Collins

Maths Zone 3

Updated Edition

Series Editor
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Preface

Maths Zone* (Updated Edition)** is a series of eight books for Classes 1 to 8. The series conforms to the objectives outlined in *National Curriculum Framework*. The updated edition of ***Maths Zone, trying to make a difference with its new features, incorporates the latest requirements across various boards. With its activity-oriented approach, the series aims to inculcate lateral thinking, analytical, research and deduction skills in students, thus urging them to explore beyond the boundaries of textual knowledge.

Based on the NCERT syllabus, the series follows a coherent and structured approach. It provides a seamless continuity in the Maths curriculum for classes 1 to 8, laying emphasis on developing problem-solving skills.

The series has been updated in view of the extensive feedback received from the user schools and experienced teachers. Wherever necessary, content has been simplified to cater to the needs of all kinds of learners in a classroom.

Key Features

Mental Maths to help practise calculation skills and deductive reasoning

Cross-curricular Links (Classes 1 to 5) integrate knowledge across subjects

Exercises after each topic and **Revision Exercises** at the end of each chapter for a comprehensive review of the concepts

Summary (Classes 6 to 8) gives a snapshot of the chapter for quick recapitulation

Maths Lab Activity to test skills of investigation, observation and deduction

Worksheets to reinforce practice with fun exercises

Consolidated **Practice Worksheets** and **Reasoning Worksheet** at the end of the book for further practice

Latest **International Mathematics Olympiad** paper to help students prepare for competitive exams

Maths Tales (Classes 1 to 5) at the end of the book give colourful cartoon spreads

Vedic Maths (Classes 3 to 8) to master shortcut techniques which aid in faster calculations

Poster, at the end as a pull-out, for a quick revision of important points and formulae

Remember, **Common Errors**, **Challenge** and **Projects** are a few other features included in the books.

Four **assessment papers** and two **comprehensive assessment papers** have been given at the end of each book, in addition to the exercises within and at the end of each chapter.

In line with the CBSE guidelines, evaluation features along with the tools of assessment have been provided extensively to the teachers and learners in a well-integrated manner.

We would like to take this opportunity to thank all the teachers who reviewed the books and provided their valuable feedback. Special thanks to Ms Shobha P Nair, Toc H Public School, Ernakulam; Ms Sangeetha S and Ms Manju R, SBOA School, Chennai, for giving their suggestions, which helped in improving the quality of the content.

Feedback, valuable comments and suggestions from the users are welcome.

Authors

Key Features

Cross-curricular Link:
What is the difference in the meaning of the words 'remainder' and 'reminder'?

Mental Maths

Look at the pattern and fill in the blank

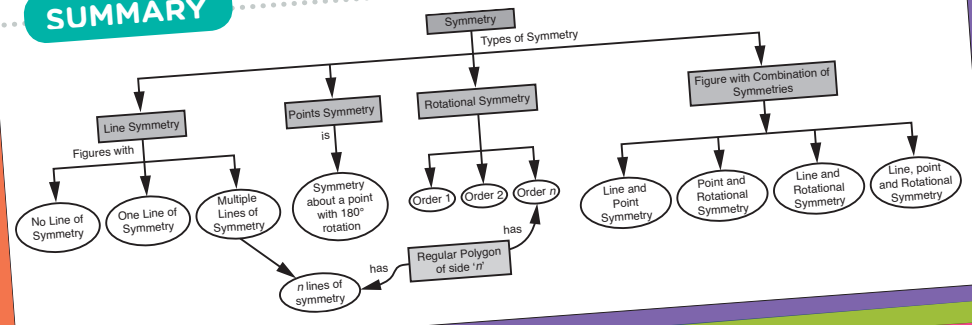
$7 - 1 = 6$
$70 - 6 = 10$

$4 - 3 = 1$
$\_\_\_\_ - \_\_\_\_ = \_\_\_\_$

$5 - 2 = 3$
$50 - 20 = 30$

$9 - 3 = 6$
$\_\_\_\_ - \_\_\_\_ = \_\_\_\_$

SUMMARY



Exercise 16.1

1 Find the perimeter of the following objects using the correct formulae.

(a) 125 cm, 125 cm

(b) 15 cm, 15 cm

(c) 52 in, 30 in

Revision Exercise

1 Find the perimeter and area of each of the following figures.

(a) 8 cm, 8 cm

(b) 20 cm, 20 cm

(c) 13 cm, 7 cm

Maths Lab Activity

Aim: To classify objects into rolling, sliding and rolling as well as sliding objects

Materials required: Different objects as shown:

Procedure:

1. Make an inclined surface using a book on the table.
2. Place the objects one by one on the book.
3. Observe whether the object rolls, slides or rolls as well as slides.
4. Complete the table given below for any five objects by drawing them.

Object	Rolling (R)/Sliding (S)/Sliding & Rolling (R & S)

WORKSHEET

Look at the addition statements and fill in the blanks.

- 2 + 5 = 7
- 1 + 3 = 4
- 2 + 1 = ____
- 20 + 50 = 70
- 10 + 30 = 40
- 20 + 10 = ____
- 200 + 500 = 700
- 100 + 300 = 400
- 200 + 100 = ____
- 2000 + 5000 = 7000
- 1000 + 3000 = 4000
- 2000 + 1000 = ____

A Journey with Time

Vedic Maths

When the numbers to be multiplied are not near the base, then we can use the following method in general to multiply any two 2-digit numbers.

Example 1: Multiply 31 and 22.

Step 1: Multiply the numbers vertically in the last column.

$1 \times 2 = 2$

	3	1
×	2	2
		2

Step 2: Multiply the numbers crosswise in both the columns and add the results.

$1 \times 2 = 2$ and $3 \times 2 = 6$

	3	1
×	2	2
	2	6

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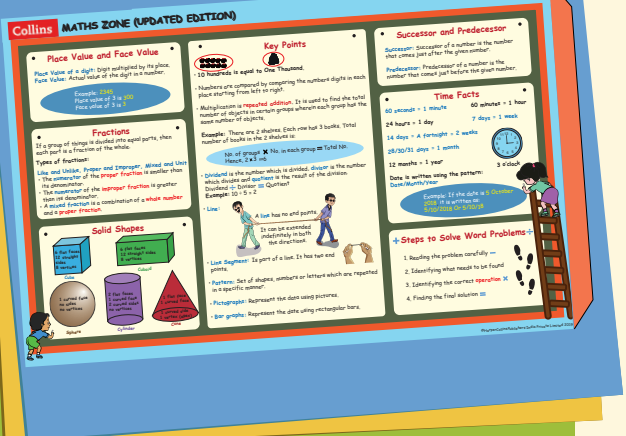


Contents

1 Numbers up to 10,000

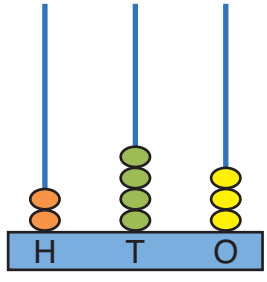
Learning Objectives

- To read, write and expand 4-digit numbers
- To compare 4-digit numbers
- To round off numbers to the nearest 10 and 100

Let's Get Started

We have seen how to represent 3-digit numbers using their place values of hundreds, tens and ones on an abacus tool.

The number corresponding to the representation shown here is 243.



Expanded form: 243 = 200 + 40 + 3

Number name: Two hundred forty-three

Reading a 3-digit number

1. Read the number in the hundreds places.
2. Then, read the number in the tens and ones places together.

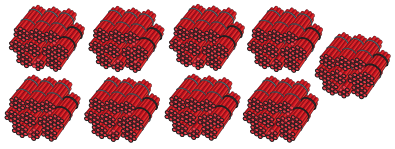
INTRODUCTION TO 4-DIGIT NUMBERS

You know that the greatest 3-digit number is 999.

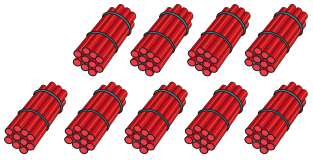
Which number comes after 999?

Recall that you added 1 to 99 to get 100. Similarly, add 1 to 999 to get the next number.

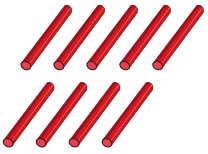
The number 999 has 9 hundreds, 9 tens and 9 ones as shown below.



9 hundreds

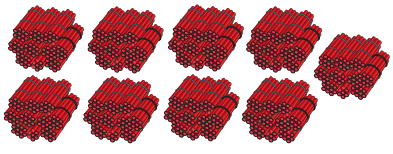


9 tens

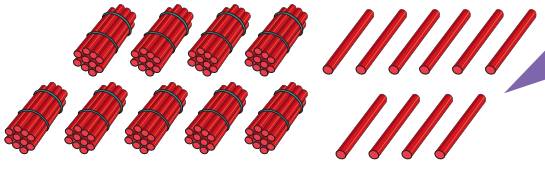


9 ones

Add one loose stick to the representation. Now, count the number of hundreds, tens and ones.

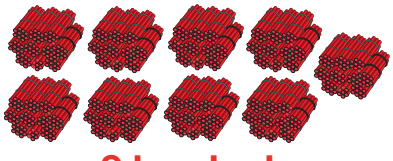


9 hundreds

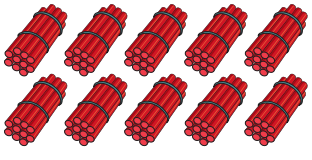


9 tens **10 ones**

10 ones = 1 ten.
Change 10 ones to 1 bundle of ten.

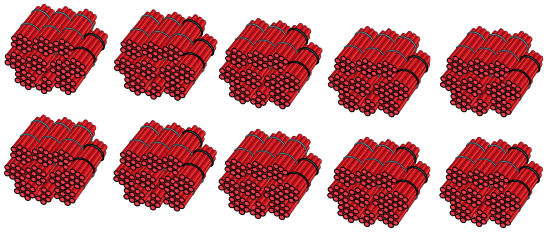


9 hundreds



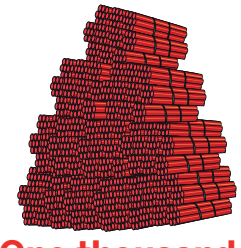
10 tens

10 tens = 1 hundred.
Change 10 tens to 1 bundle of hundred.



10 hundreds

10 hundreds are bundled into a group and it is known as **one thousand**.



One thousand

Thousands place value is written to the left of hundreds place.

Th	H	T	O
1	0	0	0

Naming of thousands					
1000	One thousand	5000	Five thousand	9000	Nine thousand
2000	Two thousand	6000	Six thousand	10000	Ten thousand
3000	Three thousand	7000	Seven thousand		
4000	Four thousand	8000	Eight thousand		

PLACE VALUE AND FACE VALUE

The place value of a digit in a number is the digit multiplied by its place.

Write the place value of the digits in the number 4583.

The place value of 4 in 4583 is 4000.

The place value of 5 in 4583 is 500.

The place value of 8 in 4583 is 80.

The place value of 3 in 4583 is 3.

Th	H	T	O
4	5	8	3
4000	500	80	3

The face value is the actual value of the digit in a number.

For example, in the number 2571, the face value of 2 is 2. Similarly, the face value of 7 is 7.

Exercise 1.1

1. Write the place value of the underlined digits.

(a) 1<u>8</u>46 _____ (b) 2<u>0</u>01 _____ (c) 37<u>3</u>4 _____

(d) 54<u>6</u>9 _____ (e) 689<u>0</u> _____ (f) 77<u>7</u>0 _____

(g) <u>9</u>215 _____ (h) <u>4</u>458 _____ (i) <u>7</u>770 _____

2. Fill in the following tables.

(a)

Th	H	T	O
5	2	4	9

Place Value				
Face Value				

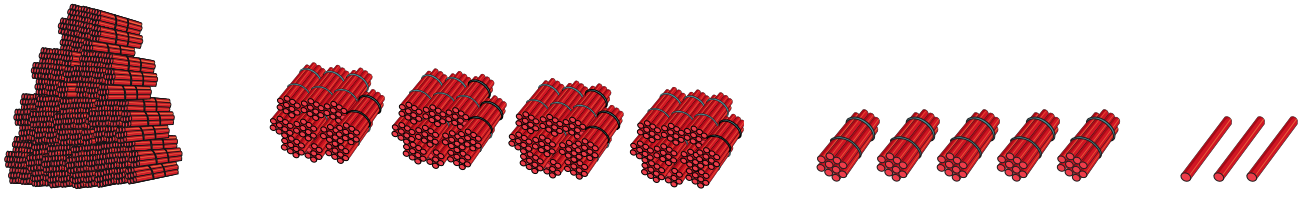
(b)

Th	H	T	O
9	1	5	4

Place Value				
Face Value				

Naming a 4-digit number

Let us write the number corresponding to the following representation. Count the number of thousands, hundreds, tens and ones.



1 thousand **4 hundreds** **5 tens** **3 ones**

First read the number in thousands place, that is, **one thousand**.

Next, read the number in hundreds place, that is, **four hundred**.

Then, read the number in tens and ones places together, that is, **fifty-three**.

Th	H	T	O
1	4	5	3

Number: **1453**

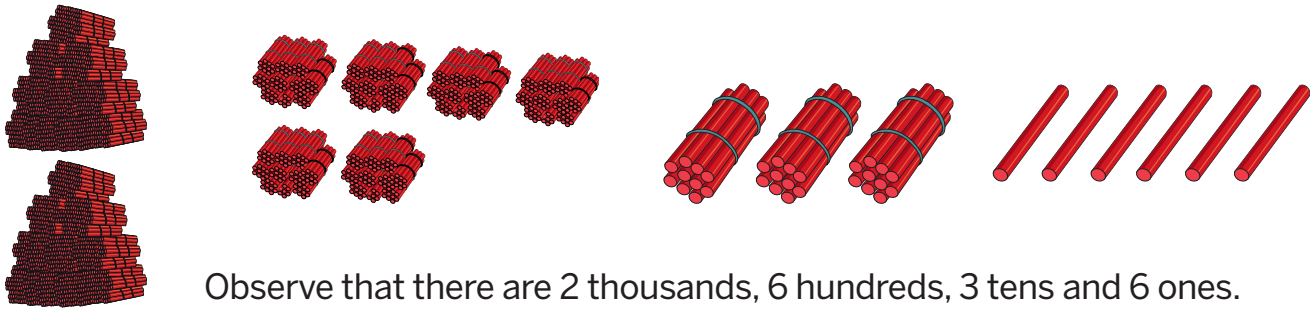
Number name: One thousand four hundred fifty-three

Place value of each digit in the number is as follows:

Th	H	T	O
1	4	5	3
↓	↓	↓	↓
1000	400	50	3

Expanded form: 1000 + 400 + 50 + 3

Consider another representation. Let us write the number corresponding to it.



Observe that there are 2 thousands, 6 hundreds, 3 tens and 6 ones.

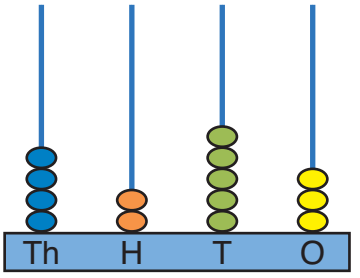
Number: **2636**

Number name: Two thousand six hundred thirty-six

Expanded form: 2000 + 600 + 30 + 6

Th	H	T	O
2	6	3	6
↓	↓	↓	↓
2000	600	30	6

Let us represent 4-digit numbers using abacus.
Consider the representation of the number 4253.

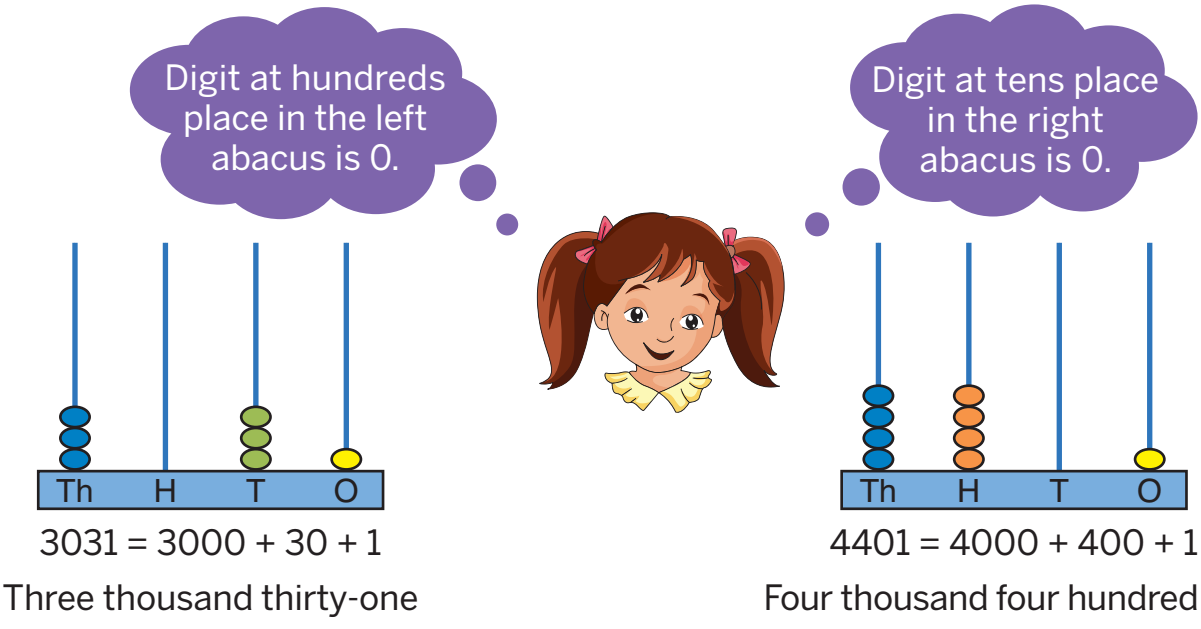


It has four thousands, two hundreds, five tens and three ones.

Number: **4253**

Number name: Four thousand two hundred fifty-three

Expanded form: **4000 + 200 + 50 + 3**



3031 = 3000 + 30 + 1

Three thousand thirty-one

4401 = 4000 + 400 + 1

Four thousand four hundred one

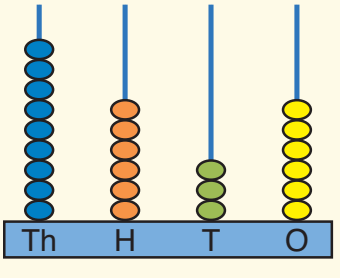
FACT FILE

Abacus is a counting tool which was used in Japan for calculations in olden days.

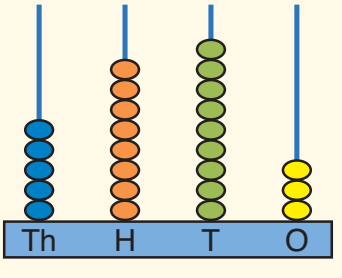
Exercise 1.2

1 **Write the numbers corresponding to the following representations. Also, write them in the expanded form.**

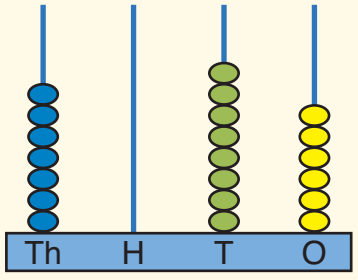
(a)



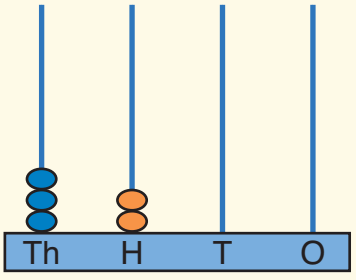
(b)



(c)

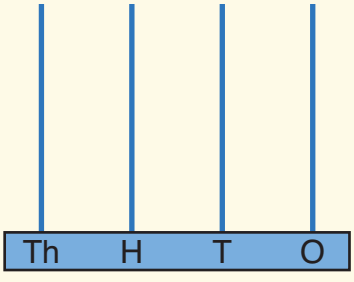


(d)

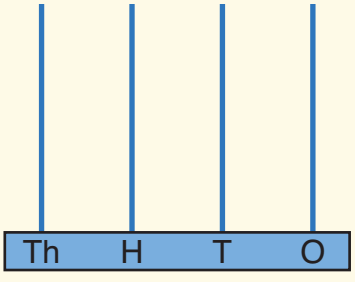


2 **Represent the following numbers on the abacus.**

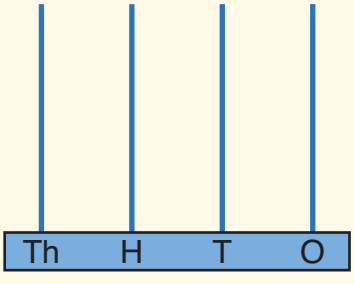
(a) 8465



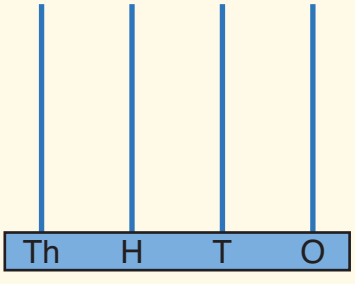
(b) 2506



(c) 1008



(d) 9999



3 **Write the numbers corresponding to the expanded forms given.**

(a) 1000 + 800 + 20 + 1 = _____ (b) 5000 + 400 + 80 + 6 = _____

(c) 8000 + 900 + 40 + 3 = _____ (d) 3000 + 70 + 5 = _____

(e) 9000 + 200 + 8 = _____ (f) 6000 + 200 = _____

4 **Identify the numbers given in the following sentences and write their number names.**

(a) Distance between Bangalore and Delhi is 2130 kilometres.

Number name: _____

_____

_____

(b) Mohandas Karamchand Gandhi was born in the year 1869 and died in the year 1948.

Number name: _____

_____

_____

Number name: _____

_____

_____

(c) Mount Everest is the highest mountain in the world and its peak is 8848 metres above the sea level.

Number name: _____

_____

_____

(d) The river Nile is the longest river in the world and its length is 6853 kilometres.

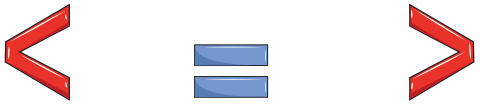
Number name: _____

_____

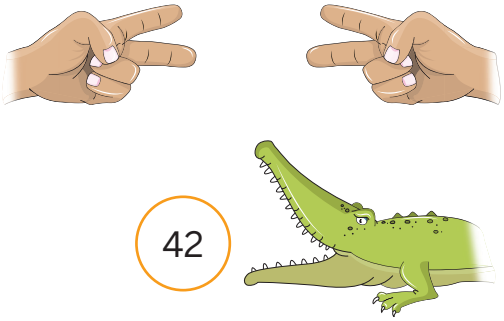
_____

COMPARISON OF NUMBERS

Recall that to compare two numbers, we use the following symbols:



Less than Equal to Greater than



Also, recall the rules for comparing 3-digit numbers.

Rule 1: Compare the digits at the hundreds place. The number with the greater digit at the hundreds place is bigger than the other number.

H	T	O
8	5	6

H	T	O
3	1	2

8 > 3

856 > 312

Rule 2: Compare the digits at the tens place if the digits at the hundreds place are the same. The number with the greater digit at the tens place is bigger than the other number.

H	T	O
4	7	6

H	T	O
4	4	1

7 > 4

476 > 441

Rule 3: Compare the digits at the ones place if the digits at the hundreds and the tens places are the same. The number with the greater digit at the ones place is bigger than the other number.

H	T	O
2	5	8

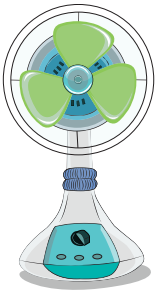
H	T	O
2	5	3

8 > 3

258 > 253

Comparison of a 3-digit number and a 4-digit number

The price of a table fan is ₹850 and that of a ceiling fan is ₹1300. Which fan costs more?



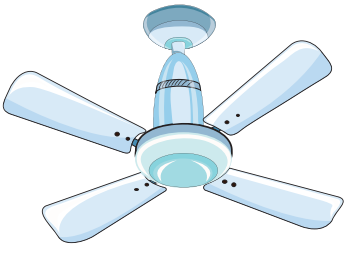
H	T	O
8	5	0

Note that 1300 has one thousand whereas 850 has no thousands. Therefore, 1300 is greater than 850.

1300 > 850

Also, 1300 has 4 digits whereas 850 has only 3 digits.

Therefore, the ceiling fan costs more than the table fan.



Th	H	T	O
1	3	0	0

Rule 1: In general, the number with more digits is always greater than the other number.

Comparison of 4-digit numbers

Rule 2: Compare the digits at the thousands place of two given numbers. The number with the greater digit at the thousands place is bigger than the other number.

₹8960

₹6425

Th	H	T	O
8	9	6	0

Th	H	T	O
6	4	2	5

8 > 6

8960 > 6425

Rule 3: If the digit at the thousands place is same in both the numbers, then the number with the greater digit at the hundreds place is bigger than the other number.

Th	H	T	O
5	6	8	1

Th	H	T	O
5	2	4	6

6 > 2

5681 > 5246

Rule 4: If the digits at the thousands and the hundreds places are the same in both the numbers, then the number with the greater digit at the tens place is bigger than the other number.

Th	H	T	O
3	4	8	6

Th	H	T	O
3	4	7	2

8 > 7

3486 > 3472

Rule 5: If the digits at the thousands, the hundreds and the tens places are the same in both the numbers, then the number with the greater digit at the ones place is bigger than the other number.

Th	H	T	O
4	5	8	2

Th	H	T	O
4	5	8	0

2 > 0

4582 > 4580

Exercise 1.3

1 **Compare the numbers and put the correct sign (>/</=).**

(a) 251 ☐ 1320 (b) 8756 ☐ 7245 (c) 6580 ☐ 6583

(d) 2475 ☐ 5784 (e) 9475 ☐ 9784 (f) 4025 ☐ 4052

(g) 1024 ☐ 2024 (h) 3457 ☐ 3547 (i) 7389 ☐ 7089

(j) 999 ☐ 1000 (k) 5001 ☐ 4999 (l) 9999 ☐ 9990

2 **State whether the following are true (T) or false (F).**

(a) 2002 > Three thousand ☐

(b) 5000 + 400 + 20 + 1 < 9000 + 400 + 20 + 1 ☐

(c) 3000 + 3 > 3000 + 30 + 3 ☐

(d) 5000 + 600 + 30 + 7 < 5000 + 600 + 30 + 4 ☐

(e) 2000 + 200 + 1 > 2000 + 200 + 10 ☐

(f) 900 + 90 + 9 > 9000 + 90 + 9 ☐

(g) Seven thousand and forty-two < Seven thousand four hundred and forty-two ☐

3 **Arrange the following numbers in ascending order.**

(a) 245, 4390, 4281, 4387 _____

(b) 7582, 7524, 7568, 7531 _____

(c) 9999, 9990, 9995, 9998 _____

4 **Tick (✓) the sets of numbers which are in descending order.**

(a) 8547, 6245, 3012, 1845, 101 ☐ (b) 6852, 6514, 6489, 6257, 6200 ☐

(c) 2678, 2659, 2632, 2610, 2611 ☐ (d) 7024, 4356, 2425, 1658, 1912 ☐

(e) 9000, 6000, 8000, 4000, 100 ☐ (f) 1869, 1867, 1864, 1862, 1860 ☐

FORMING NUMBERS WITH THE GIVEN DIGITS

Different 4-digit numbers can be formed with the given digits. For example, using the digits 5, 2, 6 and 9, some of the 4-digit numbers that can be formed are:

Th	H	T	O	Th	H	T	O	Th	H	T	O	Th	H	T	O	Th	H	T	O
6	2	5	9	5	9	2	6	6	9	2	5	9	5	6	2	2	9	5	6

Smallest 4-digit Number

Example: Which is the smallest 4-digit number that can be formed using the digits 5, 2, 6 and 9 only once?

Step 1: In order to form the smallest 4-digit number with the given digits, first identify the smallest digit among the four. Here, among 5, 2, 6 and 9, 2 is the smallest digit.

Write the smallest digit at the thousands place.

Th	H	T	O
2			

Step 2: Identify the smallest digit among the rest of the three digits. 5 is the smallest among 6, 5 and 9.

Write 5 at the hundreds place.

Th	H	T	O
2	5		

Step 3: Again, identify the smaller digit among the remaining two digits. 6 is the smaller among 6 and 9.

Write 6 at the tens place.

Th	H	T	O
2	5	6	

Step 4: Write the remaining digit, that is, 9 at the ones place.

Th	H	T	O
2	5	6	9

Therefore, 2569 is the smallest 4-digit number that can be formed using the digits 5, 2, 6 and 9 only once.

How are the digits arranged in the number 2569?

Note that, the digits are arranged in ascending order from thousands place to ones place.

Rule: To form the smallest 4-digit number using the given digits, arrange the digits in ascending order.

What is the smallest 4-digit number that can be formed using the digits 4, 1, 0 and 7 only once?

Arranging digits in ascending order will give the smallest 4-digit number.

Th	H	T	O
0	1	4	7

Note that 0147 is the same as 147, which is a 3-digit number.

So, interchange the positions of 1 and 0.

Th	H	T	O
0	1	4	7

→

Th	H	T	O
1	0	4	7

Therefore, 1047 is the smallest 4-digit number.

Rule: While forming the smallest 4-digit number using the given digits, if one of the digits is 0, then first write the digits in ascending order and then interchange the digits at thousands and hundreds places.

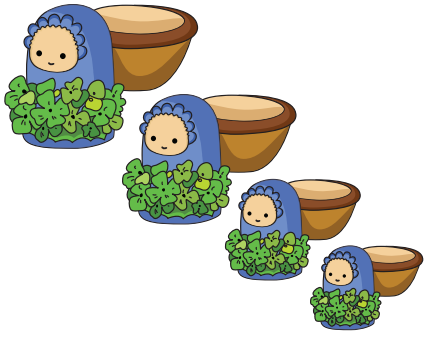
Greatest 4-digit Number

What happens to the number when you write its digits in descending order?

Consider the example of writing the digits 2, 5, 6 and 9 in descending order.

The number you get is 9652.

9652 is the greatest 4-digit number that can be formed using the digits 5, 2, 6 and 9 only once.



Rule: To form the greatest 4-digit number using the given digits, arrange the digits in descending order.

Smallest 4-digit number is 1000.

Greatest 4-digit number is 9999.

Can you write the smallest and the greatest 4-digit number using the digits 5, 8, 3, 9?

Smallest:_____

Greatest:_____

Exercise 1.4

1 **Underline the smallest 4-digit number that can be formed using the given digits.**

(a) 8, 1, 7, 2 1728 1287 1278

(b) 9, 3, 4, 6 3469 3496 3964

(c) 2, 3, 4, 1 1324 1234 4321

(d) 8, 5, 4, 6 8546 4568 4658

(e) 7, 5, 0, 8 587 5087 5078

(f) 0, 9, 4, 7 4097 4079 7049

2 **Write the greatest 4-digit number that can be formed using the given digits.**

(a) 3, 5, 1, 9: _____

(b) 1, 3, 5, 7: _____

(c) 8, 7, 6, 9: _____

(d) 7, 8, 3, 2: _____

(e) 4, 0, 8, 5: _____

(f) 2, 3, 0, 1: _____

3 **Fill in the blanks.**

(a) The greatest 2-digit number is _____.

(b) The smallest 4-digit number is _____.

(c) The greatest 4-digit number is _____.

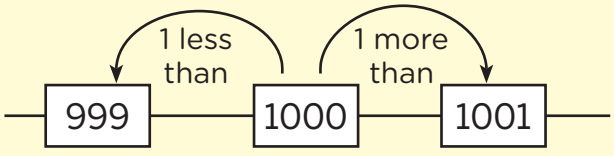
(d) The smallest 3-digit number is _____.

(e) The greatest 3-digit number is _____.

(f) The smallest 2-digit number is _____.

BEFORE, IN BETWEEN, AFTER

1 less than the given number will give the number before it.
1 more than the given number will give the number after it.



NUMBER PATTERNS BY SKIP COUNTING

Skip Count of Numbers by 2

Start from a number and skip count by 2 to get a sequence of numbers.

1500, 1502, 1504, 1506, 1508,

1510, 1512, 1514, _____, _____

Skip Count of Numbers by 5

Start from a number and skip count by 5 to get a sequence of numbers.

1210, 1215, 1220, 1225, 1230,

1235, 1240, 1245, _____, _____

Skip Count of Numbers by 10

From the starting number, skip count by 10 to get the sequence of numbers.

1100, 1110, 1120, 1130, 1140, 1150, 1160, 1170, 1180, _____, _____

Skip Count of Numbers by 100

Skip count the numbers by 100 from the starting number to get the next number.

2000, 2100, 2200, 2300, 2400, 2500, 2600, 2700, _____, _____

Skip Count of Numbers by 1000

Starting from 1000, skip count by 1000 to get the following number sequence.

1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, _____, _____

Exercise 1.5

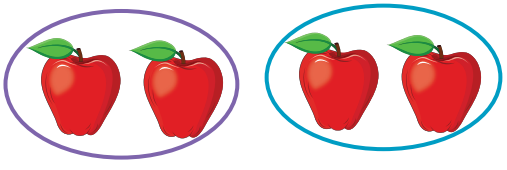
Complete the patterns using skip counting.

1. 1464, 1466, 1468, _____,_____,_____, _____
2. 8014, 8016, 8018, _____,_____,_____, _____
3. 3545, 3550, 3555, _____,_____,_____, _____
4. 6585, 6590, 6595, _____,_____,_____, _____
5. 3690, 3700, 3710, _____,_____,_____, _____
6. 8256, 8266, 8276, _____,_____,_____, _____
7. 1100, 1200, 1300, _____,_____,_____, _____
8. 4356, 4456, 4556, _____,_____,_____, _____
9. 1227, 2227, 3227, _____,_____,_____, _____
10. 2600, 3600, 4600, _____,_____,_____, _____.

EVEN AND ODD NUMBERS

Let us recall the concept of even and odd numbers.

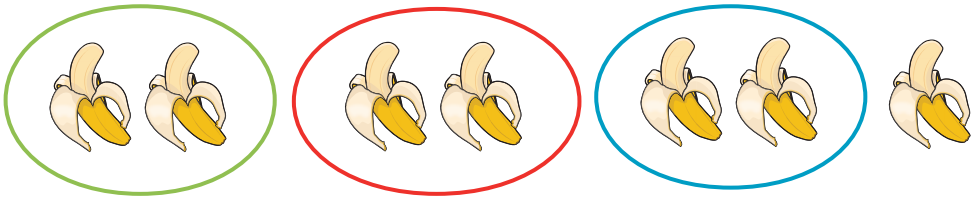
The numbers which can be paired completely are known as **even numbers**.



For example, consider the number 4.

4 apples can be paired completely. *Therefore, 4 is an even number.*

Consider the number 7. One banana is left. *Therefore, 7 is an* **odd number**.



The numbers which cannot be paired completely are known as odd numbers.

Odd numbers have 1, 3, 5, 7 or 9 in their ones place.

Even numbers have 2, 4, 6, 8 or 0 in their ones place.

Classify the numbers from 100 to 120 into odd and even numbers.

Odd	Even
101	102
103	104

Observe the last digits of **odd numbers**.

Write the last digits of odd numbers.

_____

Observe the last digits of **even numbers**.

Write the last digits of even numbers.

_____

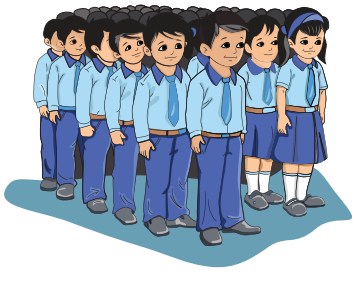
Numbers can be classified into odd and even numbers by looking at the digits at the ones place. For example, 7035 is an odd number as its end digit is 5. The number 8124 is even as its end digit is 4.

Fill in the blank in the following table.

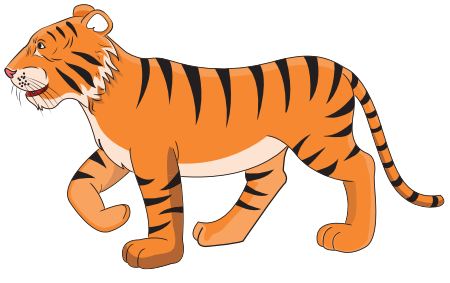
Number	Digit at ones place	Odd/Even
9387		
5610		

ROUNDING OFF NUMBERS

Read the following sentences.



There are **about** 200 students in the school assembly.



The total population of tigers in India is **roughly** 1700.

The words *'roughly', 'around' and 'about'* are used to tell the rounded-off numbers rather than the exact numbers. For example, roughly 1700 tigers means there are close to 1700 tigers but not exactly 1700.

Sometimes, numbers are rounded off to the nearest ten or hundred or thousand to give a rough idea of the quantity present.

Rounding off numbers to the nearest 10

Consider the number 27. To round off this number to the nearest 10, let us represent it on the number line.

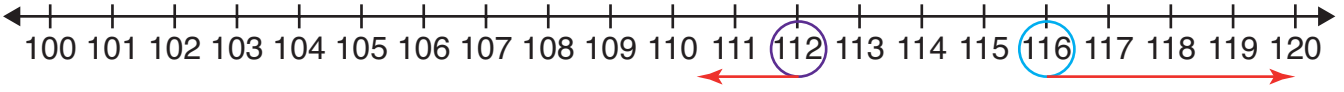
The number 27 is in between 20 and 30. Also, it is closer to 30. Therefore, it can be rounded off to 30.

Consider the number 21. It is closer to 20. Therefore, 21 can be rounded off to 20.

The number 25 is in between 20 and 30. Also, it is at the same distance from 20 as it is from 30. But, in general practice, we round off 25 to 30.

Let us round off 3-digit numbers to the nearest 10.

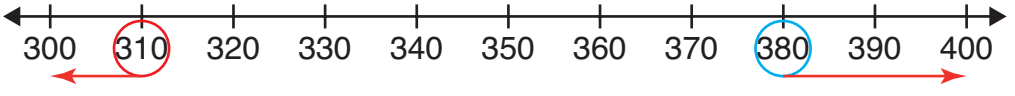
112 can be rounded off to 110 as it is closer to 110 than 120.



116 can be rounded off to 120 as it is closer to 120.

Rounding off numbers to the nearest 100

Let us round off the number 310 to the nearest 100. Observe that the number 310 is closer to 300 than 400. Therefore, the number 310 is rounded off to 300.



380 is closer to 400. Hence, it can be rounded off to 400.

The number 350 will be rounded off to 400. It is a rule that the number exactly in the middle of two numbers will be rounded off to the hundred towards its right.

The number 821 will be rounded off to 800 and 876 to 900.

Exercise 1.6

1 Round off the numbers to the nearest 10.

(a) 24 _____ (b) 12 _____ (c) 65 _____

(d) 89 _____ (e) 37 _____ (f) 94 _____

2 Underline the number rounded off to the nearest 10 of the given number.

(a) 136 → 150 130 140 (b) 551 → 560 550 540

(c) 101 → 100 10 110 (d) 478 → 470 490 480

(e) 812 → 800 810 820 (f) 795 → 790 780 800

3 Round off the numbers to the nearest 100.

(a) 204 _____ (b) 122 _____ (c) 605 _____

(d) 891 _____ (e) 379 _____ (f) 940 _____

(g) 550 _____ (h) 710 _____ (i) 470 _____

4 Round off the numbers in the following sentences to the nearest 100 and rewrite the sentences. The first one has been done for you.

(a) In a tennis stadium, there are 812 spectators.

In a tennis stadium, there are about 800 spectators.

(b) The population of a village is 285.

_____

(c) There are 432 marbles in the jar.

_____