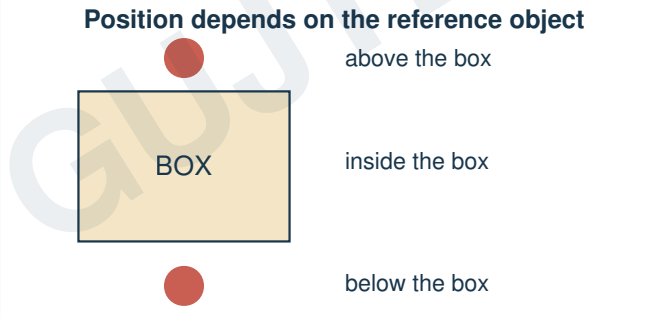
One-to-one correspondence pairs one object with exactly one object from another collection. Pair each cup with one spoon. If two spoons remain, there are two more spoons than cups. If nothing remains unpaired in either collection, the numbers are equal even if the objects look different.

Seriation arranges objects in order by an attribute, such as shortest to longest or lightest to heaviest. Align one end of sticks before comparing length. A stick placed farther to the right is not automatically longer. To compare masses, use a suitable balance rather than judging only size.

Conservation of number means that spreading the same counters farther apart does not change how many there are. Count each counter once, or match the collections one to one. A longer row need not contain more objects.

Position and the reference object

Words such as **inside/outside, above/below, in front of/behind, near/far, left/right** describe relationships. State what the position is relative to. A ball can be below a shelf and above the floor at the same time. Left and right can change when the observer turns; the objects need not have moved.



The two red balls are above and below the box respectively. The word BOX is inside its outline.

Match and compare collections

There are 5 cups and 7 spoons. Pair one spoon with each cup.

$$7 - 5 = 2$$

Five pairs can be made. **Two spoons remain**, so there are two more spoons than cups. Neither spreading the cups out nor pushing the spoons together changes these totals.

Quantity, order and representation

A number can represent a quantity, an order or a label. In “five books,” five is cardinal. In “the fifth child,” fifth is ordinal. A bus route number is an identifier; adding two route numbers does not describe a meaningful journey. Numeration connects quantities with spoken names and written symbols.

Our decimal system is **positional and base ten**. Ten units of any place make one unit of the next higher place. A digit's face value is the digit itself; its place value depends on its position. Zero is both a number and an essential placeholder. In 50,407, the zero between 5 and 4 records that there are no thousands; omitting it changes the number.

Place	Value of one unit	Contribution in 4,36,205
Lakhs	1,00,000	4,00,000
Ten-thousands	10,000	30,000
Thousands	1,000	6,000
Hundreds	100	200
Tens	10	0
Ones	1	5

Thus 4,36,205 = 4,00,000 + 30,000 + 6,000 + 200 + 5. Expanded form exposes the role of each place; it is not merely a different arrangement of commas.

Indian and international grouping

In the Indian system, put the first comma after three digits from the right and then after every two digits: **7,34,56,218**. Read this as seven

crore thirty-four lakh fifty-six thousand two hundred eighteen. The international system groups every three digits: **73,456,218**, read as seventy-three million four hundred fifty-six thousand two hundred eighteen. The numerical value is unchanged.

1 lakh = 100,000; 10 lakh = 1 million; 1 crore = 10 million. A comma is a reading aid, not a decimal point. When comparing whole numbers, first compare the number of digits after ignoring leading zeros, then compare corresponding digits from the left.

Constructing numbers

To make the greatest number from given digits used once, arrange them in descending order. For the smallest number, place the smallest non-zero digit first and arrange the remaining digits in ascending order. Zero cannot lead an ordinary multi-digit number if all places are to count.

Worked example: form the greatest and smallest numbers

Use the digits 0, 2, 5 and 7 once each.

- **Greatest number:** arrange the digits in descending order, giving 7520.
- **Smallest four-digit number:** put the smallest non-zero digit first, then the other digits in ascending order, giving 2057.

$$7520 - 2057 = 5463$$

Check: 2057 + 5463 = 7520. A leading zero cannot be counted as the thousands digit.

Rounding and estimation

Rounding selects a nearby multiple of a specified place value. To round 46,783 to the nearest thousand, compare 46,000 and 47,000. The distances are 783 and 217, so the rounded value is 47,000. The familiar “next digit 5 or more” convention is a shorthand for choosing the nearer multiple, with a stated convention for exact halves.

Estimate before calculating. A sum near 4000 cannot reasonably equal 40 merely because a written algorithm produced that answer. Estimation checks magnitude, but it does not replace an exact answer when the problem requires one.

Roman numeral connections

I, V, X, L, C, D and M represent 1, 5, 10, 50, 100, 500 and 1000. Repetition and subtraction are restricted in standard school notation: IV = 4, IX = 9, XL = 40, XC = 90, CD = 400, CM = 900. Do not use arbitrary subtraction such as IC for 99; use XCIX. Roman numerals do not have a positional zero analogous to decimal notation.

Key points

- Place value depends on a digit's position; face value does not.
- Read Indian and international grouping without changing the value.
- A leading zero does not create an extra place.

Questions from earlier examinations

The following questions were asked in earlier examinations on the topics explained above. Wording is adapted; year, medium, set and original number identify each item.

CTET December 2018 · Paper I · Set I · English/Hindi main paper · Q 48. Reworded; final key checked.

1. Write eleven thousand eleven hundred eleven as one number.

A. 111111 B. 12111

C. 11000110011 D. XIXIXI

Answer: B. The phrase adds 11000+1100+11=12111. It is an unusual grouping phrase, so expand each quantity before writing the numeral.

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2. Use 6, 7, 8 and 9 once each. What is the difference between the greatest and smallest four-digit numbers?

A. 3087 B. 2997

C. 2889 D. 1989

Answer: A. 9876 - 6789 = 3087.

TET-1 · 2023 · Gujarati medium · Set A · Q 96 · Adapted

3. In 3285, how much greater is the place value of 2 than that of 5?

A. 200 B. 500

C. 280 D. 195

Answer: D. The values are 200 and 5, giving a difference of 195.

Practice Questions

1. What is the place value of 6 in 4,36,205?

A. 600 B. 6,000

C. 60,000 D. 6

2. Which is the smallest four-digit number using 0, 2, 5 and 7 once?

A. 2507 B. 2057

C. 5027 D. 0257

3. How many lakhs equal one million?

A. 100 B. 1000

C. 10 D. 1

4. Round 46,783 to the nearest thousand.

A. 46,800 B. 46,000

C. 47,000 D. 46,700

5. Which represents 99 in standard Roman notation?

A. IC B. CIX

C. XCXI D. XCIX

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6. What does a zero in a place-value numeral help record?

A. An empty place without changing the positions of other digits

B. A compulsory negative quantity

C. The number of commas only

D. A different base every time

7. Which is 7,34,56,218 written with international grouping?

A. 734,562,18

B. 734,56,218

C. 7,345,621,8

D. 73,456,218

8. What is the difference between the greatest and smallest four-digit numbers formed from 0, 2, 5, 7 once?

A. 5463

B. 5473

C. 5460

D. 5453

9. Six counters are spread into a longer row without adding or removing any. What happens to their number?

A. It becomes their row length.

B. It remains six.

C. It increases.

D. It decreases.

10. A collection contains 5 cups and 7 spoons. After pairing one spoon with each cup, how many spoons remain?

A. 5

B. 7

C. 12

D. 2

11. In the sorting figure, which group contains all the circles?

A. A, D, E

B. A, C, E

C. B, D, F

D. B, C, F

12. Putting sticks from shortest to longest illustrates which process?

A. Addition of sticks

B. Measurement of mass

C. Seriation

D. Random scattering

Answers and explanations

1. B. The digit 6 occupies the thousands place, contributing 6 × 1000.

2. B. The first digit must be the smallest non-zero digit; then arrange the rest ascending.

3. C. One lakh is 100,000; ten lakhs equal 1,000,000.

4. C. The value is closer to 47,000 than to 46,000.

5. D. XC is 90 and IX is 9; together they give 99.

6. A. Zero preserves the positional structure where no units of that place occur.

7. D. International commas group digits in threes from the right.

8. A. 7520 - 2057 = 5463.

9. B. Changing spacing changes appearance, not the number of counters.

10. D. Five spoons are paired; 7 − 5 = 2 remain.

11. A. A, D and E are circles. A, C, E instead form the red colour group.

12. C. Seriation orders objects by a chosen attribute, here length.

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