Vande Mataram

Vande Mataram!

Sujalam, suphalam, malayaja shitalam,

Shasyashyamalam, Mataram!

Vande Mataram!

Shubhrajyotsna pulakitayaminim,

Phullakusumita drumadala shobhinim,

Suhasinim sumadhura bhashinim,

Sukhadam varadam, Mataram!

Vande Mataram, Vande Mataram!

- Bankimchandra Chatterji

వందే మాతరం

వందే మాతరం వందే మాతరం

సుజలాం సుఫలాం మలయజ శీతలాం

సస్యశ్యామలాం మాతరం వందే మాతరం

శుభ్రజ్యోత్స్నాపులకిత యామినీం

ఫుల్లకుసుమిత ద్రుమదళ శోభినీం

సుహాసినీం సుమధుర భాషిణీం

సుఖదాం వరదాం మాతరం వందే మాతరం.

– బంకించంద్ర ఛటర్జీ

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Our National Anthem | జాతీయ గీతం

Jana-gana-mana-adhinayaka jaya he
Bharata-bhagya-vidhata
Panjaba-Sindhu-Gujarata-Maratha
Dravida-Utkala-Banga
Vindhya-Himachala-Yamuna-Ganga
uchchala-jaladhi-taranga
Tava Subha name jage,
tava subha asisa mage,
gahe tava jaya-gatha.
Jana-gana-mangala-dayaka jaya he
Bharata-bhagya-vidhata.
Jaya he, Jaya he, Jaya he,
jaya jaya jaya jaya he.

- Rabindranath Tagore

జనగణమన అధినాయక జయహే!
భారత భాగ్యవిధాతా!
పంజాబ, సింధు, గుజరాత, మరాఠా,
ద్రావిడ, ఉత్కళ, వంగా!
వింధ్య, హిమాచల, యమునా, గంగా!
ఉచ్చల జలధి తరంగా!
తవ శుభనామే జాగే!
తవ శుభ ఆశిష మాగే
గాహే తవ జయగాథా!
జనగణ మంగళదాయక జయహే!
భారత భాగ్య విధాతా!
జయహే! జయహే! జయహే!
జయ జయ జయ జయహే!!

– రవీంద్రనాథ్ ఠాగూర్

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Amaravati, Andhra Pradesh.

Pledge | ప్రతిజ్ఞ

India is my country. All Indians are my brothers and sisters.
I love my country and I am proud of its rich and varied heritage.
I shall always strive to be worthy of it.
I shall give my parents, teachers and all elders respect,
and treat everyone with courtesy. I shall be kind to animals.
To my country and my people, I pledge my devotion.
In their well-being and prosperity alone lies my happiness.

- Pydimarri Venkata Subba Rao

భారతదేశం నా మాతృభూమి. భారతీయులందరూ నా సహోదరులు.
నేను నా దేశాన్ని ప్రేమిస్తున్నాను. సుసంపన్నమైన, బహువిధమైన నా దేశ వారసత్వ సంపద నాకు గర్వకారణం.
దీనికి అర్హత పొందడానికై సర్వదా నేను కృషి చేస్తాను.
నా తల్లిదండ్రుల్ని, ఉపాధ్యాయుల్ని, పెద్దలందర్ని గౌరవిస్తాను. ప్రతివారితోను మర్యాదగా నడుచుకొంటాను.
జంతువులపట్ల దయతో ఉంటాను.
నా దేశంపట్ల, నా ప్రజలపట్ల సేవానిరతితో ఉంటానని ప్రతిజ్ఞ చేస్తున్నాను.
వారి శ్రేయోభివృద్ధిలే నా ఆనందానికి మూలం.

– పైడిమర్రి వెంకట సుబ్బారావు

National Education Policy 2020

This textbook is designed in alignment with the National Education Policy (NEP) 2020 and the National Curriculum Framework for School Education (NCF-SE) 2023, highlighting the vision and goals of Mathematics education. "Mathematics is the study of numbers, shapes, patterns and relationships that help us understand the world around us. We use Mathematics in our daily life while counting, shopping, cooking, playing games and observing nature. As envisioned in NEP 2020, Mathematics education focuses on developing basic numeracy, logical thinking, problem-solving skills and mathematical intuition. It encourages children to observe patterns, think clearly, explain their ideas, and make correct decisions. When Mathematics is taught in a joyful and activity-based way, it creates curiosity, wonder and confidence in children and helps them develop a lifelong love for learning and applying Mathematics in real-life situations.

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Curricular Goals and Competencies

As per NCF-SE 2023, learning at the Middle Stage builds on concepts from the Preparatory Stage and gradually moves towards abstraction for wider application. At this stage, learners deepen their understanding of the number system, geometry, and patterns. These areas are explored through activities that support conceptual clarity and mathematical thinking. The table below presents the aligned Curricular Goals and Competencies for the Middle Stage as a reference for classroom teaching and learning.

CG-1 Understands numbers (counting numbers and fractions), represents whole numbers using the Indian place value system, understands and carries out the four basic operations with whole numbers, and discovers and recognises patterns in number sequences	C-1.1 Represents numbers using the place value structure of the Indian number system, compares whole numbers, and knows and can read the names of very large numbers C-1.2 Represents and compares commonly used fractions in daily life (such as ½, ¼) as parts of unit wholes, as locations on number lines and as divisions of whole numbers C-1.3 Understands and visualises arithmetic operations and the relationships among them, knows addition and multiplication tables at least up to 10 × 10 (*Pahade*) and applies the four basic operations on whole numbers to solve daily life problems C-1.4 Recognises, describes, and extends simple number patterns such as odd numbers, even numbers, square numbers, cubes, powers of 2, powers of 10, and Virahanka–Fibonacci numbers.
CG-4 Develops problem-solving skills with procedural fluency to solve mathematical puzzles as well as daily-life problems, and as a step towards developing computational thinking	C-4.1 Solves puzzles and daily-life problems involving one or more operations on whole numbers (including word puzzles and puzzles from 'recreational' areas, such as the construction of magic squares) C-4.2 Learns to systematically count and list all possible permutations or combination given a constraint, in simple situations (e.g., how to make a committee of two people from a group of five people) C-4.3 Selects appropriate methods and tools for computing with whole numbers, such as mental computation, estimation, or paper-pencil calculation, in accordance with the context
CG-5 Knows and appreciates the development in India of the decimal place value system that is used around the world today	C-5.1 Understands the development of zero in India and the Indian place value system for writing numerals, the history of its transmission to the world, and its modern impact on our lives and in all technology.

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Maths Magic

గణితంతో గమ్మత్తు

Class (తరగతి) - 5

Semester (సెమిస్టర్) - 1

Unit No. అధ్యాయం సంఖ్య	Name of the Unit అధ్యాయం పేరు	Month నెల	Pages పేజీలు
	Readiness *(Refer to Readiness book)* సంసిద్ధత	**June** జూన్	
1.	**My Number World** నా సంఖ్యా ప్రపంచం	**July** జులై	**2-37**
2.	**Addition and Substraction** కూడిక మరియు తీసివేత	**August** ఆగష్టు	**38-69**
3.	**Multiplication and Division** గుణకారం మరియు భాగహారం	**September** సెప్టెంబరు	**70-105**
4.	**Multiples and Factors** గుణిజాలు మరియు కారణాంకాలు	**October** అక్టోబరు	**106-147**
	Mind Map		**148**

M8B7L7

Teacher corner

U4A6I9

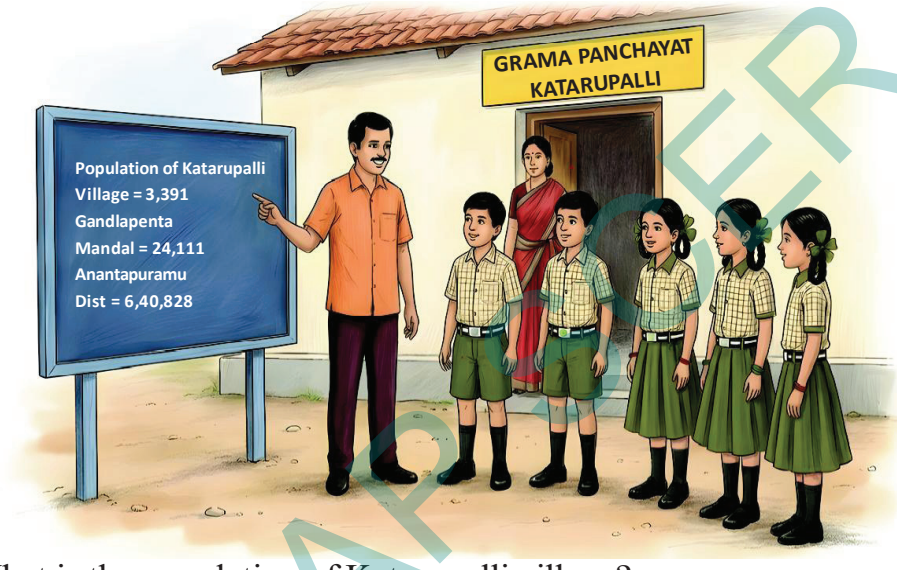
Student corner

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UNIT 1 My number world

Learner will be able to :

- Know Hindu - Arabic system of numeration and as well as in International system of numeration upto 9-digit numbers (CG1)
- Rewrite the given expanded forms and number names in standard forms (short forms).(CG1)
- Identify Place-value and Face-value of any digit in a number.(CG1)
- Write in ascending and descending orders.(CG1)
- Read and write Roman numerals up to 100.(CG1)

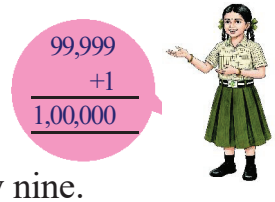


Rekha and Harsha are studying 5th class. Their class teacher asked them to collect the information on population of their Village/ward, Mandal and District from their Village Panchayat. They went to the village Panchayat and collected the information.



What is the population of Katarupalli village?
What is the population of Gandlapenta mandal?
Can anyone say the population of Anantapuramu district?

It has more than five digits. You have learned up to 5-digit numbers in your previous class. Now you will learn numbers with 6-digits and more.



Lakh Introduction :

Teacher: What is the greatest 5-digit number?

Student: 99,999 or Ninety nine thousand nine hundred and ninety nine.

Teacher: What is one more than 99,999?

Student: It is hundred thousand.

Teacher: It is also called as **One lakh**.

In the same way, 2,00,000 is read as two lakhs.



One lakh = 1,00,000

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3,00,000 is read as Three lakh 4,00,000 is read as _____

5,00,000 is read as _____ 6,00,000 is read as _____

7,00,000 is read as _____ 8,00,000 is read as _____

9,00,000 is read as _____ 4,50,000 read as _____

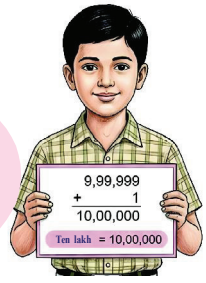
We read **4,53,258** as Four lakh fifty three thousand two hundred and fifty eight.

7,49,192 is read as _____

Do these

1) Read the numbers 3,51,645 and 9,38,715.
2) Write any five 6 - digit numbers using the digits 7,4,9 and 3. Express them in word form.

9,99,999
+1
10,00,000



Ten lakh: We know that 9,99,999 is the largest six digit number.

If we add 1 to this, we will get 10,00,000.

It is the smallest 7-digit number and read as **ten lakh**.

Ten lakh =10,00,000

Read the following.

20,00,000 read as _____ 30,00,000 read as _____

40,00,000 read as _____ 50,00,000 read as _____

60,00,000 read as _____ 70,00,000 read as _____

Example: We read the number 75,29,386 as seventy five lakh twenty nine thousand three hundred and eighty six.

Do these

1) Read the numbers 65,14,852 and 29,36,429.
2) Write any five 7-digit numbers using the digits 2,8,5 and 1. Express them in word form.

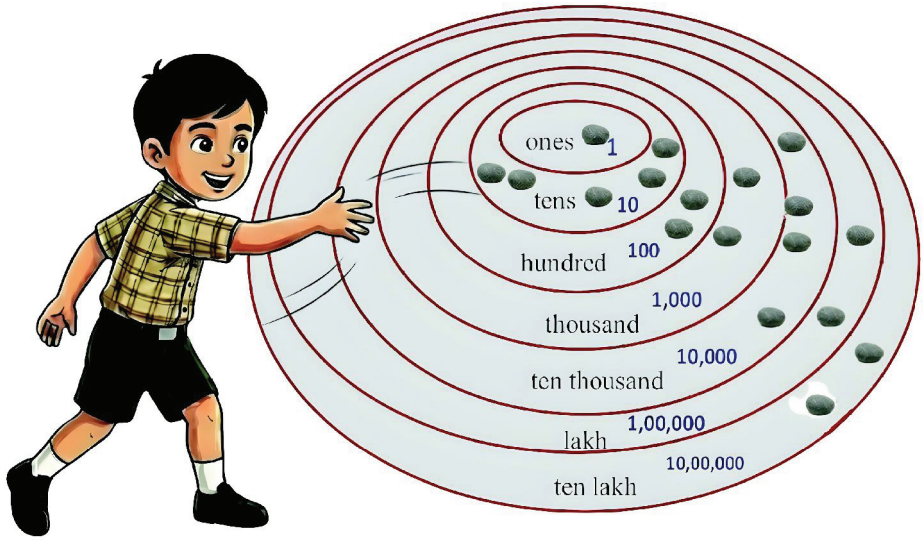


Let us play

Let us draw seven circles on the floor.
Name the circles as 'ones', 'tens', 'hundreds',... from inner most to outer most circles.
Each time, one student comes to play and throws some stones into the drawn circles.
After that, the student observes how many stones are there in each circle and according to the place value written on the circles, forms a number.

Note : Whenever 10 or more stones fall into any circle, 10 stones should be removed and 1 stone should be placed in the next higher place.

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Twenty two lakh forty two thousand two hundred and fifty one

EXERCISE-1

1) Identify the biggest number among the following. ( )

A) 7,26,581 B) 7,36,581 C) 7,16,584 D) 7,96,581

2) What is the place value of 8 in 7,08,643? ( )

A) 80,000 B) 800 C) 8,000 D) 0

3) Write the following numbers in words.

a) 1,25,602 b) 5,58,946 c) 9,57,524

4) Write the following in numbers.

a) Fourteen lakh thirty five thousand and fifteen = _____

b) Seventy four lakh sixty two thousand four hundred and sixty five = _____

5) Read the following and answer.

Vemanna bought a house for ₹45,87,000 and a plot beside it, at ₹18, 56,000. He paid a total amount of ₹64,43,000.

The cost of the house (in words): _____

_____

The cost of the plot (in words): _____

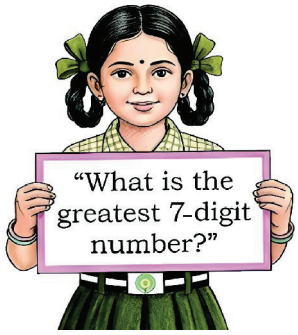
_____

The total cost of the house and the plot is (in words): _____

_____

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Crore



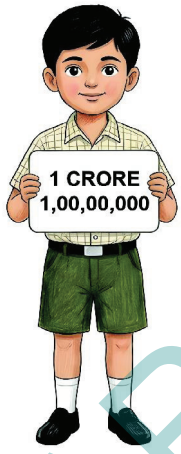


If we add 1 to the number, it will be

$$\begin{array}{r} 99,99,999 \\ +\quad 1 \\ \hline 1,00,00,000 \end{array}$$







It is one **Crore**. And one crore is the smallest 8 - digit number.

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Ten crore

The greatest 8-digit number is _____

What happens when 1 is added to this?

$$\begin{array}{r} 9,\ 99,\ 99,\ 999 \\ +\quad 1 \\ \hline 10,\ 00,\ 00,\ 000 \end{array}$$



Ten crore is the smallest 9-digit number.

What is the biggest 9-digit number?

Ten crore = 10,00,00,000

In the same way we can have **Hundred Crore, Thousand Crore……..etc.**

Children! ones, tens, hundreds, thousands, ten-thousands, lakhs….etc are the places in **Hindu-Arabic system of numeration** **or** **Indian system of numeration** which is widely used in our country.

Hindu-Arabic system of numeration (Indian system of numeration)

From the above discussion, we can form a table of places according to Hindu-Arabic system of numeration as follows

Place	Ten Crore	Crore	Ten Lakh	Lakh	Ten Thousand	Thousand	Hundred	Ten	One
	10,00,00,000	1,00,00,000	10,00,000	1,00,000	10,000	1,000	100	10	1

Do you know?

We commonly put a comma after hundreds at first, next ten-thousands, next ten-lakhs... etc to read any number easily in Indian system of numeration.

Hindu - Arabic system of numeration



In words:- Fourteen crore ninety five lakh ninety seven thousand eight hundred and seventy two.

Standard form (Short form) :- 14,95,97,872

Expanded form of 14,95,97,872 :

(1x10,00,00,000) + (4x1,00,00,000) + (9x10,00,000) + (5x1,00,000) + (9x10,000) + (7x1,000) + (8x100) + (7x10) + (2x1)

= 10,00,00,000 + 4,00,00,000 + 90,00,000 + 5,00,000 + 90,000 + 7,000 + 800 + 70 + 2

= ten crores + four crores + ninety lakhs + five lakhs + ninety thousands + seven thousands + eight hundreds + seventy + two

= Fourteen crore ninety five lakh ninety seven thousand eight hundred and seventy two.

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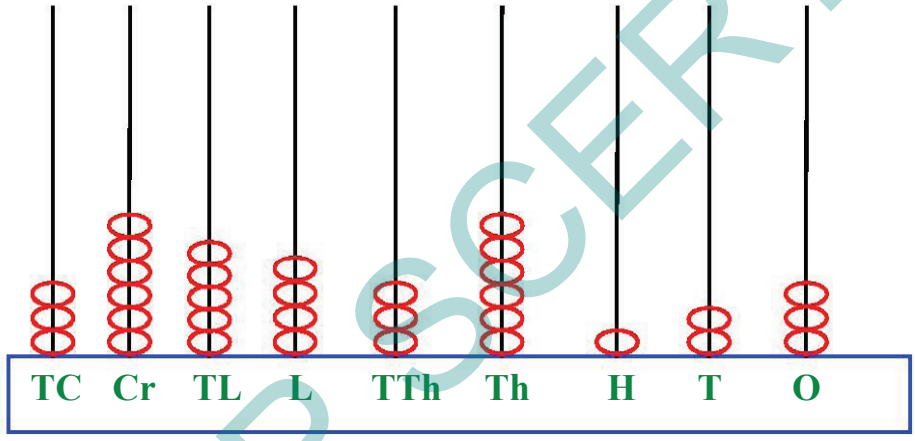
Do these

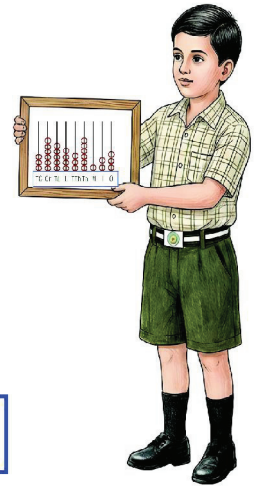
1) Write the following numerals in standard form and also write them in words.
   a) 721594 b) 4632584
2) Express the following numbers in expanded form.
   a) 40,63,52,456 b) 73,45,46,800

Activity 1

a) Observe the following representation of a number on spike abacus.

Example :





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Number in standard form: 36,54,36,123

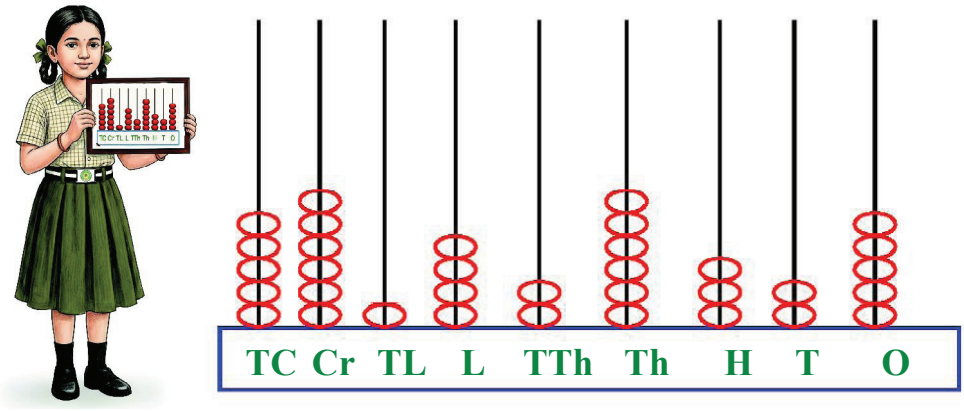
Expanded form:

30,00,00,000 + 6,00,00,000 + 50,00,000 + 4,00,000 + 30,000 + 6,000 + 100 + 20 + 3

Number in words:

Thirty six crore fifty four lakh thirty six thousand one hundred and twenty three.

b) Write the standard form, expanded form and the number in words for the number represented based the beads on the spike abacus.



Number in standard form: .....

.....

Expanded form: .....

.....

Number in words: .....

.....

Do these

1) Draw the spike abacus for the following numbers.

   1) 54,56,705 2) 6,27,12,545 3) 72,61,50,305

2) Write the numerals in standard form for the following number names.

   a) Twenty five lakh five thousand eight hundred and forty one.

   .....

   b) Five crore twenty lakh six thousand two hundred and five.

   .....

3) Write the numerals in standard form for the following expanded forms.

   a) 60,00,000 + 0 + 50,000 + 1,000 + 0 + 0 + 8 = ...

   b) 20,00,00,000 + 80,00,000 + 40,000 + 500 + 1 = ...

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Let's Play

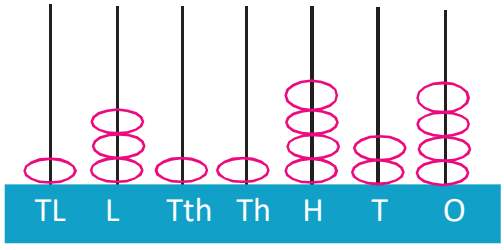
TC	Cr	TL	L	TTh	Th	H	T	O

Draw a table as shown above on the blackboard. Teacher invites students to come forward and write digits in the boxes starting from the ones place. Each student adds a digit. As soon as the ninth child writes his digit in ten-crores box, he has to read out the number formed. This game can also be played in two groups.

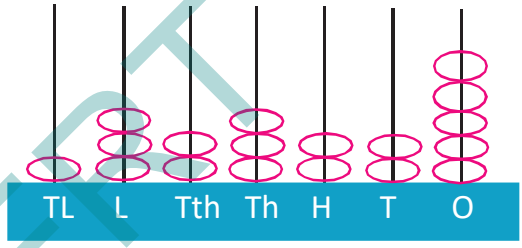
EXERCISE-2

1) On the basis of given abacuses, state which of the following option is true. ( )

i)



ii)



A) i > ii B) i < ii C) i = ii D) None

2) Write the following numerals in standard form.

a) 24536192 b) 900000100

3) Write the following numerals in words.

a) 93,53,26,491 b) 70,30,10,400

4) Write expanded form for the following numerals.

a) 3, 49,85,294 b) 50,23,80,050

5) Write the number in standard form for the following.

a) Forty five lakh thirty three thousand six hundred and eighty four.

b) 5crore + 20 lakh + 9 lakh + 40 thousand + 2 thousand + one hundred + 2 ten + 8one

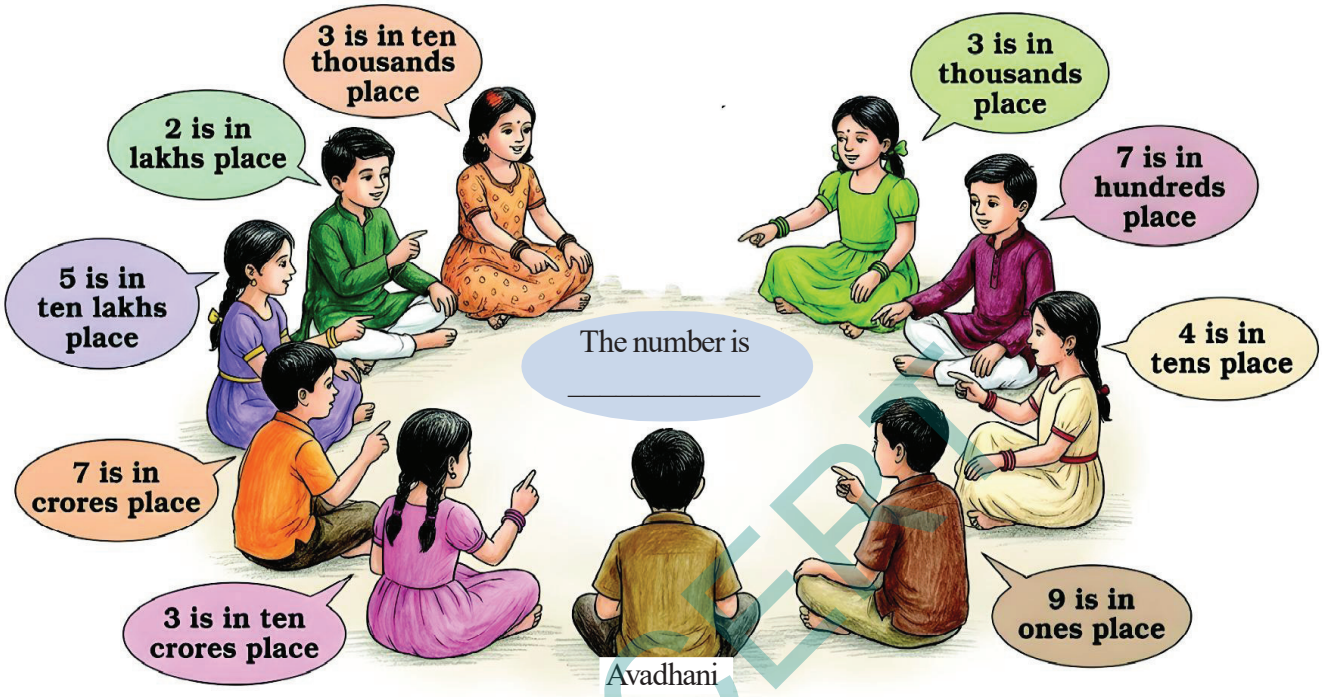
6) The distance between Sun and our planet Earth is fourteen crore ninety five lakh ninety seven thousand eight hundred and seventy kilometers.

Write the above number name in standard form and expanded form.

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Fun activity: Sankhyavadhanam

In this activity, the student acting as the Avadhani should carefully listen to the digits and their place values spoken by the other students, remember all the numbers, and write the number formed in the circle given in the centre.



Place value and Face values of a digit in a number:

Place of digit:

Ex: In 5,46,739, the place of 4 is ten thousands place.

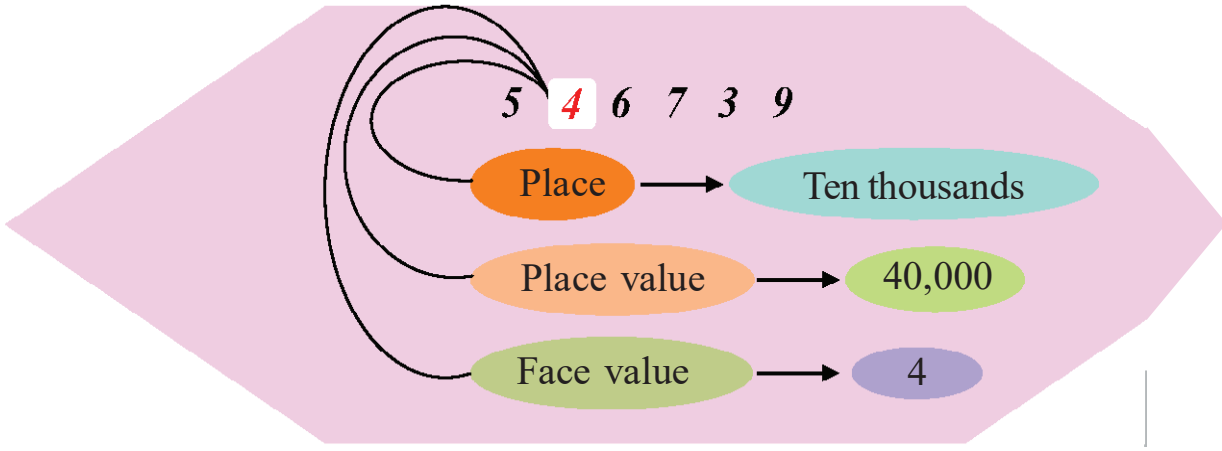
Place value of digit:

Ex: In 5,46,739, the place-value of 4 is 4x10,000 = 40,000, since 4 is in ten thousands place.

Face-value of digit:

Ex: In 5,46,739, the face-value of 4 is 4.

The face value of a digit never changes.



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Do these

Write place, place value and face value of the digit underlined in the following numbers.

a) 4<u>3</u>, 84,304 b) 73, <u>6</u>7,245 c) 68,<u>9</u>8,23,052 d) <u>9</u>7, 63, 05, 100

Activity - 2

0	1	2	3	4	5	6	7	8	9
	10	20	30	40	50	60	70	80	90
	100	200	300	400	500	600	700	800	900
	1000	2000	3000	4000	5000	6000	7000	8000	9000
	10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000
	1,00,000	2,00,000	3,00,000	4,00,000	5,00,000	6,00,000	7,00,000	8,00,000	9,00,000
	10,00,000	20,00,000	30,00,000	40,00,000	50,00,000	60,00,000	70,00,000	80,00,000	90,00,000
	1,00,00,000	2,00,00,000	3,00,00,000	4,00,00,000	5,00,00,000	6,00,00,000	7,00,00,000	8,00,00,000	9,00,00,000
	10,00,00,000	20,00,00,000	30,00,00,000	40,00,00,000	50,00,00,000	60,00,00,000	70,00,00,000	80,00,00,000	90,00,00,000

Prepare flash cards showing the place values of numbers as given in the table.

Write a number on the blackboard (e.g., 43,52, 16,978). Students select the appropriate flash cards for each digit, arrange them to show the expanded form.

40,00,00,000	3,00,00,000	50,00,000	2,00,000	10,000	6,000	900	70	8



EXERCISE-3



1) The biggest 5 - digit number formed with digits 2, 0, 6, 4 and 9 is ( )

A) 64,920 B) 96,420 C) 96,240 D) 96,042

2) What is the standard form of "fifty nine crore seventy lakh fifty eight thousand nine hundred and ten"? ( )

A) 59,70,58,910 B) 5,97,58,910 C) 59,78,910 D) 50,97,810

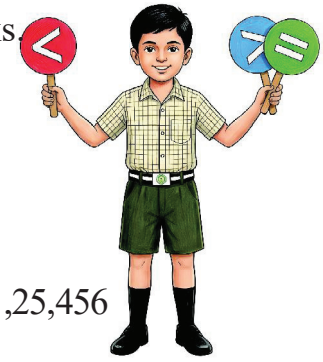
3) Write place, place-value and face-value for the underlined digits in the following numbers in (Hindu - Arabic system).

a) 73,<u>5</u>8, 942 b) 40,73,<u>3</u>5,536 c) 82,4<u>5</u>,63,125 d) <u>6</u>4,63,98,524

4) Which digit should be filled in the blank in the number (47,_5,63,251) for which place-value is 90,00,000?

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5) Compare the following numbers using (> or < or =) in the blanks.



1) 87,83,93,790 _____ 8,29,80,758

2) 9,00,20,403 _____ 40,09,53,400

6) Arrange the following numbers in the ascending order.

64,34,68,735 ; 10,29,47,026 ; 1,93,85,702 ; 14,89,27,131 ; 10,91,25,456

7) Arrange the following numbers in the descending order.

74,89,32,165 ; 48,29,30,456 ; 6,95,39,821; 98,43,26,834 ; 28,93,54,124

International system of numeration (British system of numeration)

Now let's learn International system or British system of numeration, which is slightly different from Hindu - Arabic system. It is widely used in International communications.

Places of International system of numeration.

Place	Hundred million	Ten million	Million	Hundred thousand	Ten thousand	Thousand	Hundred	Ten	One or Units
	100000000	10000000	1000000	100000	10000	1000	100	10	1

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Note: We notice that up to ten thousands place, both the systems are alike. But there are changes from lakhs place. (Here ***lakh is taken as Hundred thousand, ten lakh is taken as Million, crore is taken as Ten million, ten crore is taken as Hundred million*** and so on.)

1. In the same way, we have ***Billions, trillions…*** etc.
2. We commonly put comma, firstly after hundreds, next hundred-thousands, next hundred-millions, next hundred-billions…. etc to read any number easily in International system.

Example : Numeral 735632150 is written in the International system as 735, 632, 150 and read as Seven hundred thirty five million six hundred thirty two thousand one hundred and fifty. The number expanded as follows.

Place	Hundred million	Ten million	Million	Hundred thousand	Ten thousand	Thou-sand	Hun-dred	Ten	One or Units
Number	7	3	5	6	3	2	1	5	0
Place Value	7x100 000 000	3x10 000 000	5x1 000 000	6 x 100 000	3 x 10 000	2x1 000	1 x 100	5 x 10	0 x 1
	700 000 000	30 000 000	5 000 000	600 000	30 000	2 000	100	50	0
Number in words	Seven hundred and thirty five million			Six hundred and thirty two thousand			One hundred and fifty		

Example: Write standard form and number name for 720563042 in International system.

Solution:

Use commas : 720,563,042

Number in words: Seven hundred twenty million five hundred sixty three thousand and forty two.

Project work

Collect the newspapers of last week and pick out any ten large numbers. Then write their standard forms, number in words and expanded forms in Hindu-Arabic and International systems of numeral.



AP SCERT

Do these

1) **Write the following numerals in standard forms in International sys tem and write the number names.**

   a) 4753625 b) 700400300

2) **Write the following numerals in the International system.**

   a) Three hundred thousands = _____

   b) 5 millions = _____

Comparision of the Hindu-Arabic system and International system.



Think and say

One million is _____ lakhs.

Indian system of numeration (Hindu-Arabic system of numeration)			International system of numeration (British system of numeration)		
	Place			Place	
	Ones	1		Ones	1
	Tens	10		Tens	10
	Hundreds	100		Hundreds	100
Thousands	Thousand	1,000	Thousands	Thousands	1,000
	Ten Thousands	10,000		Ten Thousands	10,000
Lakhs	Lakhs	1,00,000		Hundred Thousand	100,000
	Ten Lakhs	10,00,000	Millions	Millions	1,000,000
Crores	Crores	1,00,00,000		Ten Millions	10,000,000
	Ten Crores	10,00,00,000		Hundred Millions	100,000,000

Do you know?

The largest number commonly known as one Googol plex. It is 10 raised to the power of a Googol. (Googol is 1 followed by 100 zeros)

AP SCERT

EXERCISE-4

1) Write the following numerals in standard form by putting commas, according to International system of numeration.

a) 4528973 b) 901247381 c) 200200200

2) Write the number names for the following numbers in International system.

a) 1,200,000 b) 7,521,256

3) Answer the following questions.

a) 1 lakh = _____ thousands.

b) 1 million = _____ lakhs.

c) 1 crore = _____ millions.

d) 1 hundred million = _____ crores.

e) 1 million = _____ thousands.

4) Identify the place of the digit 7 in the number 672, 443, 810. ( )

A) millions B) ten millions C) hundred millions D) hundred thousands.

5) One million = _____ thousands. ( )

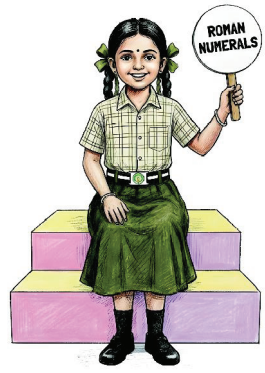
A) 10 B) 100 C) 1000 D) 10,000

The Roman Numbers :

Roman numbers use seven letters to represent numerical values. In your previous class you learned about I, V, and X. Let's recall.

Roman numbers 1 - 40

1 = I	11 = XI	21 = XXI	31 = XXXI
2 = II	12 = XII	22 = XXII	32 = XXXII
3 = III	13 = XIII	23 = XXIII	33 = XXXIII
4 = IV	14 = XIV	24 = XXIV	34 = XXXIV
5 = V	15 = XV	25 = XXV	35 = XXXV
6 = VI	16 = XVI	26 = XXVI	36 = XXXVI
7 = VII	17 = XVII	27 = XXVII	37 = XXXVII
8 = VIII	18 = XVIII	28 = XXVIII	38 = XXXVIII
9 = IX	19 = XIX	29 = XXIX	39 = XXXIX
10 = X	20 = XX	30 = XXX	40 = XL



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The Roman number system introduces new symbols to represent certain larger numbers:
Instead of writing a number by repeating a smaller symbol many times (e.g., X repeats 5 times to makes 50 and ten times makes 100) new symbols are introduced
Now, let's know two new symbols.

For 50, the symbol is L **For 100, the symbol is C**

L = 50 **C = 100**

Rules : These values are added or subtracted to make a number based on how these symbols are arranged. There are certain rules for writing Roman numbers, Let's observe them.



When a symbol is repeated, its value is added..

Example: III = 1 + 1 + 1 = 3
XX = 10 + 10 = 20
XXX = 10 + 10 + 10 = 30

Note : Only the numbers I,X and C can be repeated consecutively. The symbols V,L are never repeated consecutively.



you can never have more than three of the same numbers in a sequence or row.

Example: 40 is written as XL, not XXXX
50 is written as L, not XXXXX
90 is written as XC, not LXXXX



Add numerals together when a smaller value is placed after a larger one.

Example:
XV = 10 + 5 = 15
LX = 50 + 10 = 60
LXXV = 50 + 10 + 10 + 5 = 75

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Subtract a smaller value from a larger one when it is placed before the larger value.

Important for 40 and 90:

IV = 5 - 1 = 4	IX = 10 - 1 = 9
XL (10 before50) = 50 - 10 = 40	XC (10 before 100) = 100 - 10 = 90





The symbol V (5) is never placed before a symbol of higher value. You cannot subtract V from X, L, or C

Explanation : If you want to write a number like 45 or 95 you must use addition, not subtraction. Observe the below table.

Hindu Arabic-Number	Roman number	Wrong/Right	Why Incorrect	Correct	Why correct
45	VL	×	V is used before L	XLV ✔	V is placed after L
95	VC	×	V is used before C	XCV ✔	V is placed after C

Now we write the Hindu - Arabic Numbers for Roman numerals.

XLII = (50 - 10) + 2 = 40 + 2 = 42

LXXXVII = 50 + 10 + 10 + 5 + 1 + 1 = 87

XCIV = (100 - 10) + (5 - 1) = 90 + 4 = 94

Do these

1. Write the Hindu - Arabic numbers for the Roman numerals given.
   a) LXXXIX = _____ b) LXV = _____
2. Write the Roman numerals for the Hindu - Arabic numbers.
   a) 39 = _____ b) 92 = _____

Do you Know ?

The Roman number system has unique symbols reserved for much larger quantities. Do you know which distinct, single letters denote the massive milestones of 500 and 1000?

The symbols are :

D = 500 **M = 1000**

AP SCERT

EXERCISE-5

1. The Roman numeral for 63 is ( )
   A) LXIII B) LIII C) XLIII D) XXXIII
2. What number does the Roman numeral LIV? ( )
   A) 44 B) 54 C) 64 D) 74
3. Convert these Hindu - Arabic numbers into Roman numerals.
   a) 7 = _____ b) 78 = _____ c) 56 = _____
4. Convert these Roman numerals into Hindu - Arabic Numbers.
   a) XII = _____ b) LX = _____ c) C = _____
5. Use <, > or = to compare the following values,
   a) LIII _____ XLIII b) LXX = _____ LXXX c) LXXXIII _____ LXXXIII
6. Circle the numeral that is miswritten in each row.
   a) XLV, XXXXX, XIX b) VV, XIII, XC
7. Apart from clocks and watches, write the places where we see Roman numerals.

_____

_____

1 - 100 Roman Numbers

1	I	26	XXVI	51	LI	76	LXXVI
2	II	27	XXVII	52	LII	77	LXXVII
3	III	28	XXVIII	53	LIII	78	LXXVIII
4	IV	29	XXIX	54	LIV	79	LXXIX
5	V	30	XXX	55	LV	80	LXXX
6	VI	31	XXXI	56	LVI	81	LXXXI
7	VII	32	XXXII	57	LVII	82	LXXXII
8	VIII	33	XXXIII	58	LVIII	83	LXXXIII
9	IX	34	XXXIV	59	LIX	84	LXXXIV
10	X	35	XXXV	60	LX	85	LXXXV
11	XI	36	XXXVI	61	LXI	86	LXXXVI
12	XII	37	XXXVII	62	LXII	87	LXXXVII
13	XIII	38	XXXVIII	63	LXIII	88	LXXXVIII
14	XIV	39	XXXIX	64	LXIV	89	LXXXIX
15	XV	40	XL	65	LXV	90	XC
16	XVI	41	XLI	66	LXVI	91	XCI
17	XVII	42	XLII	67	LXVII	92	XCII
18	XVIII	43	XLIII	68	LXVIII	93	XCIII
19	XIX	44	XLIV	69	LXIX	94	XCIV
20	XX	45	XLV	70	LXX	95	XCV
21	XXI	46	XLVI	71	LXXI	96	XCVI
22	XXII	47	XLVII	72	LXXII	97	XCVII
23	XXIII	48	XLVIII	73	LXXIII	98	XCVIII
24	XXIV	49	XLIX	74	LXXIV	99	XCIX
25	XXV	50	L	75	LXXV	100	C

APSCERT

Improve Your Learning

1. 40000 + _____+ 70 = 43070. What should come in the blank?
2. Which of these is the SMALLEST number? ( )

   a) 110 ones b) 40 tens c) 2 hundreds d) 1 thousand
3. The distance between Kanyakumari and Srinagar is 3631 km

   Which of the following is NOT a correct expanded form of 3631? ( )

   a) 3 + 6 + 3 + 1

   b) 3 thousands + 6 hundreds + 3 tens + 1 ones

   c) (3×1000) + (6×100) + (3×10) + (1×1)

   d) 3000 + 600 + 30 + 1
4. David holds up a card which reads 5067. He described this number in four sentences shown below.

   Write 'T" for true, and 'F' for false in the boxes.

   a) This number is an even number. ( )

   b) The place value of the digit in the thousands place is 100. ( )

   c) Its nearest hundred is 5100. ( )

   d) Its predecessor is 5066. ( )
5. A printing machine printed a total of 1 million worksheets. Write the number equal to 1 million in the Hindu-Arabic number system?
6. Rohan was asked to write the number Seventy Lakhs in the International System. He wrote it as 7,000,000 and read it as Seven Million. Write whether Rohan's answer is correct or not and provide one reason for your answer.
7. In a book the preface ends on page "xiv". Write the page number in Hindu-Arabic numbers.
8. Meena and Zareena are making numbers with these digit cards.

4	6	0	8	1	3

   a) What are the greatest and smallest 6-digit numbers they can make using all these cards?

   b) What is the place value of 3 in the smallest number?

   c) If the digits of the smallest number are written in reverse order, is the new number greater than, less than, or equal to the original greatest number? Show your steps.

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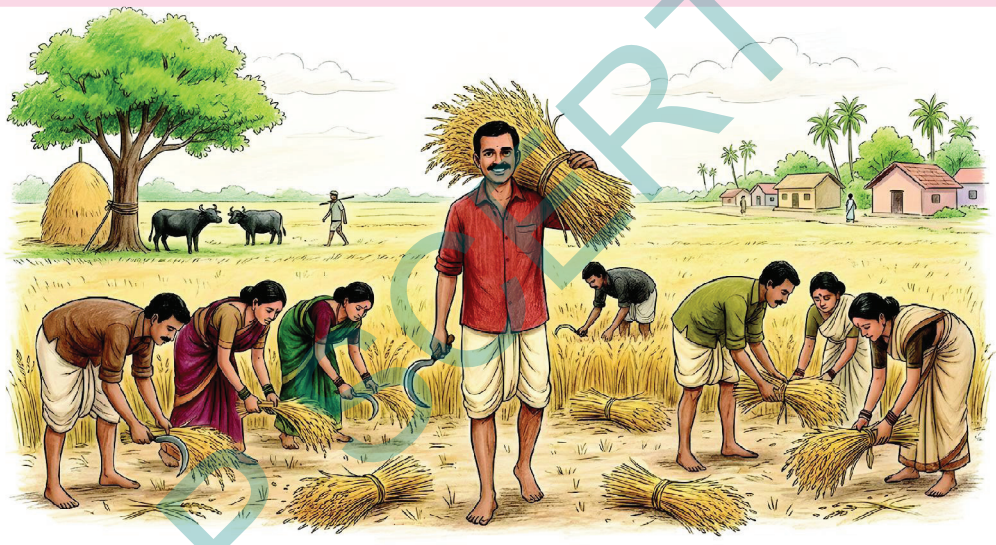
UNIT 2

Addition and Subtraction

K5I4R4

Learner will be able to :

- Perform additions and subtractions up to 5 -digits.(CG1)
- Understand addition and subtraction facts.(CG1)
- Solve real-life problems involving addition and subtraction.(CG4)
- Explain the concepts of cost price, selling price.(CG4)
- Solve problems related to profit and loss.(CG4)
- Check the addition properties.(CG1)



Introduction:

Shankar cultivated paddy in his two acres field. He wanted to know the cost of cultivation. He asked his daughter to write down the details of his expenditure. She wrote the details and expenditure for 1 acre. Calculate it for 2 acres.

Details of expenditure	Expenditure for 1 acre (₹)	Expenditure for 2 acres(₹)
Preparation of field	2,545	
Seed bed and plantating	4,507	
Removal of weeds	1,235	
Fertilizers & pesticides	4,700	
Harvesting	4,125	
To heap and to thresh	4,675	

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Now answer the following questions.

1. How much amount did Shankar invest on preparation of field for seed bed?
2. How much amount did he spend on harvesting and to heaping and threshing?
3. How much amount did he spend on seed bed and removal of weeds?
4. What is the total cost of cultivating paddy on 1 acre?
5. What is the total cost of cultivating paddy on 2 acres?



Sambaiah, the brother of Shankar, has 1 acre of field.

Let's observe how much they spent together.

	T.Th	T	H	T	O
Shankar's expenditure	=	4	3	5	7	4
Sambaiah's expenditure	= +	2	1	7	8	7

This problem can be solved like this

3.2 Process of Addition:

Step 1: Adding digits in ones place .....

4 ones + 7 ones = 11 ones

= 1ten+1 one

Write 1 in ones place and carry one ten to the tens place.

T.Th	Th	H	T	O
			(1)	
4	3	5	7	4
2	1	7	8	7
				1

Step 2: Adding digits in tens place .....

1 Ten (carried) +7 tens +8 tens

= 16 tens = 1 hundred + 6 tens

Write 6 in tens place and

1 hundred is carried to hundreds place.

T.Th	Th	H	T	O
		(1)	(1)	
4	3	5	7	4
2	1	7	8	7
			6	1

Step 3: Adding digits in hundreds place .....

carried 1 hundred + 5 hundred + 7 hundreds

= 13 hundreds

=1 thousand + 3 hundreds

Write 3 in hundreds place and 1 in thousand place.

T.Th	Th	H	T	O
	(1)	(1)	(1)	
4	3	5	7	4
2	1	7	8	7
		3	6	1

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Step 4: Adding digits in thousands place

1 thousand + 3 thousands + one thousand carried = 5 thousands

Write 5 in thousands place.

Step 5: Adding digits in ten thousands:

4 Ten thousands + 2 Ten thousands = 6 Ten thousands

Write 6 in ten thousands place.

So, the total amount spent by both of them is 65,361

T.Th	Th	H	T	O
	(1)	(1)	(1)	
4	3	5	7	4
2	1	7	8	7
	5	3	6	1

T.Th	Th	H	T	O
	(1)	(1)	(1)	
4	3	5	7	4
2	1	7	8	7
6	5	3	6	1

Example -1: Add 52,435 and 42,567

Solution: 52435 + 42567

	T Th	Th	H	T	O
		1	1	1	
	5	2	4	3	5
+	4	2	5	6	7
	9	5	0	0	2

So, 52435 + 42567 = 95002



AP SCERT

Do these

1) Do the following.

Add 20762 and 12225

2) Arrange in columns and add.

13482+26742+37323



Subtraction :

Mohan is a proprietor of a meals canteen. He invested ₹ 31,787 in January 2026 and earned ₹53,574. Calculate his gain in the month?

		T.Th	Th	H	T	O
Mohan earned in January	=	5	3	5	7	4
Investment of Mohan	=	(-) 3	1	7	8	7
Gain	=					

3.3 Algorithm of Subtraction :

Step 1:

Subtract the ones column. 7 > 4 so, borrow one ten from tens place leaving behind 6 Tens.
Regroup 1 ten borrowed into 10 ones.
Now you have 10 ones + 4 ones =14 ones.
14ones - 7 ones = 7 ones
Write 7 in the ones place.

T.Th	Th	H	T	O
			(6)	(14)
5	3	5	~~7~~	~~4~~
3	1	7	8	7
				7

Step2:

Subtract the tens column. 8 tens > 6 tens. So, borrow one hundred from hundreds column leaving behind 4 hundreds.
Regroup 1 hundred borrowed into 10 tens.
Now you have 10 Tens+ 6 Tens = 16 Tens.
16 Tens - 8 Tens= 8 Tens
Now, write 8 in tens place.

T.Th	Th	H	T	O
		(4)	(16) ~~6~~	(14)
5	3	~~5~~	~~7~~	~~4~~
3	1	7	8	7
			8	7

Step 3:

Subtract hundreds column. 7 hundreds > 4 hundreds.
So borrow one thousand from thousand column.
Regroup 1 thousands borrowed into 10 hundreds.
You have 10 hundred + 4 hundreds =14 hundreds
14 hundreds – 7 hundred = 7 hundreds.
Write 7 in hundreds place.

T.Th	Th	H	T	O
	(2)	(14) ~~4~~	(16) ~~6~~	(14)
5	~~3~~	~~5~~	~~7~~	~~4~~
3	1	7	8	7
		7	8	7

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Step 4:

Subtract the thousands column.

2 Thousands – 1 Thousand = 1 Thousand.

Write 1 in Thousands place.

T.Th	Th	H	T	O
	2	14 ~~4~~	16 ~~6~~	14
5	~~3~~	~~5~~	~~7~~	~~4~~
3	1	7	8	7
	1	7	8	7

Step 5:

Subtract Ten thousands place.

5 Ten thousands – 3 Ten thousands

= 2 Ten thousands.

Mohan's profits in the January is ₹ 21,787

T.Th	Th	H	T	O
	~~2~~	14 ~~4~~	16 ~~6~~	14
5	~~3~~	~~5~~	~~7~~	~~4~~
3	1	7	8	7
2	1	7	8	7

Example 1: Subtract 26874 from 49543

Solution: 49543 - 26874

T.Th	Th	H	T	O
4	9	5	4	3
- 2	6	8	7	4
2	2	6	6	9

49543 - 26874 = 22669



AP SCERT

Do these

1. Subtract the following.

   a) 43521 - 38445 b) 86048 - 76485

2. Which number has to add 13672 to get 53267?

Cloth store:

Vanaja's family decided to purchase some garments on the occasions of her daughter's marriage. So she purchased some garments in APCO showroom. The billing details are as shown below.



Purchased garments	Total in (₹)
Silk sarees	9,899
Cotton sarees	6,940
Silk panche	2,785
Door curtains	8,438
Bed sheets	5,900
Towels	2,350



1. How much money was spent on silk sarees more than that of door curtains?
2. How much less money was spent on bed sheets than cotton sarees?
3. How much money was spent on both silk sarees and silk panche?
4. How much money did Vanaja spend for door curtains, bed sheets and towels?
5. How much money did Vanaja family spend for shopping?

AP SCERT

Project work

Collect the information about your village from your sachivalayyam. Findout the sums.

Village Name:

Number of males	
Number of females	
Number of children	
Total population	
Number of literates	
Number of illiterates	
Total	



Discuss with your teacher about the table.

Example 1 : What is the difference of the largest 5-digit number and the largest 4-digit number?

5-digit largest number	=	99,999
4-digit largest number	=	- 9,999
Difference	=	90,000
The difference	=	90,000.

Example 2 : Find the sum of the smallest 5-digit odd number and the largest 4-digit even number.

The smallest 5-digit odd number	=	10,001
The largest 4-digit even number	=	+ 9,998
Total	=	19,999
Their sum	=	19,999.

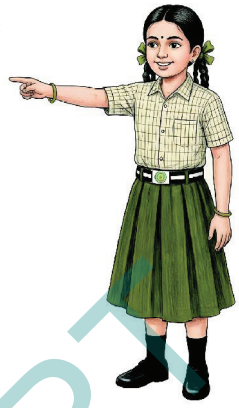
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Relation between Addition and Subtraction

We know that 8 + 4 = 12. We can derive two subtraction facts for this addition.

12 - 4 = 8 and 12 - 8 = 4 What did you observe?

We can write two subtraction facts for any addition in the



Example : 43267 + 15268 = 58535

The subtraction facts that follow are...

58535	58535
– 15268	– 43267
43267	15268

For each subtraction, we can have only one addition fact.

Example : 14 - 8 = 6, then the addition fact is 6 + 8 = 14.

For 65347 - 45621 = 19726 Subtraction

The addtion fact is 19726 + 45621 = 65347

19726
+ 45621
65347

Example : Simplify 52837 + 14563 - 32409

Solution:

Step-1: Add the numbers having '+' sign.

Step-2: Subtract the third number from the sum obtained in step-1

	T.Th	Th	H	T	O
	5	2	8	3	7
+	1	4	5	6	3
	6	7	4	0	0

	T.Th	Th	H	T	O
	6	7	4	0	0
–	3	2	4	0	9
	3	4	9	9	1

52837 + 14563 – 32409 = 34991

APSCERT

EXERCISE-1

1. A man earns ₹37,645 in a month and his wife earns ₹25,367. If they spend ₹ 38,600 in a month, how much do they save in that month?

2. Siva had ₹52,490. He bought a Television for ₹15,870 and a Washing machine for ₹25,785. How much money is with him now? Do you think you can buy another item costing ₹12,000? Explain your answer.

3. A milk dairy supplies 25,545 litres of milk every day. It supplies 15,625 litres of milk to various milk depots and the rest to the market. How much milk is supplied to the market?

4. Madhu father gave him ₹2500 and his mother ₹1300 on his birthday. He spent ₹3100 cloths and cake. What is the remaining amount with him? ( )

   A) ₹500 B) ₹700 C) ₹600 D) ₹800

5. The difference between two number is 643. On of the number is 6489. Find the another number? ( )

   A) 5846 B) 5864 C) 5800 D) 7132

6. **Fill in the blanks.**

Addition	Subtraction Fact - 1	Subtraction Fact - 2
7500 + 2500 = 10,000	10000 – 2500 = _____	10000 – 7500 = _____

7. **Do the following.**

   a) 12645 - 36221 + 43576 = _____

   b) 40376 - 20568 + 37364 = _____

Properties of addition:

Property 1:

Example: Add 2579 to 3275 and 3275 to 2579.

$$\begin{array}{r} 3\,2\,7\,5 \\ +\ 2\,5\,7\,9 \\ \hline 5\,8\,5\,4 \end{array} \qquad \begin{array}{r} 2\,5\,7\,9 \\ +\ 3\,2\,7\,5 \\ \hline 5\,8\,5\,4 \end{array}$$



If we change the order of 2579 and 3275 as shown above, the result is same.

Thus, 2579 + 3275 = 3275 + 2579 = 5854.

- Changing the order of the two addends does not change the total.

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Property 2:

Example: Let us add 9213 to 0 and also add 0 to 9213.

We have

$$\begin{array}{r} 0 \\ +\ 9213 \\ \hline 9213 \end{array} \qquad \begin{array}{r} 9213 \\ +\ \ 0 \\ \hline 9213 \end{array}$$

From the above example you may know that, while adding '0' to any number you will get the same number.

Thus 9213 + 0 = 9213 + 0 = 9213.

- **If we add a number to 0, we get the number itself.**

Do these

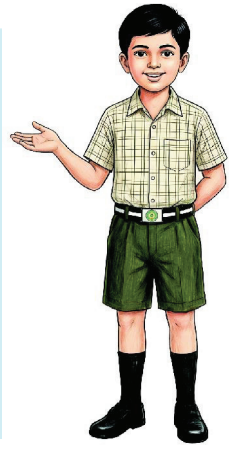
1) Fill in the blanks using addition properties.

a. 27543 + 56409 = 56409 + _____

b. 34178 + 67894 = _____ + _____

c. 88998 + 0 = _____

d. 0 + _____ = 65912 + _____



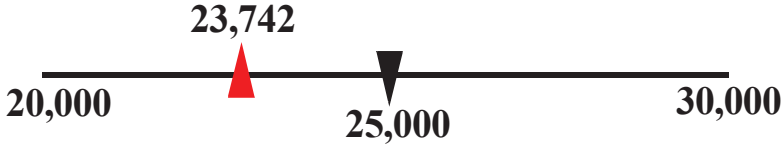
Rounding off to the nearest ten thousands

Example 1: Round off 23,742 to nearest ten thousands.

Step 1: To round off a number to the nearest ten thousands we have to identify between which two ten thousands the given number lies.

23,742 lies between 20,000 and 30,000.

Step 2: Identify the midpoint of the above two ten thousands, Identify the given number position on number line.



The number 23,742 is closer to **20,000** because it is before the half way (mid) point (25,000). So, we round off 23,742 to **20,000**.

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Example 2: Round off 75000 to nearest ten thousands.

75000 lies between 70000 and 80000.



75,000 is the mid point of 70000 and 80000

Middle numbers are rounded upto the next ten thousands.

so we round off 75000 to **80000.**

Rules of rounding to the nearest ten thousand

- Identify the previous ten-thousand and next ten-thousand of the given number.
- Look at the thousands digit of the given number.
- If the thousands digit is 0, 1, 2, 3, or 4, round down to the previous ten-thousand.
- If the thousands digit is 5, 6, 7, 8, or 9, round up to the next ten-thousand.

Do these

Round off the given numbers to the nearest ten-thousand.

a) 28,456 = _____ b) 35,782 = _____ c) 43,248 = _____

Estimating sum and difference:

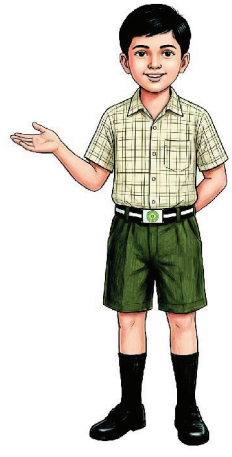
To estimate sum or difference, first round off each number to its nearest ten, hundred or thousand as per the number of digits in the numbers and then add or subtract.

Estimating Large numbers

Estimate the sum or difference by rounding off each number to the nearest ten thousand.

Example :

62,014	60,000		
+ 15,703	+ 20,000	**approximately**	
	80,000		
85,703	90,000	**approximately**	
- 62,014	- 60,000		
	30,000		



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Estimate, the answer by rounding off. Do addition or subtraction according to the problem given. One is done for you.

Example:

Baba had ₹ 7844 in his bank account. His expenditure is ₹ 2257. Estimate the remaining balance in his bank account.

₹ 8000 ₹ 9000 ₹ 10000 ₹ 6000

1. Raghu went to Rythu bazar and bought some vegetables worth ₹ 158, grocery worth ₹143. How much did he spend approximately?

   ₹ 200 ₹ 300 ₹ 400 ₹ 500

2. Raju bought a mobile for ₹7890 and a chair for ₹ 3295. Estimate how much did he pay more for the mobile, compared to the chair?

   ₹ 4000 ₹ 3000 ₹ 1000 ₹ 5000

3. Bunny scored 6,776 points on a video game and Baba scored 2,373 points. Estimate the difference of the scores of Bunny and Baba approximately?

   5000 8000 7000 6000

4. Lakshmi is reading a book that contain 257 pages. She has already read 163 pages. Estimate how many pages are yet to be read approximately?

   600 900 100 70

Profit and Loss:

A weaver weaves sarees on his handloom and sells them in market. He buys cotton, thread, silk thread, Zari silk...etc. from a whole-saler. He sells them at a **profit** and sometimes at a **loss**. He weaves costly sarees on the orders of consumers. He can weave a cotton-saree within two days and a silk saree in 4 to 5 days. Now let's see his **cost** of measuring each saree.



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Cotton saree	
Cotton thread	- ₹ 300
Zari	- ₹ 200
Weaving charge	- ₹ 400
Total:	₹ 900

Silk saree	
Silk thread	- ₹ 2500
Zari	- ₹1000
Weaving charge	- ₹ 2000
Total:	₹ 5,500

Answer the following questions.

1. The weaver sells a cotton saree for ₹ 1100. Does he make profit or loss?

2. The weaver sells a cotton saree for ₹ 400 each for some reasons does he make a profit or a loss? Also think about what will be the reason for selling saree for low price?

Example : A shop keeper purchases cotton saree at the rate of ₹1200 and silk saree for ₹7000 from weaver. He sells those for ₹1400 and ₹8500 respectively.



Situation : 1

What is your observation about cotton saree?

Cost price of the cotton saree = ₹1200

Selling price of the cotton saree = ₹1400

Here Selling Price > Cost Price hence

Selling price of the cotton saree = ₹ 1400

Cost Price of the cotton saree =(–)₹ 1200

₹200

Situation : 2

What is your observation about silk saree?

Cost price of the silk saree = ₹7000

Selling price of the silk saree = ₹8500

Here Selling Price > Cost Price hence

Selling price of the silk saree = ₹ 8500

Cost Price of the silk saree =(–) ₹ 7000

₹1500

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What is your observation ?

In both the cases, the selling price is higher than the cost price. So, he is getting more amount than the cost price, hence we said he got profit. To know how much profit he got, we have to subtract the cost price from the selling price.

Profit = Selling Price - Cost Price

We can gain if the selling price is more than cost price. Then the difference is profit.

Some ₹1200 cotton sarees are damaged. Such sarees were sold for ₹800 each.

What is your observation about cotton saree?

Cost price of the cotton saree = ₹1200

Selling price of the cotton saree = ₹800

Here Selling Price < Cost Price hence

Cost Price of the cotton saree	=	₹1200
Selling price of the cotton saree	=	(–) ₹ 800
		₹ 400



What is your observation?

In the above case, selling price is lesser than the cost price. To know, how much he got loss we have to subtract selling price from cost price.

Loss = Cost Price – Selling Price

We get loss if the cost price is more than selling price.

Example -1:

Amar is a gold merchant. He bought 5 grams of gold for ₹50,000. Now its rate has increased up to ₹57,000. Will Amar make a profit or a loss on selling the gold? How much?

Solution: Cost price of 5g Gold = ₹50,000

Present rate of 5g gold = ₹57,000

Present rate is high. So he gets profit.

Profit = Present rate - Cost price

= ₹57,000 – ₹50,000

= ₹7,000



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EXERCISE-2

1. Cost price of a fan is ₹800 and by selling it, Ravi got a profit of ₹250. What is its selling price?

2. A thermos flask is purchased for ₹450 by a shopkeeper. He wants a profit of ₹50. At what price should be sell it?

3. Rekha and Geetha went to a movie. Rekha bought two tickets for ₹500. Geetha bought two pop-corn packets at the rate of ₹75 for each. How much more money did Rekha spend than Geetha?

4. A shop owner bought a book for ₹800 and sold it for ₹650. Then which is true. ( )

   A) ₹150 gain B) ₹150 loss C) No gain, No loss D) ₹650 loss

5. If you want a profit, ( )

   A) selling price < cost price B) selling price > cost price

   C) selling price = cost price D) selling price - cost price

6. Find the amount of profit or loss for the following problems then complete the table.

   a) Cost price of rice bag = ₹750; selling price = ₹900

   b) Cost price of bed sheet = ₹635; selling price = ₹815

   c) Cost price of umbrella = ₹105; selling price = ₹90

Profit/Loss	How much



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Improve Your Learning

1. A dealer bought a chair for ₹295. He wants to get a profit of ₹25 on the chair. How can he calculate the selling price of the chair? ( )

   a) Selling price = 295 - 25 b) Selling price = 295 + 25

   c) Selling price = 295 x 25 d) Selling price = 295 ÷ 25

2. Ram and Shyam went out to the market to buy toffees. ( )

   Number of toffees bought by Ram = 5000 ones

   Number of toffees bought by Shyam = 60 tens

   What is the difference in the number of toffees bought by Ram and Shyam?

   a) 1010 b) 4400 c) 4940 d) 5060

3. Fill in the blank.

   _____ - 36782 = 4591.

   Show your work.

4. For an annual celebration, two classes collected ₹46,569 and ₹34,266.

   Together, how much more money should be added to make the total ₹99,000?

5. An ice-cream shop sold 1,178 scoops of vanilla ice cream and 983 scoops of chocolate ice cream last month. What was the TOTAL number of ice-cream scoops sold last month?

6. A fruit seller buys a basket of mangoes for ₹1,200. He spends ₹100 on transport. He sells the basket for ₹1,400 and says that he made a profit of ₹ 200.

   Is his statement correct?

   Give a reason for your answer.

7. Anusha bought a bicycle and later sold it at a loss of ₹500.

   Create one possible cost price and selling price of the bicycle that would result in this loss.

8. Anita wants to buy a toy set that costs ₹ 3,600. She has already saved ₹ 2,150. Her grandmother promised to give her ₹ 500 next month. How much more money will Anita still need to buy the toy set after getting money from her grandmother?

9 Rachana's income was ₹ 6,25,320 in 2018. Next year her income exceeded the previous year's income by ₹ 64,200. What was her income in the year 2019? How much did she earn in these two years?

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UNIT 3 Multiplication and Division

H5K9F7

Learner will be able to :

- Multiply 4-digit number with 1,2 and 3-digit numbers.(CG1)
- Frame word problems based on multiplication.(CG4)
- Estimate products and verify the answers.(CG1)
- Divide 4-digit number by 1 and 2-digit numbers.(CG1)
- Apply the unitary method using multiplication and division.(CG4)
- Estimate quotients and verify the answers.(CG1)
- Solve real-life problems involving multiplication and division.(CG4)

Mr. Raju is a farmer. He is building a new house. He purchased the required material like sand, cement, iron, gravel and bricks to build the house.



The expenditure is as mentioned below.

S.No.	Item	Unit	Cost per unit	No.of units
1.	Sand	1Tractor truck	₹3000	3
2.	Cement Brick	1	₹16	500
3.	Iron	1 kg	₹80	122 kg
4.	Cement	1 Bag	₹435	50
5.	Gravel	1Tractor truck	₹4000	2

How much amount was spent to purchase the material?

	Cost per unit(₹)		Number of unit		Total amount (₹)
1. Sand		×		=	
2. Cement bricks		×		=	
3. Iron		×		=	
4. Cement		×		=	
5. Gravel		×		=	

Then Raju asked Babu to send masons, helpers and labourers to work on daily wages. The daily wages of the workers are given below.

S.No.	Workmanship	Wage per day
1	Mason	₹ 1100
2	Helper	₹ 950
3	Labour	₹ 750

After the completion of 31 days of work, the helper had to be paid. How much his wage at ₹ 950 per day? Sai who is the son of Raju calculated the amount as shown below:

Days wage	900	50	0
30	900 × 30 = 27000	50 × 30 = 1500	0 × 30 = 0
1	900 × 1 = 900	50 × 1 = 50	1 × 0 = 0

Total : 27000 + 1500 + 0 + 900 + 50 + 0 = ₹ 29,450

But Sai's sister Harshitha calculated the same in another way as shown below.

Helper wage for one day = ₹950

Helper wage for 31 days = 950 × 31

= (900 + 50 + 0) × 31

= (900 × 31) + (50 × 31) + (0 × 31)

= 27,900 + 1,550 + 0

= ₹29,450

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When they showed the two methods to their mother Devi, she said, "both are correct and she explained the problem using another method which is given below.

Helper wage for 31 days

$= 950 \times 31$

950 ------ (950×1)

$+ 28500$ ------ (950×30)

₹ 29450

To multiply by 30, first write a zero in one's place. Then we only have to multiply by 3.

Which of the above three methods did you like? Why?

Example:

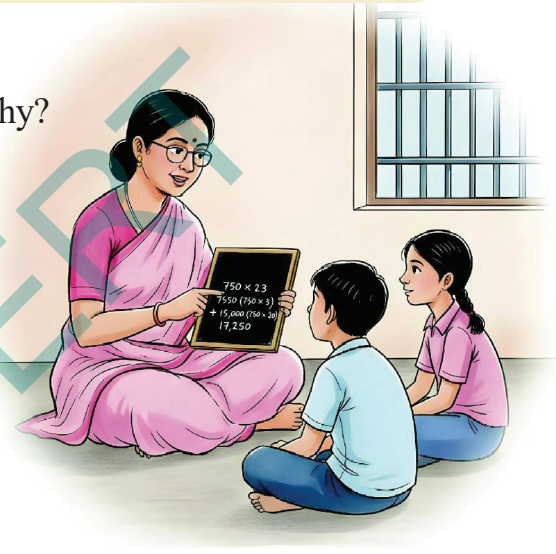
Find the wage of labour for 23 days.

750×23

2250 ------- (750×3)

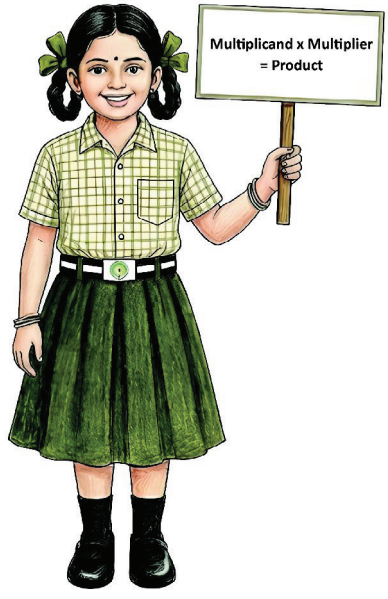
$+ 15000$ ------- (750×20)

₹ 17250



Raju completed his house construction. He wanted to invite 1250 members to 'house warming'. So he made a list of his friends and relatives. He consulted a printing press to print the invitation cards.

The cost of each card ₹ 7.



Raju calculated the total amount as shown below.

The cost of one invitation card = ₹ 7

Members to be invited = 1250

Total amount to be paid to the press owner = 1250×7

= ₹ 8750

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Process of Multiplication: 1250 × 7

Step 1:

We start multiplication from ones place.

Multiply number 0 (multiplicand) by 7 (multiplier), 7 × 0 = 0,

write 0 under ones place in 1250.

1 2 5 0 × 7
0

Step 2:

Now multiply the digit 5 which is in tens place by 7. (7 × 5 = 35)

Write 5 under (tens place in 1250).

Now write 3 the rest of the digit in 35, above 2 (hundreds place in 1250).

3
1 2 5 0 × 7
5 0

Step 3:

Multiply the digit 2 which is in hundreds place by 7. (7 × 2 = 14)

Add 3 which is above 2 to this result. 14 + 3 = 17

Now write 7 under (hundreds place in 1250) and 1 above 1(thousands place in 1250).

1 ~~3~~
1 2 5 0 × 7
7 5 0

Step 4:

Multiply 1which is in thousands place by 7. (7 × 1 = 7)

Add 1which is on 1 to the result. 7 + 1 = 8

Now write 8 under 1 (Thousands place in 1250).

~~1~~ ~~3~~
1 2 5 0 × 7
8 7 5 0

1250 × 7 = 8750

Do these

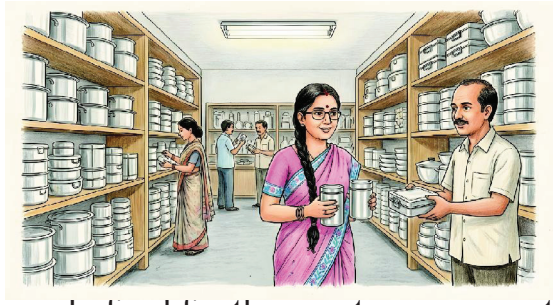
1) Do the following.

a) 245 × 2 b) 2835 × 3 c) 3746 × 5 d) 4539 × 6

2) A factory manufactures 4950 cars in a month. How many cars will the factory produce in a year?

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Raju's wife Devi wanted to buy gifts for 1250 guests for house warming. She went to the market and purchased steel boxes, each costs ₹34. Devi calculated the total amount to pay the shop keeper like this.



```
  1 2 5 0 × 3 4
  5 0 0 0  ---------- (1250 ×4 )
+ 3 7 5 0 0  ---------- (1250 ×30 )
  4 2 5 0 0
```

Raju made a deal with the cook Mastan to supply food for the guest arriving on the house warming day for ₹155 each plate.

Example 1 : 1101 members attended on that day. How much amount does Raju have to pay Masthan?

Solution :

Number of guests attended = 1101
Cost of each plate of meal = ₹ 155
Total amount to be paid = 1101 × 155
= ₹ 1,70,655

To multiply by 100, first write two zeros in one's place, tens place respectively. Then we only have to multiply by 1.

```
  1 1 0 1 × 155
    5 5 0 5  ---------- (1101 × 5)
  5 5 0 5 0  ---------- (1101 × 50)
+ 1 1 0 1 0 0  ---------- (1101 × 100)
  1 7 0 6 5 5
```

Example 2: If 1365 members attended to the function and the cost of each plate of meal was ₹160. How much money would masthan get?

Solution :

Number of guests attended = 1365
Cost of each plate of meal = ₹ 160
Total amount to be paid = 1365 × 160
= ₹ 2,18,400

```
  1 3 6 5 × 1 6 0
    0 0 0 0  ---------- (1365 × 0)
  8 1 9 0 0  ---------- (1365 × 60)
+ 1 3 6 5 0 0  ---------- (1365 × 100)
  2 1 8 4 0 0
```

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Multiplication with 10, 100, 1000

Complete the table :

10 ×
10 × 1 = 10
10 × 2 = ____
10 × 3 = ____
10 × 4 = ____
10 × 5 = ____
10 × 6 = ____
10 × 7 = ____
10 × 8 = ____
10 × 9 = ____
10 × 10 = ___

20 ×
20 × 1 = 20
20 × 2 = ____
20 × 3 = ____
20 × 4 = ____
20 × 5 = ____
20 × 6 = ____
20 × 7 = ____
20 × 8 = ____
20 × 9 = ____
20 × 10 = ___

100 ×
100 × 1 = 100
100 × 2 = ____
100 × 3 = ____
100 × 4 = ____
100 × 5 = ____
100 × 6 = ____
100 × 7 = ____
100 × 8 = ____
100 × 9 = ____
100 × 10 = ___

1000 ×
1000 × 1 = 1000
1000 × 2 = ____
1000 × 3 = ____
1000 × 4 = ____
1000 × 5 = ____
1000 × 6 = ____
1000 × 7 = ____
1000 × 8 = ____
1000 × 9 = ____
1000 × 10 = ___

Making of word problems:

Example : Prepare a word problem by using 12 x 127.

Problem : Balu wants to plant 12 tomato plants in a row. How many tomato plants can be planted in 127 rows?

Observe the below image and prepare a word problem.

Example :



Kumar sells sugarcane juice. The price of one glass of sugarcane juice is ₹10. One day, Kumar sold 164 glasses of juice. How much money did Kumar earn that day ?

(Hints : sugarcane juice., Kumar, glass ₹ 10, 10 x 164)

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(Hints : Hema, sarees shop, ₹ 650 x 5)

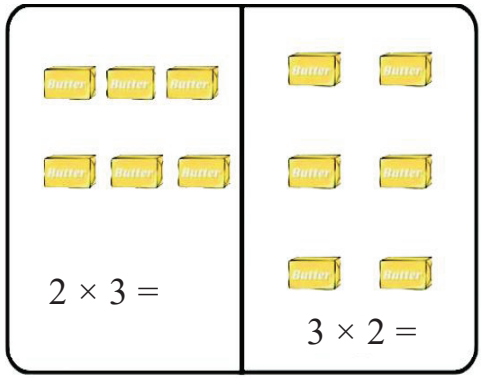
Do these

1) Do the multiplications and prepare a suitable word problem.
   a) 3628 × 9 b) 4256 × 23
2) Amar sells a cup of tea for ₹ 6. If 1100 cups of teas was sold on a day, how much amount did he earned?
3) Carpenter Johnson made 9 cots and sold each cot for ₹ 8,500. How much amount did he earn?

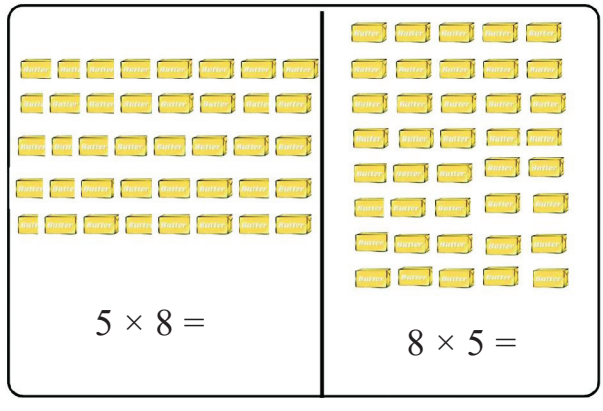
Think & Discuss

Srujana runs a milk processing unit. She has arranged the butter packets in the following ways. Find the number of butter packets in each case. What pattern do you noticed ? discuss in class.

a)



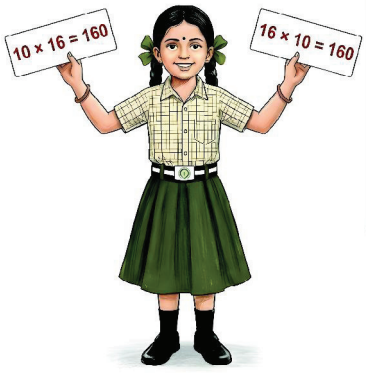
b)

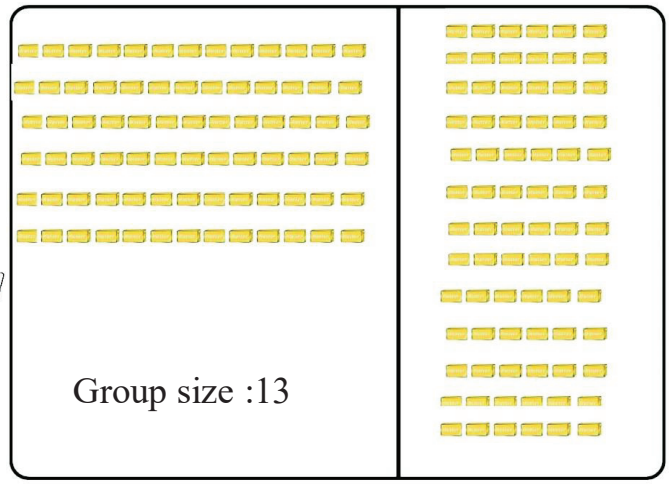


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c)

Number of groups : 6





$6 \times 13 =$
$13 \times 6 =$

d)

$10 \times 5 =$
$5 \times 10 =$

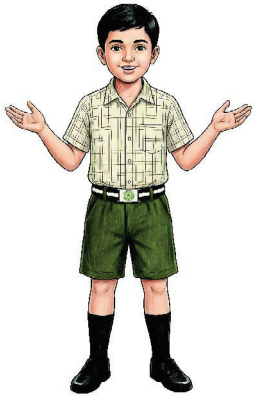
e)

$8 \times 20 =$
$20 \times 8 =$

f)

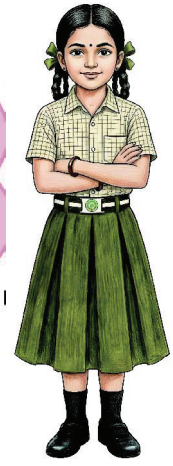
$12 \times 9 =$
$9 \times 12 =$

The product of two numbers in any order result is same? Discuss in your class.



What do you observe?

The product of two given numbers remains the same even if their order is changed. This is known as "**commutative property** of multiplication".



Multiplication with 1

Do the following.

1) $89 \times 1 =$ _____ 2) $261 \times 1 =$ _____ 3) $4589 \times 1 =$ _____



What do you observe?



The product of any number and 1 is the number itself. 1 is "**multiplicative identity**".

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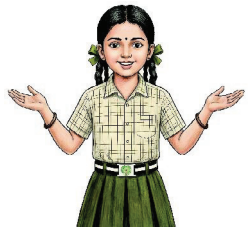
Multiplication with '0'

Do the following.

1) 56 × 0 = _____ 2) 258 × 0 = _____ 3) 0 × 953 = _____



What do you observe?



The product of any number and zero is always zero. This is known as **"zero property of multiplication"**.

Do these

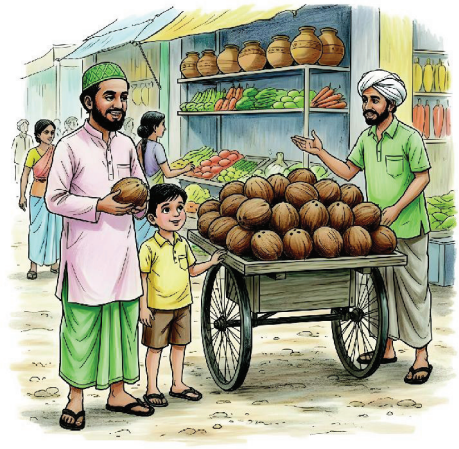
1. Find the products: 46 × 23 and 23 × 46.
2. Do the following:

a) 23 × 1 = _____ b) 342 × 1 = _____ c) 999 × 1 = _____

d) 53 × 0 = _____ e) 259 × 0 = _____ f) 5817 × 0 = _____

Let us Estimate:

There are 18 members in Ramu's family. His friend Shafi wanted to buy coconuts for them on a festival day. The cost of one coconut is ₹ 32. He asked his grandson Rahim to estimate the amount of 18 coconuts.



Rahim estimated as follows.

Total amount = 32 × 18

= 30 × 20 ..... (32 → 30)

= 600 ..... (18 → 20)



18 × 32
20 × 30 = 600. The multiplier and multiplicand are rounded off to the nearest ten.

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Did Rahim estimated correctly?

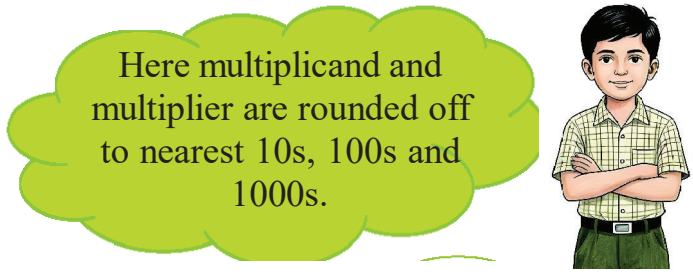
Observe the products estimated below.

$47 \times 29 \longrightarrow 50 \times 30 = 1500$

$72 \times 98 \longrightarrow 70 \times 100 = 7000$

$167 \times 19 \longrightarrow 170 \times 20 = 3400$

$396 \times 78 \longrightarrow 400 \times 80 = 32{,}000$



Do these

Estimate the products of these multiplications.

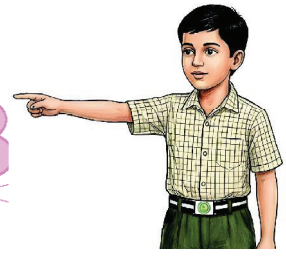
1) 59×19 2) 99×56 3) 189×33

Division

Mr. Raju donated 9984 books and 8 almirahs to Mandal Parishad Primary school library. The teacher asked the 5th class students to arrange the books equally in the 8 almirahs.



1. How many books were donated to the library?
2. How many almirahs were donated by Mr. Raju?
3. Which operation is required to arrange the books equally in almirahs?



Let's see how to divide 9984 by 8.

Step 1:

We begin from the left, i.e., with the thousands.

Divide 9 (the digit in thousands place) by 8.

Estimate the highest multiple of 8, which can be subtracted from 9 completely.

Clearly, known as $8 \times 1 = 8$ and $8 \times 2 = 16$.

As, $8 < 9$ while $16 > 9$.

We take $8 \times 1 = 8$.

Write 1 in the quotient.

Subtract 8 from 9.

Bring down 9, the digit in the hundreds place.

$$\begin{array}{r} 8)\,9\,9\,8\,4\,(1 \\ -8\downarrow \\ \hline 1\,9 \end{array}$$

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Step 2 :

Divide 19 by 8.

Estimate the highest multiple of 8 which can be subtracted from 19 completely.

Clearly, $8 \times 2 = 16$ and $8 \times 3 = 24$.

As, $16 < 19$ while $24 > 19$.

We take $8 \times 2 = 16$.

Write 2 next to the previous quotient.

Subtract 16 from 19. We get 3.

Bring down 8, the digit in 10s place.

```
8) 9 9 8 4 (12
  -8
  ---
   1 9
   1 6
  -----
     3 8
  -----
```

Step 3 :

Divide 38 by 8.

Estimate the highest multiple of 8 which can be subtracted from 38.

Clearly, $8 \times 4 = 32$ and $8 \times 5 = 40$.

As, $32 < 38$ while $40 > 38$.

we take $8 \times 4 = 32$.

Write 4 next to the previous quotient.

Subtract 32 from 38. We get 6.

Bring down 4 ones, write beside the 6.

```
8) 9 9 8 4 (124
  -8
  ---
   1 9
 - 1 6
  -----
     3 8
   - 3 2
  -------
       6 4
```

Step 4 :

Divide 64 by 8.

Clearly, $8 \times 8 = 64$.

Write 8 next to the previous quotient.

Subtract 64 from 64.

We get '0' as remainder.

```
8) 9 9 8 4 (1248
  -8
  ---
   1 9
 - 1 6
  -----
     3 8
   - 3 2
  -------
       6 4
     - 6 4
     -----
         0
```

In each almirah we arranged 1248 books.

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Example - 1

If eight agricultural workers earned ₹ 9616 in a day as daily wage, how much amount will each one get?

Solution:

Number of agricultural workers = 8

Amount earned = ₹ 9616

Amount each one will get = ₹ 1202

```
8) 9 6 1 6 (1202
 - 8
   1 6
 - 1 6
     0 0 1
       - 0
         1 6
         1 6
           0 0
```

Quotient = 1202

Remainder = 0

Example - 2

What is the remainder if you divide 19895 with 21?

Solution:

(Dividend)

```
(Divisor) 2 1 ) 1 9 8 9 5 ( 9 4 7  (Quotient)
           -1 8 9
               9 9
             - 8 4
               1 5 5
             -1 4 7
                   8   (Remainder)
```

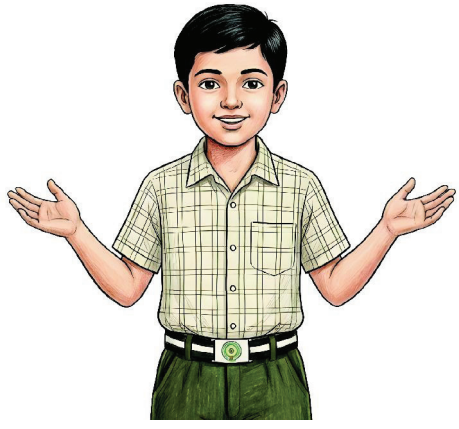
Quotient = 947

Remainder = 8

Division Rule

Relation between divisor, dividend, quotient and remainder is

Dividend = (Divisor ×Quotient) + Remainder



Verify the solution by using the division rule.

Dividend = (Divisor x Quotient) + Remainder

19895 = (947 × 21) + 8

19895 = 19887 + 8

19895 = 19895

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Do these

1) Do the following divisions. Write the dividend, divisor, quotient and remainder. Then verify the answer using with division relation.
   a) 9786 ÷ 6 b) 5682 ÷ 9

2) Raju bought 120 blankets with ₹ 6000 to distribute to orphans. What is the cost of each blanket?

3) Do the following and write the quotient and remainder in each case. What did you observed.
   a) 53427÷10 b) 53427÷100 c) 53427÷1000 d) 53427÷10000

Unitary Method:

The unitary method is a process in which you find the value of one unit and then the value of a required number of units.

Example :

Murali sells 10 guavas for ₹ 50. What would be the price of 7 guavas?

Sol.

Cost of 10 guavas = ₹ 50
Cost of 1 guava = ₹ 50 ÷ 10
= ₹ 5
Cost of 7 guavas = ₹ 5 x 7
= ₹ 35

Do these

1. If 8 pots cost ₹ 800, what would be the cost of 5 pots?
2. If 5 kg tomatoes cost ₹125, what would be the cost of 2 kg tomatoes?
3. A publisher printed 3,875 books in the month of July. If publisher make the same number of books in every month, how many books can be printed in a leap year?

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Activity

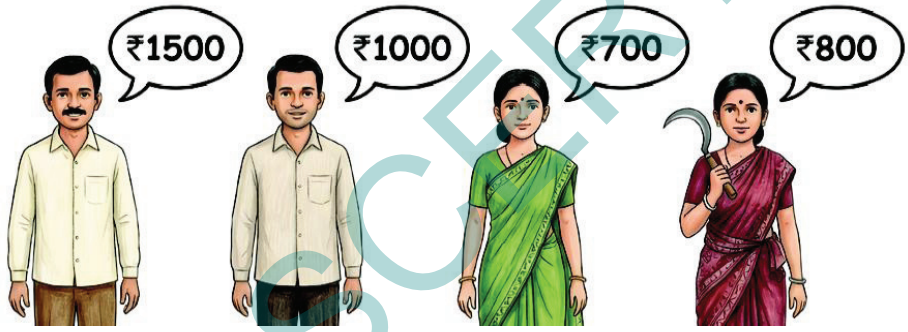
Solve the given problems and colour the answers in the following grid of numbers.

21 × 16	15 × 7	181× 5	288 ÷ 4	576 ÷ 12	78 ÷ 3

717	1001	105	3128	123
919	81	165	100	336
709	48	85	72	71
905	676	500	121	26

Let's Estimate

4 Labourers agreed to work for ₹ 4250 to mow the landlord's field. Each of them estimated the amount they are going to receive individually. Observe their estimations.



Whose estimation is correct ?

If we round off ₹ 4250 to the nearest thousands, we get ₹ 4000. If ₹ 4000 divided by 4, each of will get ₹1000.

Write the name of the person who estimated correctly. _____

Example: The Mandal Educational Officer of Kallur Mandal wanted to take 1895 children to a science fair. If each bus can accommodate 48 students, estimate the number of buses required.

To estimate the quotient we have to round off the divisor and dividend both to nearest multiples of 10, 100 and 1000 etc.

Number of Buses required = 1895 ÷ 48
= 2000 ÷ 50
= 40

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Do these

1. Estimate the result.

   a) 309 ÷ 11 b) 497 ÷ 23 c) 891 ÷ 32

2. Johnny bought 5 packets of buns each containing 20, to distribute on his birthday. If he distributed equally the buns to 48 patients, how many buns each patient will get approximately?

Relation between multiplication and division



Kavya! Do you know? I can write two division facts corresponding to every multiplication fact.

Write the division fact for this multiplication fact.
15 x 3=45





Corresponding division facts
45 ÷ 3 = 15, 45 ÷ 15 = 3

Multiplier × Multiplicand = Product
Multiplier = Product ÷ Multiplicand
Multiplicand = Product ÷ Multiplier

Look at the table and fill in the blanks.

Multiplication	Division fact -1	Division fact-2
10 x 2 = 20	20 ÷ 2 = 10	20 ÷ 10 = 2
23 x 4 = 92		92 ÷ 23 = 4
52 x 12 = 624	624 ÷ 12 = 52	
500 x 4 = 2000		2000 ÷ 500 = 4
36 x 18 = 648		
527 x 15 = 7905		

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Kavya! Now tell me one division fact. I will tell the corresponding multiplication fact.



18 ÷ 2 = 9



The corresponding multiplication fact is 9 x 2 = 18.

Look at the following table and write multiplication forms for the following divisions.

Division form	Multiplication form
54 ÷ 6 = 9	9 x 6 = 54
168 ÷ 12 = 14	14 x 12 = 168
792 ÷ 22 = 36	
200 ÷ 5 = 40	
1265 ÷ 23 = 55	
2262 ÷ 39 = 58	



EXERCISE

1. The cost of a bicycle is ₹ 4,950. The cost of a motor cycle is 13 times the bicycle's cost.What is the cost of the motor cycle?
2. A carton can hold 36 mangoes. How many such cartons are required if there are 4,320 mangoes in all?
3. The owner of a cell phone shop bought 8 cell phones at the same price and he gave ₹9,800 to wholesaler. The wholesaler returned him ₹ 200. What is the cost of each cell phone?

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4. A fisher man wants to sell 8 kg of fish for ₹ 1,600. But Ramu wants to buy 5 kg only. Find the cost of 5 kg fish?
5. Harsha painted pictures and sold them in an art gallery. He charged ₹2,567 for a big painting and ₹ 465 for a small painting. He sold 6 large paintings and 3 small paintings. How much amount did he earn in the art gallery?
6. The cost price of 3kg apples is ₹360 then find the cost of apples for 2 kg.
7. Swetha multiplied the number of eggs in her basket by 312. The answer was a number between 4000 and 4300. What could be the number of eggs in her basket? ( )

   A) 10 B) 11 C) 20 D) 13
8. A shop keeper had 297 story books. He wanted to pack them equally into 8 boxes. How many story books would be left unpacked? ( )

   A) 1 B) 7 C) 8 D) 37
9. Do the following problems with in 5 minutes.

Multiply 300 × 5	**Identify spelling mistake** Multiplication Divition Remainder	If 8 books costs ₹ 800, what the cost of 5 books?	200 ÷ 5 = 40 write multiplication form of this division	390 ÷ 13
426 × 24 = __ × 426	Estimate the given product 13 × 21	3650 × 0 =	Complete this division relation Dividend =	

Then colour the stars how many problems you solved correct with in 5 minutes

☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆

Fun with maths

Observe and continue it...

1 × 1 = 1
121 × 1 = 11 × 111
12321 × 1 = 111 × 111
1234321 × 1 =
.....
.....

1 × 9 = 9
12 × 9 = 108
123 × 9 = 1107
1234 × 9 =
.....
.....

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Improve Your Learning

1. In 5436 ÷ 7, Quotient_____ Remainder_____

2. 345 books were bought for the school library. These books have to be packed into boxes that hold 15 books each. Which of the following could be used to find the number of boxes needed? ( )

   a) Add 15 to 345 b) Subtract 15 from 345

   c) Multiply 345 by 15 d) Divide 345 by 15

3. A school group is heading to the zoo on six buses. The first five buses, each accommodating 40 students, are full. The last bus has 5 empty seats. In total, how many students are going to the zoo?

4. A division problem solved correctly is shown below.

   Which digit should go in the empty box?

$$\begin{array}{r} 106 \\ 6\overline{)66\square6} \end{array}$$

5. Shop 'A' sells a pack of 5 pens for ₹100. Shop 'B' sells a pack of 8 pens for ₹152. The cost of a pen is low in price in shop 'A', compare to shop 'B'
   Write "Yes" or "No" and provide a mathematical reason to support your answer.
6. Cost of 1 meal is ₹110. If you have ₹ 1000 how many meal can you arrange? To arrange 1 more meal how much money do you need?
7. A pension holder gets a pension of ₹ 9950 per month. How much pension will he get in one year?
8. Sara wants to buy a certain kind of toy. Each toy cost ₹1,000. If she has ₹50,000, how many toys can she buy?
9. A shopkeeper had 4297 storybooks. He wanted to pack them equally into 18 boxes. How many storybooks would be left unpacked?
10. 28 laddoos weigh 1 kg. How many laddoos weigh 12 kgs. If 16 laddoos can be packed in one box, how many boxes are needed to pack all these laddoos ?

AP SCERT

UNIT 4

Multiples and Factors

F2S6K4

Learner will be able to :

- Recall the divisibility rules of 2,5 and 10.(CG1)
- Express the divisibility of numbers by 4 and 8 through divisibility rules.(CG1)
- Understand the concept of multiples and common multiples.(CG1)
- Find the LCM of given numbers.(CG1)
- Understand the concept of factors(CG1)
- Understand the concept of prime numbers and composite numbers and use prime factorisation.(CG1)
- Explain the concept of common factor.(CG1)
- Find the LCM and HCF using division method and prime factorisation.(CG1)
- Solve word problems involving LCM and HCF.(CG4)

Divisibility rules



Teacher : Good morning children!
Now let us have fun with maths

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I will write some numbers on the board. You have to tell which are divisible by 2,5,10 without making division.

864, 768,342,400,355,150,275,526		
divisble by 2	divisible by 5	divisible by 10
864	275	400
342		

Students : sir,

864 is divisible by 2.

275 is divisible by 5.

400 is divisible by 10.

342 is divisible by 2.

864, 768, 342, 364, 398, 148, 666 .... These are all even numbers, divisible by 2. Letus check these numbers divisible by 4.

```
4) 864 (216
  -8
  06
  - 4
    24
  - 24
    0
```

```
4) 342 (85
  -32
   22
  - 20
    0 2
```

Not all numbers divisible by 2 are divisible by 4. Now we will learn divisibility of 4.

Divisibility rule of 4

Observe and underline the last two digits (ones, tens) of the given numbers.

a) 624 b) 3232 c) 5840 d) 4557 e) 3234

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They are 24, 32, 40, 57 and 34 at the end of the numbers.

Only 24, 32 and 40 are multiples of 4 and are exactly divisible by 4.

```
4) 624 (156
 - 4
   22
 - 20
     24
   - 24
      0
```

```
4) 3232 (808
 - 32
     03
   - 0
     32
   - 32
      0
```

```
4) 5840 (1460
 - 4
    18
  -16
     24
  -24
      00
    -00
      0
```

So in the given numbers 624, 3232 and 5840 are divisible by 4.

Now, Divide 4557, 3234 by 4.

What are the remainders?

What do you observe?

4557 and 3234 are not exactly divisible by 4.

```
4) 4557 (1139
   4
   05
  -4
   15
   12
   37
   36
    1
```

```
4) 3234 (808
 - 32
     03
   - 0
     34
   - 32
      2
```

If the last two digits (ones, tens) of a given number is exactly divisible by 4, the given number is also divisible by 4.

Note : All the numbers divisible by 4 which are also divisible by 2.

Do these

1) Circle the numbers which are divisible by 4.
   Give the reason, if it is not divisible by 4.
   a) 2436 b) 3840 c)1235 d)3636
   e) 6850 f) 5644 g) 8888 h) 6430

2) Write the missing number in the blank to make the number exactly divisible by 4.
   a) 323_ b) 304_ c) 58_6 d) 53_ _ e) 65_ _

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Divisibility rule of 8

As 8 is a multiple of 4, is the divisibility rule for 4 applicable for 8?

Observe the multiples of 4 and 8.

Multiples of 4 : 4, 8, 12, 16, 20, 24, 28, 32 .....

Multiples of 8 : 8, 16, 24, 32, 40 .....

∴ All the multiples of 4 are not the multiples of 8.

So, the divisibility rule for 4 is not applicable for 8.

Divide the last three digits of 29816 by 8.

Divide 29816 by 8 .What did you observe?

In the above two conditions, the remainder is '0'.

```
8) 816 (102
 - 8
   01
 - 0
    16
  - 16
     0
```

```
8) 29816 (3727
 - 24
    58
  - 56
     21
   - 16
      56
    - 56
       0
```

Example: Divide the last three digits of 39328 by 8.

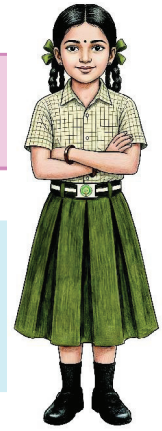
Divide 39328 by 8.

The remainder are zero in both divisions.

What did you say?

From the above two examples can you tell the divisibility rule for 8?

If the last three digits of a number are divisible by 8, then the entire number is divisible by 8.



Do these

Circle the following numbers which are divisible by 8.

a) 42456 b) 73791 c) 68240 d) 93230 e) 27000

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EXERCISE-1

1. Circle the numbers which are divisible by 2 (by using divisibility rule).
   3624, 3549, 7864, 8420, 8500, 8646
2. 4 __8, Fill in the blank with a suitable digit to make the number divisible by 4.
3. Fill in the blank with a suitable digit to make the number divisible by both 2 and 10.
   678__, 588__, 388__, 222__, 364__, 786__, 666__, 788__
4. Identify the numbers which are divisible by both 4 and 8.
   2104, 726352 1800, 32256, 52248, 25608
5. Fill the missing digit that would make each number divisible by the number given.
   a) 395__ by 10 b) 20710___ by 4 c) 92048__ by 2
   d) 1452___ by 8 e) 2340 by ___ 5
6. Find the smallest number to be added to 2887, so that it can be divisible by 4.

Multiples

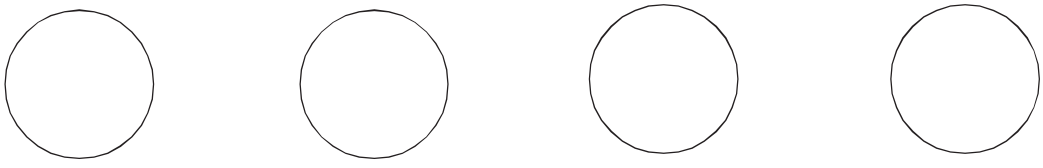
Activity

Take the cards having digits from 0 to 9 Now draw four big circles on board and name them as multiples of 2, multiples of 3, multiples of 5 and multiples of 7. A student has to take two cards at a time and form a 2-digit number, and check whether the number is multiple of 2, 3 or 5 and then write it in suitable circle. If the number is multiple of any two numbers write it in the both circles.

1	2	3
4	5	6
7	8	9
	0	

Example: A student take 3 and 2 cards, to form 23 which is not multiple of any of the above. So ask him to form 32 which is multiple of 2 then write in suitable circle. This can be executed as individual or group activity.

Multiples of 2 | Multiples of 3 | Multiples of 5 | Multiples of 7



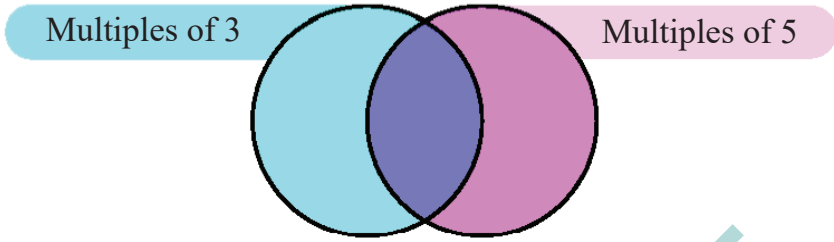
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Common Multiples

Write about multiples of 3 and 5 in the relevant circles.There may be a possibility of having some common multiples for 3 and 5. Write them in the common part.

Multiples of 3 : .....

Multiples of 5 : .....

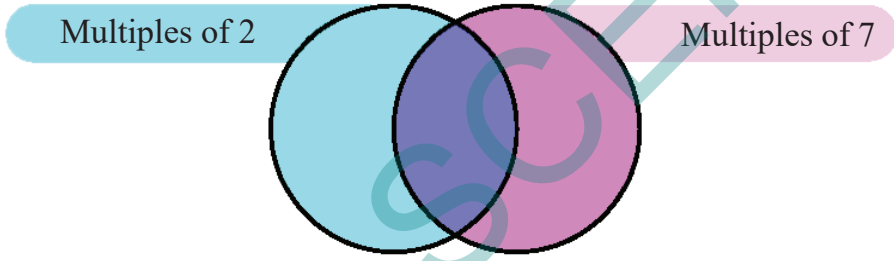


Common multiples of 3 and 5 are : .....

Repeat the process using the numbers 2 and 7

Multiples of 2 : .....

Multiples of 7 : .....



Common multiples of 2 and 7: .....

Example:

Write common multiples of 2 and 10.

Solution : Multiples of 2 : 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26 ,28,30…

Multiples of 10 : 10, 20, 30, 40, 50, 60,……..….

Common multiples of 2 and 10: 10, 20, 30, 40, 50,…….....……

Do these

Write the first 10 multiples of the following numbers and list the common multiples.

a) 2 and 4 b) 4 and 12 c) 6 and 8 d) 5 and 10

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Least Common Multiple (L.C.M)

The smallest common multiple of two or more numbers is called the Least Common Multiple (L.C.M).

Example-1 : The least common multiple (L.C.M) of 9 and 12 is ….

Solution : Multiples of 9 are 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108, …

Multiples of 12 are 12, 24, 36, 48, 60, 72, 84, 96, 108, 120, …

Common multiples of 9 and 12 are 36, 72, 108, …

Least common multiple (L.C.M) of 9 and 12 is 36

Example-2 : Find the least common multiple (L.C.M) of 2, 4 and 6?

Solution : Multiples of 2 : 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24,...

Multiples of 4 : 4, 8, 12, 16, 20, 24, 28, 32,…

Multiples of 6 : 6, 12, 18, 24, 30,...

Common multiples of 2, 4 and 6 are 12, 24,…

Least common multiple (L.C.M) of 2, 4 and 6 is 12

Do these



1. Find the L.C.M for the following sets of numbers?

   a) 12, 15 b) 16, 20 c) 8, 12, 20 d) 15, 20 e) 6, 9, 12

2. Find the L.C.M for the following numbers. What do you observe?

   a) 15, 30 b) 4, 16 c) 5, 15 d) 6, 18

Note: In a given pair of numbers, if one of them is multiple of other number then the biggest number is the L.C.M of the numbers.

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Factors

Activity - 1

Fill the multiplication table.

X	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1												12		
2						12								
3				12										
4			12											
5														
6		12												
7														
8														
9														
10														
11														
12	12													
13														
14														

Observe the boxes in the above multiplication table.

1. Which numbers do we multiply to get 12?

$1 \times 12 = 12$

$2 \times 6 = 12$

$3 \times 4 = 12$

$4 \times 3 = 12$

$6 \times 2 = 12$

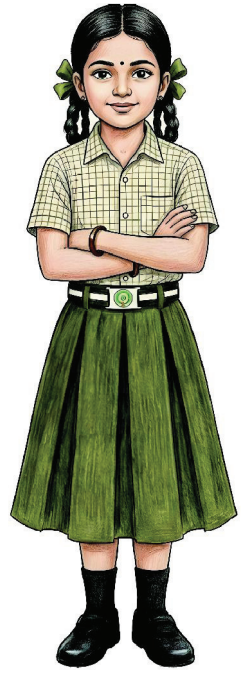
$12 \times 1 = 12$

But, we know that

$1 \times 12 = 12 \times 1$

$2 \times 6 = 6 \times 2$

$3 \times 4 = 4 \times 3$



$\therefore$ $1 \times 12 = 12$

$2 \times 6 = 12$

$3 \times 4 = 12$

1, 2, 3, 4, 6 and 12 exactly divides 12.

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2) Which numbers do we multiply to get 10?

_____ × _____ =10

_____ × _____ =10

_____ × _____ =10

_____ × _____ =10

Finally we get

_____ × _____ =10

_____ × _____ =10

_____,_____,_____,_____

are exactly divided by 10.

3) Which numbers do we multiply to get 14?

_____ × _____ = 14

_____ × _____ = 14

_____ × _____ = 14

_____ × _____ = 14

Finally we get

_____ × _____ =14

_____ × _____ =14

_____,_____,_____,_____

are exactly divided by 14.

When two or more numbers multiplied together, the number which we get as a result is called the product.

The numbers which are multiplied together are called the factors of the product or the numbers which divide a given number exactly are called factors of the number.

From the above observations, we get

1, 2, 3, 4, 6 and12 are factors of 12.

1, 2, 5, and 10 are factors of 10.

1, 2, 7and 14 are factors of 14.

In any multiplication table, some numbers are shown in two boxes only. Identify the numbers and colour it.

1 × 2 = 2 x 1	1 × 3 = 3 x 1	1 × 5 = 5 x 1 ...

Which numbers are shown in two boxes?.....

What are the factors of those numbers?

Are they 1 and the number itself?

Those numbers are called **prime numbers**.

A number which has 2 factors one and itself is called a Prime number.

The numbers which have more than 2 factors, those are called composite numbers.

Example: 4, 6, 8, 9, 10, 12 .....

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A number which has more than two factors is called a composite number.

Example-1: Find all the factors of 24.

Solution :

$1 \times 24 = 24$
$2 \times 12 = 24$
$3 \times 8 = 24$
$4 \times 6 = 24$

Thus, all the factors of 24 are 1, 2, 3, 4, 6, 8, 12 and 24.

$\therefore$ 24 is a composite number.

Example-2:- Is 8 a factor of 2568?

Solution : We know that every number is divisible by its factors, remainder is zero.

8 is a factor of 2568.

```
8) 2568 (321
 - 24
   16
 - 16
    08
  - 08
     0
```

Do these

1) Find all the factors of the following numbers.
   a) 21 b) 38

2) Find out whether the first number is a factor of the second number.
   a) 14; 322 b) 16; 832 c) 5; 425 d) 25; 3500
   e) 8; 48 f) 14; 37 g) 15; 75 h) 12; 72

3) Find the odd factors of 22.

4) Write all the even factors of 34.

5) List out the numbers, which are prime/composite below 30.



Prime Number	Composite Number

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Math Lab



Sieve of Eratosthenes

~~1~~	(2)	3	~~4~~	5	~~6~~	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Step-1 :- Cross out 1 as it is a neither prime nor composite.

Step-2 :- Circle 2, and cross out all the remaining multiples of 2.

Step-3 :- Circle 3, and cross out all the remaining multiples of 3.

Step-4 :- Circle 5 and cross out all the remaining multiples of 5.

Step-5 :- Circle 7 and cross out all the remaining multiples of 7.

Step-6 :- Circle all the numbers which are not crossed.

All the circled numbers are Prime-numbers.

And all the crossed numbers are Composite numbers.

Fill the table.

Numbers	**1 - 10**	**10 - 20**	**20 - 50**	**50 - 100**
Prime numbers				

1. Write the total prime numbers from 1 to 100?

   _____

2. Are all the prime numbers even or odd ?

   _____

'2' is the only even prime number.

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Prime factorisation by division method

Prime-factorisation for a given number can also be obtained by division method as shown below.

2 | 24	2 | 40	2 | 36
2 | 12	2 | 20	2 | 18
2 | 6	2 | 10	3 | 9
3 | 3	5 | 5	3 | 3
1	1	1
$24 = 2\times2\times2\times3$	$40 = 2\times2\times2\times5$	$36 = 2\times2\times3\times3$

The steps to be followed in this method can be summarized as below:

Step-1 :- Divide the given number by the smallest prime number that exactly divides it.

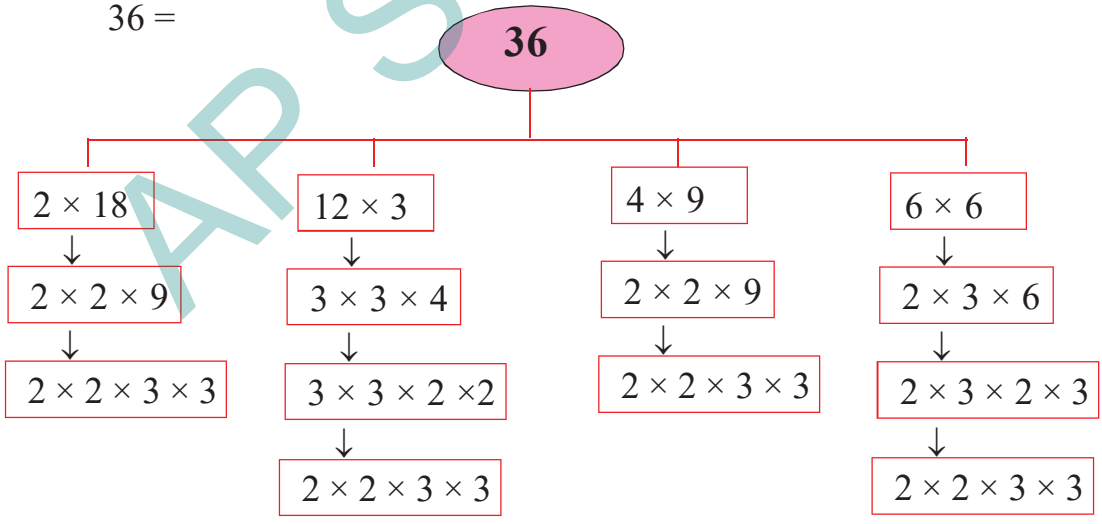
Step- 2 :- Divide the quotient further by a prime number that exactly divides it.

Step-3 :- Continue the division till the remainder is not further divisible by any number.

Prime factorisation :

Any composite number can be expressed as a product of some prime-numbers.

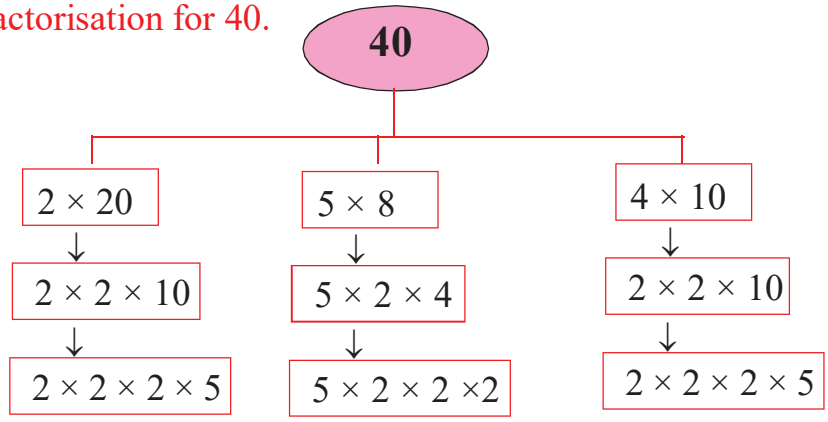
36 =



These are all prime numbers in above factorisation. Hence this factorisation is known as prime-factorisation.

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Example : Prime factorisation for 40.



Do these

1) Write the prime-factorisation for the following numbers.

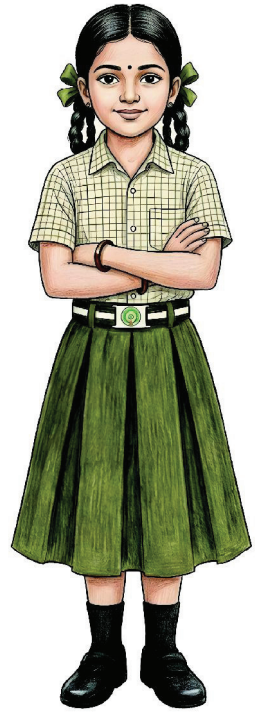
   a) 52 b) 100 c) 88 d) 90

2) The prime factorisation of 12 × 15 is _____

3) Match the following

a)	2× 2× 2×3× 3× 5	1)	180
b)	2 ×2×2×3×5×5	2)	360
c)	2×2×3×3×5	3)	900
d)	2×3×3×5×5	4)	600
e)	2×2×3×3×5×5	5)	450

4) 5×2×3×3 is the prime factorisation of _____



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Common factors

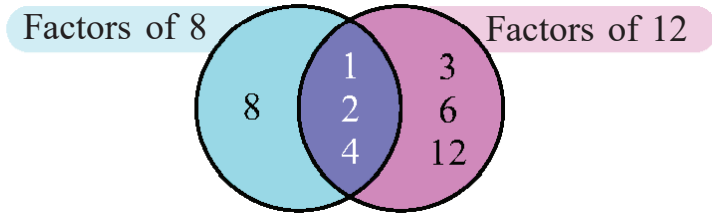
Example -1 :

Find the common factors for 8 and 12?

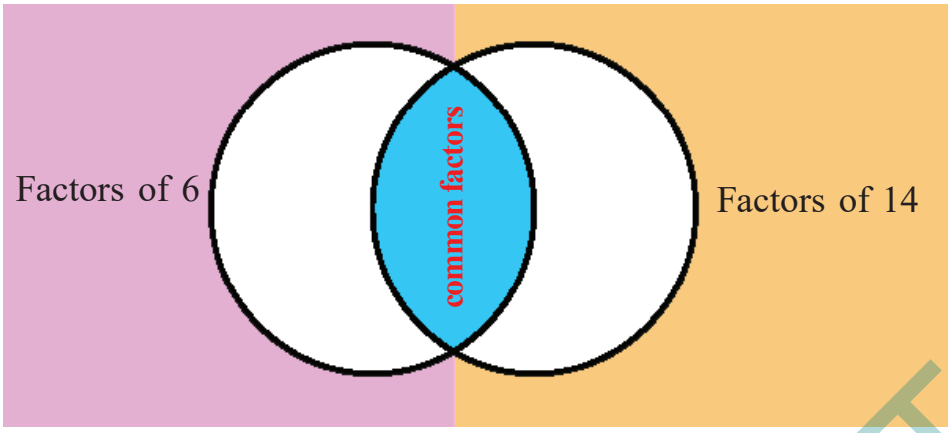
Factors of 8 = 1, 2, 4 and 8

Factors of 12 = 1, 2, 3, 4, 6 and 12

Common factors of 8 and 12 = 1, 2 and 4



Example-2 : Find the common factors for 6 and 14.





The factors that are common to two or more numbers are known as the common factors of those numbers.

Do these

Find the common factors of the following numbers and represent in the diagram.

a) 6 and 12 b) 12 and 20 c) 9 and 18 d) 11 and 22

Highest Common Factor (H.C.F) or Greatest Common Divisor (G.C.D)

The highest common factor among the common factors of two or more numbers is called Highest common factor (H.C.F or G.C.D).

Example 1: Find the Highest Common Factor (H.C.F) for 24 and 36.

Factors of 24	1	2	3	4	6	8		12		24	
Factors of 36	1	2	3	4	6		9	12	18		36

Common factors of 24 and 36 = 1, 2, 3, 4, 6 and 12

Highest common factor (H.C.F) of 24 and 36 = 12

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a) Find the highest Common factor (H.C.F) for 4 and 16 and colour it.

Factors of 4	1	2	4		
Factors of 16	1	2	4	8	16

b) Find the Highest Common Factor (H.C.F) for 5 and 15, and colour it.

Factors of 5	1		5	
Factors of 15	1	3	5	15

c) Find the Highest Common Factor (H.C.F) for 14 and 42, and colour it.

Factors of 14	1	2			7	14		
Factors of 42	1	2	3	6	7	14	21	42

By observing all above 3 tables, we can say that

In any pair of numbers, if one of them is multiple of the other, the smaller number is the H.C.F of the pair of numbers.

Do these

Find the H.C.F of the following pairs of numbers by using common factors method

1) 21 and 28 2) 34 and 20 3) 33 and 39
4) 16 and 36 5) 12 and 18 6) 80 and 100

By easy method to find L.C.M and H.C.F to big numbers is explained below

Prime-factorisation method to find L.C.M and H.C.F :

Example : Find L.C.M and H.C.F for 16 and 36 by prime-factorisation method.

2	16
2	8
2	4
	2

2	36
2	18
3	9
	3

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Step 1 : Write the prime-factorisation for the given numbers.

Prime-factorisation of 16	$= 2 \times 2 \times 2 \times 2$
Prime-factorisation of 36	$= 2 \times 2 \times 3 \times 3$

Step 2 : Take common factors and multiply with the other factors then the product obtained is L.C.M of given numbers.

Common factors = 2 x 2

Other factors = 2 x 2 x 3 x 3

$\therefore$ L.C.M = 2 x 2 x 2 x 2 x 3 x 3 =144

Step 3 : Take common factors and find product of them, which gives H.C.F of the given numbers. Common factors = 2 x 2 = 4

$\therefore$ H.C.F = 4

Division method to find L.C.M

Step 1 : Divide the numbers by a common prime factors atleast two of the given numbers. Bring down the number such that it is not completely divisible by the prime-factor.

Step 2 : Stop dividing when there is no further common factor except 1.

Step 3 : Find the product of the numbers in the left column and the last remainders.

Example-1: Find L.C.M for 16 and 36

2	16, 36
2	8, 18
	4, 9

L.C.M of 16 and 36 = $2 \times 2 \times 4 \times 9 = 144$



Example-2: Find L.C.M for 24, 32 and

2	24, 32,
2	12, 16,
2	6, 8,

3, 4, ... These numbers have no cammon factors

$2 \times 2 \times 2$ are common factors.

$\therefore$ L.C.M of 24, 32 = $2 \times 2 \times 2 \times 3 \times 4 = 96$

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Find H.C.F by common division method

Step 1 : Divide the numbers by common factors of all the given numbers.

Step 2 : Stop dividing when there are no more common factors except 1.

Step 3 : Find the product of common factors. i.e H.C.F of given numbers.

Example 1 : Find H.C.F of 16,36

Common factors	2	16, 36
	2	8, 18
		4, 9 .....

Do not have common factors.

2×2 are common factors.

H.C.F = $2 \times 2 = 4$

Example 2 : Find H.C.F of 24, 32

Common factors	2	24, 32
	2	12, 16
	2	6, 8
		3, 4 .....

Do not have common factors.

$2 \times 2 \times 2$ are common factors.

H.C.F = $2 \times 2 \times 2 = 8$

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Do these

1) Find L.C.M and H.C.F by prime factorisation method for the following.

   a)15, 48 b) 18, 48 c) 15, 25,

2) Find L.C.M and H.C.F by division method.

   a) 28, 36 b) 12,18 c) 30, 90

Do these

1. Fill the table and observe it.

S.No	First number	Second number	Product of two numbers	H.C.F	L.C.M	H.C.F × L.C.M
1	9	12	108	3	36	
2	20	300		5	60	
3	18	15				270
4	8	12				

Do you have any observation? Yes, product of two numbers = H.C.F x L.C.M

2. The H.C.F of two numbers is 3 and their L.C.M is 90. If one number is 15, find the other number.

Real-life problems on L.C.M and H.C.F

Note:-

1) L.C.M of given numbers is the smallest number that is exactly divisible by all the given numbers.

2) H.C.F of given numbers is the greatest number that exactly diviides by all the given numbers.

Example-1 : What is the least number of students required to stand in rows equally if the number of the rows are either 2, 3, 4, 6, or 8?

Solution : To find the required least number of students, we need to find the LCM for 2, 3, 4, 6 and 8.

2	2, 3, 4, 6, 8
2	1, 3, 2, 3, 4
3	1, 3, 1, 3, 2
	1, 1, 1, 1, 2

Do you know?

- 1 is factor of every number.
- Every number is factor to itself.

L.C.M of 2,3,4,6 and 8 = 2 × 2 × 3 × 2 = 24

the least number of students required to stand in rows equally if the number of the rows are either 2, 3, 4, 6, or 8 = 24

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Example-2 : What is the least number of students, to be added to 5 to form three teams containing 12, 15 or 18 students each?

Solution : We need to find the least number which is divisible by 12, 15 and 18.



3	12, 15, 18
2	4, 5, 6
	2, 5, 3

L.C.M of 12, 15, 18 = $2 \times 2 \times 3 \times 3 \times 5 = 180$

The required number of students to make 3 teams = 180

Hence, the required number is formed by adding 5.

$\therefore$ The least number of students = 180 - 5 = 175

Example-3 : A shop keeper has ropes of length 24 meters and 28 meters. What is the maximum length which the two ropes can be cut into equal pieces?

Solution : We need to find the highest common factor.



2	24, 28
2	12, 14
	6, 7 ..... Do not have common factors

2×2 are common factors, H.C.F. $= 2 \times 2 = 4$

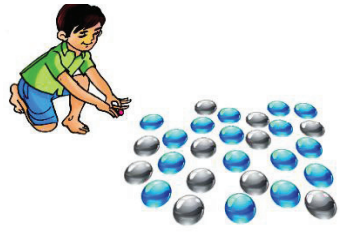
$\therefore$ The maxiumum length of the rope = 4 meters.



EXERCISE-2

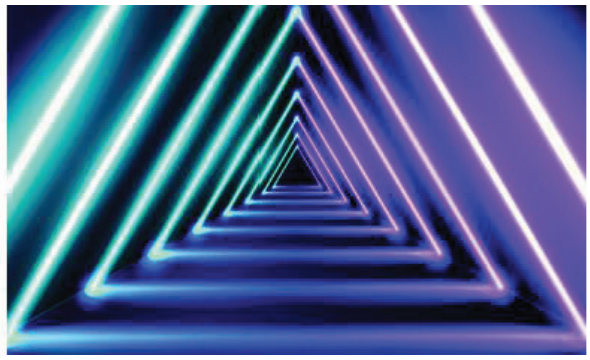


1) The H.C.F of two numbers is 6 and their L.C.M is 72. If one number is 18, find the other number.
2) The H.C.F of two numbers is 6. Their L.C.M is 36. If one number is 12, find the other number.
3) Sita exercises every 6th day and Gita exercises every 8th day. Today they both exercised. After how may days will they exercises together again'?
4) Ramu has 16 blue marbles and 12 black marbles. If he wants to arrange them in identical groups without leaving any marbles, what is the maximum number of marbles in each group Ramu can make?



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5) Two Neon lights are turned on at the same time. One blinks for every 4 seconds and another blinks for every 6 seconds. How many times will they blink together in one minute.



6) There are 40 girls and 32 boys, who want to participate in state-level games competition. Each team must have the same number of girls and the same number of boys.

a) How many boys and girls will be there in each team?

b) What is the maximum number of students in each team that can participate in state-level games?

7) What is the least number of chairs needed for an auditorium so that they can be arranged either 27 or 33 in a row?

8) A number which has more than two factors is ( )

A) even number B) odd number C) prime number D) composite number

9) Which of the following number is not a factor of 56 ( )

A) 8 B) 6 C) 4 D) 2

10) Which of the following number is exactly divisible by all 2, 5 and 10? ( )

A) 364 B) 360 C) 365 D) 362

11) A number is divisible by 8. If its last ___ digits are divisible by 8. ( )

A) 2 B) 3 C) 1 D) 4

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Improve Your Learning

1. 5 and 7 are common factors of 35 and _____. ( )

   a) 12 b) 50 c) 70 d) 84

2. Which of the following numbers is NOT a factor of 56? ( )

   a) 8 b) 6 c) 4 d) 2

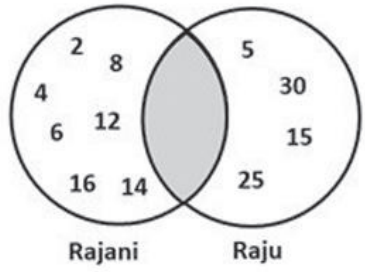
3. The factors of 28 include 1, 2, 4, and 28. Find the remaining two factors.

   Ans: _____ and _____.

4. Write the first three multiples of 16?

5. Two wires with the length of 56 m and 72 m. cut into small pieces of equal length. What is the maximum possible length of each piece?

6. The teacher asked Rajani and Raju to write multiples of 2 and 5. Rajani wrote multiples of 2, while Raju wrote multiples of 5 and prepared a diagram as given below. What numbers should be written in the shaded part?



7. A student says, "If two numbers are even, their HCF must be at least 2." Is this student correct? Explain your reasoning and provide an example to prove your answer.

8. Vani took some marbles. When she makes a group of 5 with them, found that one marble was leftover. When she makes groups of 4 or 6 that time also one marble is left over. What is the smallest number of marbles that Vani had?

9. Amit sets an alarm to drink water after every 1 hour while studying. Amit's brother, Sumit, sets an alarm to drink water after every 45 minutes.

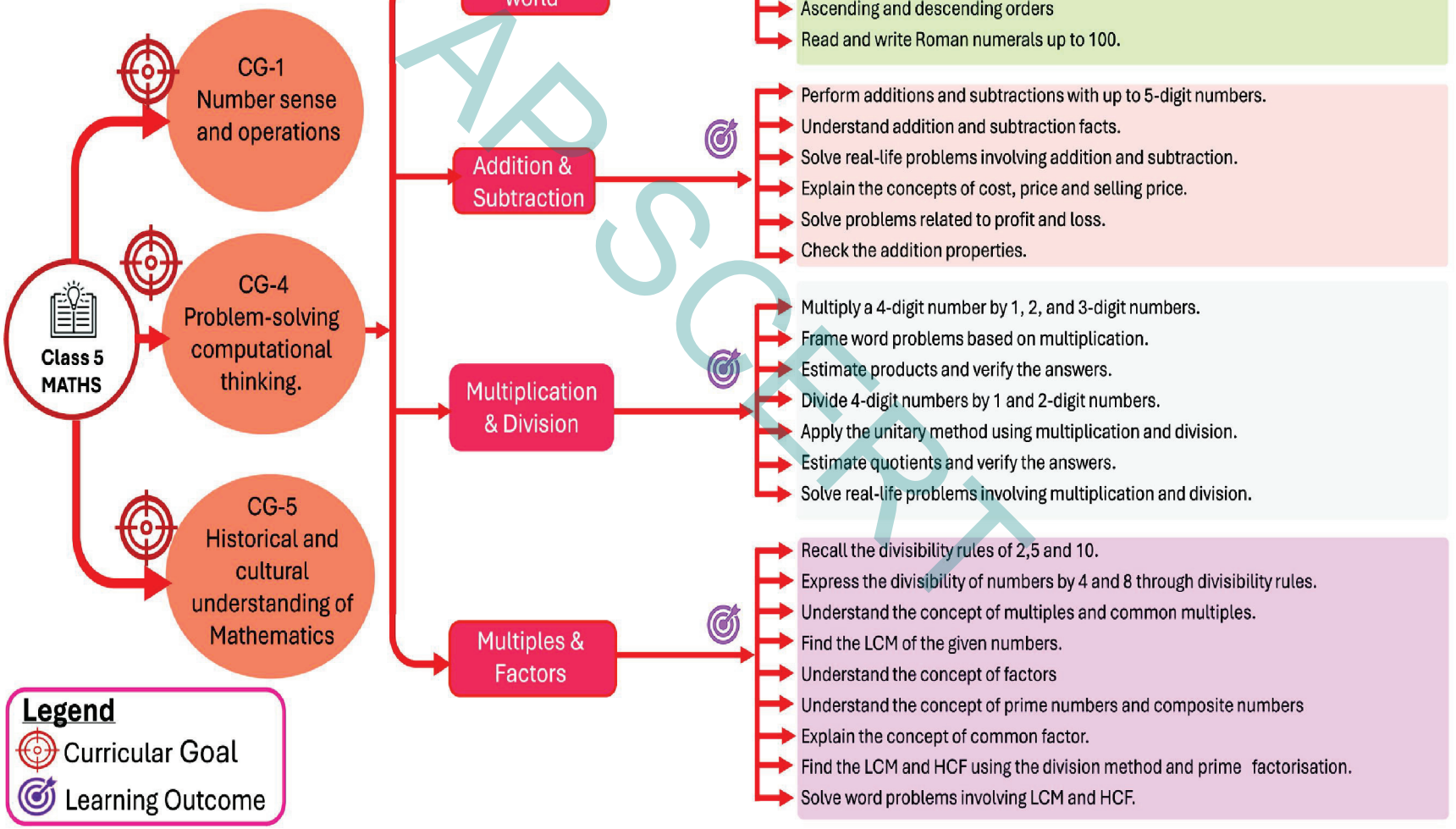
   If they start studying at the same time, after how many hours will their alarms ring together?

10. Anu visits the library once in 6 days and Shreya visits the same library once in 4 days. If they both visit the library on a Monday, on which day will the visit the library together the next time? Use HCF or LCM to find the answer.

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MIND MAP

CLASS 5_MATHS_SEM-1



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