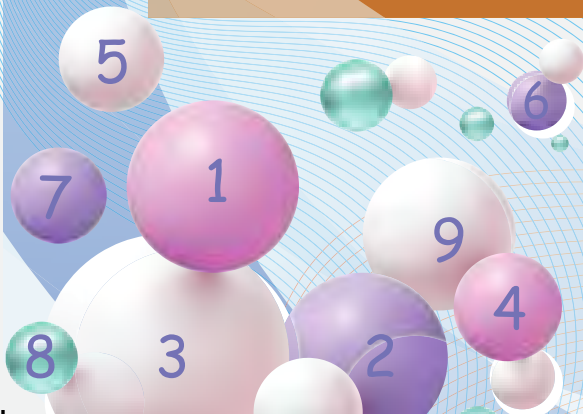


Mathematics

4



With the blessings of:
Our Parents

Mathematics (Part-4)

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- National Education Policy 2020
- NCF 2022
- Activity Based Format
- Innovative Approach
- Learning with fun
- Eco-Friendly Paper

Preface

Mathematics, a well arranged series of Mathematics strictly confirms to the vision of National Curriculum Framework 2022 and also meets the requirement of the NCERT latest syllabus. It is an activity-based maths textbook created to give the students a National Education Policy 2020-based interactive learning foundation in mathematics while also fostering the holistic development of learners through critical thinking and creativity.

These traits will aid the students in better understanding the fundamental ideas through play. Core educational ideas are the foundation of this textbook. The goal is to encourage youngsters to look beyond the theoretical side of arithmetic and to learn about practical applications.

The book's design emphasises effectiveness and logical progression. Through teaching and interactive learning, NEP 2020 seeks to enhance higher order thinking.

The purpose of this book's design and presentation is to reinforce mathematical concepts through the use of simple games. This book includes enough questions in accordance with the NEP 2020 criteria.

Salient Features of the series:

Learning Objectives: Learning objective shows the right path of learning to the teacher as well as students. It determines the direction of learning for effective and quality learning outcomes.

Warm-Up: It aids pupils in remembering lessons learnt in previous years and lets them ready for new concepts. Also, allows learners to process and explore mathematical concepts while applying, extending, and analysing information within their own unique range of understanding.

Teacher's note: A "Teacher's Note" is a set of instructions laid out for the teachers to follow in the classroom in order to make class interactive and discussion based.

Quick Tip: It offers suggestions on how to quickly solve the questions.

Facts To know: The inclusion of it gives the learner plenty of chances to investigate the information regarding the topics..

Think Wisely: These questions have been included to encourage learners to think, analyse and apply.

Mental Maths: The main goal of teaching Mental Maths to the learners is to focus on improving their arithmetic abilities through memory, practice and number manipulation.

Maths Lab Activities: These are provided with the intention of making maths learning efficient, engaging, pleasant, and intellectually stimulating.

This series of Mathematics books from class 1-8 contains sufficient questions for practice on each topic.

I am very appreciative of the entire staff and the management for working so hard to get this book into such a wonderful arrangement.

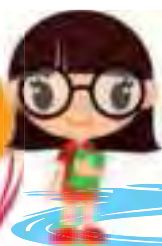
The books are always open to suggestions and enhancements.

Author

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1



The Number System



Learning Objectives

By the end of this lesson, students will be able to:

- Know the successor and predecessor of a number.
- Arrange numbers in ascending and descending order.
- Form numbers.
- Tell the face and place value of a digit.



Warm-Up

Observe the following picture and answer the following questions.



1. What is the price of half Kg apple? _____
2. Find the cost of 3 dozen bananas? _____
3. Arrange the price of fruits in ascending order. _____



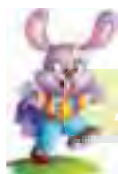


In class III, we have learnt upto 4-digit numbers. Now study further.

Extension of Numbers

Numbers	Smallest	Largest
4-digit	1000 (One Thousand)	9999
5-digit	10000 (Ten Thousand)	99999
6-digit	100000 (One Lakh)	999999
7-digit	1000000 (Ten Lakh)	9999999

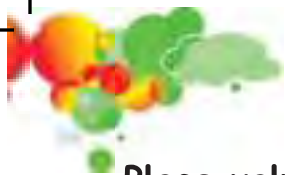
Number system helps us to find out the place value of each digit in a numeral according to its position.



Indian Number System

Indian number system is based on **Hindu-Arabic** numeration.
Thus, it is also known as **Hindu-Arabic number system**.





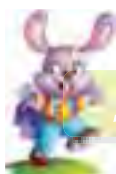
Place value chart of Indian Number System is shown below:

LAKHS		THOUSANDS		ONES		
TL	L	T-TH	TH	H	T	O
TEN LAKHS 10,00,000	LAKHS 1,00,000	TEN THOUSANDS 10,000	THOUSANDS 1,000	HUNDREDS 100	TENS 10	ONES 1

The first three places from the right are marked with **ONES**.

The next two places are marked with **THOUSANDS**.

The next to next two places are marked with **LAKHS**.



International Number System

International number system is used by many countries in the world.

In this system, we use

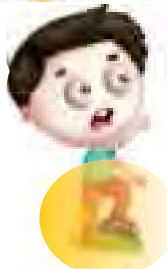
- 1 lakhs = 100 thousands
- 10 lakhs = 1 million



Place value chart of International Number System is shown below:

MILLIONS			THOUSANDS			ONES		
HM	TM	M	H-TH	T-TH	TH	H	T	O
HUNDRED MILLIONS 100,000,000	TEN MILLIONS 10,000,000	MILLIONS 1,000,000	HUNDRED THOUSANDS 100,000	TEN THOUSANDS 10,000	THOUSANDS 1,000	HUNDREDS 100	TENS 10	ONES 1





Quick Tip

In the International numeral system, we begin from the right side and insert commas after every three digits.

The first three places from the right are marked with **ONES**.

The next three places are marked with **THOUSANDS**.

The next to next three places are marked with **MILLIONS**.



Reading a Numeral

Do not use the word 'and' before tens and ones.

For example, 7486 **should not** be read as
Seven thousand four hundred and eighty-six.
It **can be read as**,
Seven thousand four hundred eighty six.



Writing a Numeral

Do not write in plural form.

For example, 2754 should never be written as two thousands seven hundreds fifty four.
It can be written as,
Two thousand seven hundred fifty four.

Solved Examples

Example 1 : Write each of the following numerals in the Indian number system using commas:

(a) 91265

(b) 345642

(c) 7392105

(d) 8123987

(e) 889016





Solution : Indian Number System

	TL	L	T-TH	TH	H	T	O	Using Commas
(a)			9	1	2	6	5	91,265
(b)		3	4	5	6	4	2	3,45,642
(c)	7	3	9	2	1	0	5	73,92,105
(d)	8	1	2	3	9	8	7	81,23,987
(e)		8	8	9	0	1	6	8,89,016

Example 2 : Write number names for each of the following numerals in the Indian number system:

(a) 64509

(b) 543290

(c) 732100

(d) 2345689

(e) 9734007

Solution : Indian Number System



	TL	L	T-Th	Th	H	T	O	Number Name
(a)			6	4	5	0	9	Sixty four thousand five hundred nine.
(b)		5	4	3	2	9	0	Five lakh forty three thousand two hundred ninety.
(c)		7	3	2	1	0	0	Seven lakh thirty two thousand one hundred.
(d)	2	3	4	5	6	8	9	Twenty three lakh forty five thousand six hundred eighty nine.
(e)	9	7	3	4	0	0	7	Ninety seven lakh thirty four thousand seven.



Example 3 : Write each of the following numerals in the International number system using commas:

- (a) 46529 (b) 5764028 (c) 912346
(d) 21903487 (e) 412357698

Solution : International Number System

	HM	TM	M	H-Th	T-Th	Th	H	T	O	Using Commas
(a)					4	6	5	2	9	46,529
(b)			5	7	6	4	0	2	8	5,764,028
(c)				9	1	2	3	4	6	912,346
(d)		2	1	9	0	3	4	8	7	21,903,487
(e)	4	1	2	3	5	7	6	9	8	412,357,698

Example 4 : Write number names for each of the following numerals in the International number system:

- (a) 764295 (b) 6421029
(c) 43528692 (d) 736145208 (e) 148009562

Solution : International Number System

	HM	TM	M	H-Th	T-Th	Th	H	T	O	Using Commas
(a)				7	6	4	2	9	5	Seven hundred sixty four thousand two hundred ninety five.
(b)			6	4	2	1	0	2	9	Six million four hundred twenty one thousand twenty nine.
(c)		4	3	5	2	8	6	9	2	Forty three million five hundred twenty eight thousand six hundred ninety two.

(d)	7 3 6	1 4 5	2 0 8	Seven hundred thirty six million one hundred forty five thousand two hundred eight.
(e)	1 4 8	0 0 9	5 6 2	One hundred forty eight million nine thousand five hundred sixty two.

Exercise 1.1

- Write each of the following numerals in the Indian number system using commas:
 - 12596
 - 731259
 - 7362487
 - 4123657
 - 435962
 - 1043521
- Write each of the following numerals in the International number system using commas:
 - 913546
 - 3126708
 - 47326580
 - 149625983
 - 721482500
 - 83456210
- Write the number names for each of the following numerals in the Hindu-Arabic number system:
 - 17309
 - 452086
 - 7312829
 - 4359800
 - 980026
 - 421053
- Write the number names for each of the following numerals in the International number system:
 - 436542
 - 7348967
 - 89456240
 - 92389628
 - 730089286
 - 102598
- Write the following number names in figures in the Hindu-Arabic number system, using proper commas:
 - Fourteen lakh two thousand seventy three.
 - Thirty two lakh nine thousand twenty.
 - Fifty lakh eleven thousand.
 - One lakh three hundred six.
 - Eighty three lakh twenty one thousand four hundred nine.

6. Write the following number names in figures in the International number system, using proper commas:

- (a) One million twenty three thousand four hundred six.
- (b) Twelve million one hundred fifty thousand ninety eight.
- (c) Sixty two million three hundred eleven thousand one hundred.
- (d) Ten million fifty thousand eighty.
- (e) Six million two thousand one hundred nine.



Face Value And Place Value of A Digit

Face Value of a digit in a numeral is the value of the digit itself.



Example 1 : Let the numeral be 205679

In the above numeral,

Face value of	9	is	9
Face value of	7	is	7
Face value of	6	is	6
Face value of	5	is	5
Face value of	0	is	0
Face value of	2	is	2

Example 2 : Let the numeral be 4258615

In the above numeral,

Face value of	5	is	5
Face value of	1	is	1
Face value of	6	is	6
Face value of	8	is	8
Face value of	5	is	5



Facts to Know

Aryabhata of Kusumapura developed the place-value notation in the 5th century and a century later Brahmagupta introduced the symbol for zero.



Face value of 2 is 2
 Face value of 4 is 4

Place value (or local value) of a digit in a numeral depends upon the value according to the place of a digit in a number.

Place value of a digit
 = Face value of a digit
 × Value of the place.

Place value of 0 is always 0, wherever it may be.

Example 3 : Let the numeral be: 79,64,208
 In the above numeral,

TL	L	T-Th	Th	H	T	O
7	9	6	4	2	0	8

Place value of 8 = 8 ones = 8×1 = 8
 Place value of 0 = 0 tens = 0×10 = 0
 Place value of 2 = 2 hundreds = 2×100 = 200
 Place value of 4 = 4 thousands = $4 \times 1,000$ = 4,000
 Place value of 6 = 6 ten thousands = $6 \times 10,000$ = 60,000
 Place value of 9 = 9 lakhs = $9 \times 1,00,000$ = 9,00,000
 Place value of 7 = 7 ten lakhs = $7 \times 10,00,000$ = 70,00,000

Example 4 : Let the numeral be: 43,58,620
 In the above numeral,

TL	L	T-Th	Th	H	T	O
4	3	5	8	6	2	0

Place value of 0 = 0 ones = 0×0 = 0
 Place value of 2 = 2 tens = 2×10 = 20

Place value of 6	= 6 hundreds	= 6×100	= 600
Place value of 8	= 8 thousands	= $8 \times 1,000$	= 8,000
Place value of 5	= 5 ten thousands	= $5 \times 10,000$	= 50,000
Place value of 3	= 3 lakhs	= $3 \times 1,00,000$	= 3,00,000
Place value of 4	= 4 ten lakhs	= $4 \times 10,00,000$	= 40,00,000

Exercise 1.2

1. Write the face value of encircled digits:

- | | |
|--------------------------|----------------------------|
| (a) 2 5 6 2 9 | (b) 7 3 4 2 6 7 |
| (c) 8 9 7 0 4 6 3 | (d) 4 8 0 9 2 7 4 |
| (e) 7 3 9 5 6 2 | (f) 1 0 4 0 5 0 9 7 |
| (g) 2 3 4 7 8 2 | (h) 9 8 4 0 1 2 7 8 |

2. Write the place value of encircled digits:

- | | |
|--------------------------|--------------------------|
| (a) 9 8 7 6 4 2 | (b) 4 1 0 0 2 7 |
| (c) 9 3 6 4 2 8 0 | (d) 8 3 4 0 6 2 8 |
| (e) 2 0 3 0 5 6 9 | (f) 1 7 3 2 5 9 2 |
| (g) 8 3 4 0 5 6 7 | (h) 7 6 4 2 5 9 |



Expansion of Numbers

When a numeral is expressed as a sum of the place value of its digits, then it is said to be in expanded form.





Solved Examples

Example 1 : Write the number 76,42,908 in expanded form.

Solution : Given numeral can be written as:

TL	L	T-Th	Th	H	T	O
7	6	4	2	9	0	8

So, 76,42,908 = 7 ten lakhs + 6 lakhs + 4 ten thousands + 2 thousands + 9 hundreds + 0 tens + 8 ones

$$= 7 \times 10,00,000 + 6 \times 1,00,000 + 4 \times 10,000 + 2 \times 1,000 + 9 \times 100 + 0 \times 10 + 8 \times 1$$
$$= 70,00,000 + 6,00,000 + 40,000 + 2,000 + 900 + 8$$



So, expanded form of 76,42,908 is:

$$70,00,000 + 6,00,000 + 40,000 + 2,000 + 900 + 8$$

Also, we can say that the short form of

$$70,00,000 + 6,00,000 + 40,000 + 2,000 + 900 + 8 \text{ is } 76,42,908.$$

Example 2 : Write the number 38,73,216 in expanded form.

Solution : Given numeral can be written as:

TL	L	T-Th	Th	H	T	O
3	8	7	3	2	1	6

So, 38,73,216 = 3 ten lakhs + 8 lakhs + 7 ten thousands + 3 thousands + 2 hundreds + 1 tens + 6 ones

$$= 3 \times 10,00,000 + 8 \times 1,00,000 + 7 \times 10,000 + 3 \times 1,000 + 2 \times 100 + 1 \times 10 + 6 \times 1$$
$$= 30,00,000 + 8,00,000 + 70,000 + 3,000 + 200 + 10 + 6$$



So, expanded form of 38,73,216 is:

$$30,00,000 + 8,00,000 + 70,000 + 3,000 + 200 + 10 + 6$$

Also, we can say that the short form of

$$30,00,000 + 8,00,000 + 70,000 + 3,000 + 200 + 10 + 6 \text{ is } 38,73,216.$$



Exercise 1.3

1. Write the expanded form of following numerals:

(a) 43,925

(b) 2,63,082

(c) 28,64,902

(d) 5,43,296

(e) 92,73,008

(f) 32,40,008

2. Write the short form of the following:

(a) $30,00,000 + 7,000 + 800 + 40 + 9$

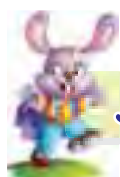
(b) $9,00,000 + 60,000 + 4,000 + 8$

(c) $70,00,000 + 3,00,000 + 20,000 + 9,000 + 5$

(d) $30,000 + 6,000 + 500 + 20 + 3$

(e) $2,00,000 + 400 + 2$

(f) $4,00,000 + 20,000 + 500 + 8$



Skip Counting

When we write some numbers with a fixed gap between two successive numbers, then such counting is known as **skip counting**.

Solved Examples

Example 1 : Counting by two's, write five numerals from 32623 onwards.

Solution : Starting from 32623, we add 2.

The required numerals are:

32623, 32625, 32627, 32629, 32631

Example 2 : Counting by five's, write five numerals from 72892 onwards.

Solution : Starting from 72892, we add 5.

The required numerals are:

72892, 72897, 72902, 72907, 72912



Similarly,

Counting by tens means there is a gap of 10 in every two successive numbers.
Counting by twenties means there is a gap of 20 in every two successive numbers.
Counting by fifties means there is a gap of 50 in every two successive numbers.
Counting by hundreds means there is a gap of 100 in every two successive numbers.
Counting by thousands means there is a gap of 1000 in every two successive numbers.
and so on.

Think Wisely

I am a number. I am not an odd number. I am greater than 90 but I am not less than 100. If you subtract me from 100. You get nothing. What number am I ?

Exercise 1.4

1. Counting by tens, write the numerals from:

- (a) 73618,
(b) 304692,
(c) 986747,
(d) 1234629,

2. Counting by twenties, write the numerals from:

- (a) 43520,
(b) 76295,
(c) 94621,
(d) 88467,

3. Counting by fifties, write the numerals from:

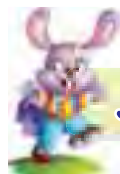
- (a) 30462,
(b) 286459,
(c) 386702,
(d) 2376408,

4. Counting by hundreds, write the numerals from:

- (a) 68423,
(b) 100926,
(c) 284652,
(d) 3642957,

5. Counting by thousands, write the numerals from:

- (a) 38425,
(b) 76120,
(c) 12459,
(d) 44398,



Successor And Predecessor

The number just **after** the given number, is called its **successor**.

It is one **more** than the number.

For example,

The successor of 73265 is 73266

The successor of 99999 is 100000

The successor of 81325 is 81326

The successor of 10298 is 10299



The number just **before** given number, is called its **predecessor**.

It is one **less** than the number.

For example,

The predecessor of 84629 is 84628

The predecessor of 10000 is 9999

The predecessor of 10295 is 10294

The predecessor of 76430 is 76429



Exercise 1.5

1. Write the successor of the following numerals:

- | | |
|-------------------|------------------|
| (a) 34652 | (b) 79688 |
| (c) 246809 | (d) 734988 |
| (e) 9176455 | (f) 83465 |
| (g) 88790 | (h) 43572 |

2. Write the predecessor of the following numerals:

- | | |
|-------------------|------------------|
| (a) 100000 | (b) 76349 |
| (c) 83490 | (d) 246958 |
| (e) 1234602 | (f) 12495 |
| (g) 54320 | (h) 64327 |

3. Complete the following table:

	Predecessor	Number	Successor
(a)		10000	
(b)		72846	
(c)		348900	
(d)		912873	
(e)		7946520	



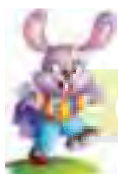
Comparison of Numbers



We have already learnt the comparison of numbers upto 4-digits in previous class.

Now, we will follow the same rules for large numbers.





Comparing Numbers Having Different Number of Digits

Number with more digits is the greater number.

$$764329 > 73664$$

$$834026 < 1723489$$



Comparing Numbers Having Same Number of Digits

- Step 1** : To compare numbers, always begin with the left most digits in both the numbers.
- Step 2** : If they are equal in value, then compare the second digits from the left in the numbers.
- Step 3** : If they are also equal in value, then compare the third digits from the left in both the numbers.
- Step 4** : Continue the process until you come across unequal digits at the corresponding places.

Number with greatest value (or larger digit) is greater.

Solved Examples

Example 1 : Which is greater: 36792 or 364720 ?

Solution : Clearly, 36792 consist of 5-digits and 364720 consist of 6-digits. We know that, number with more digits is greater.
So, $364720 > 36792$

Example 2 : Which is greater: 3467920 or 3456283 ?

Solution : Arrange the numbers in place value chart:

TL	L	T-Th	Th	H	T	O
3	4	6	7	9	2	0
3	4	5	6	2	8	3

Same
 Same
 Different



At ten thousands place,

$$6 > 5$$

So, $3467920 > 3456283$

Example 3 : Which is greater: 7246598 or 7246599 ?

Solution : Arrange the numbers in place value chart:

TL	L	T-Th	Th	H	T	O
7	2	4	6	5	9	8
7	2	4	6	5	9	9

↑ ↑ ↑ ↑ ↑ ↑ ↑

Same Same Same Same Same Same Different

At ones place,

$$8 < 9$$

So, $7246598 < 7246599$

Exercise 1.6

1. Compare the following numbers: (Which one is greater?)

- | | |
|----------------------|------------------------|
| (a) 36427 or 734695 | (b) 87408 or 87402 |
| (c) 764398 or 34679 | (d) 9783002 or 9783059 |
| (e) 837764 or 837694 | (f) 433205 or 433210 |

2. Encircle the smallest number:

- (a) 36429, 56349, 28642, 73982
(b) 76320, 43590, 63780, 89435
(c) 1739675, 993926, 83472, 9760070
(d) 3869723, 1764900, 8397280, 9865920

3. Encircle the largest number:

- (a) 73654, 28695, 98326, 90742
(b) 784320, 9873402, 8301275, 28605
(c) 2864100, 1296580, 9922460, 296001
(d) 368542, 926459, 834621, 120010



4. Write the smallest and greatest 5-digit number, using the digits:
3,6,0,2,5
5. Write the smallest and greatest 6-digit number, using the digits:
9,0,8,7,2,1
6. Write the smallest and greatest 7-digit number, using the digits:
3,4,6,7,2,9,0



Ordering of Numbers

Ordering of numbers means to arrange the numbers in either **ascending** or **descending** order.

Ascending order means to arrange the numbers from the smallest to the greatest number.



Descending order means to arrange the numbers from the greatest to the smallest number.

Example 1 : Arrange the following numbers in ascending order:

764329, 2865901, 38629, 1542860, 28659

Solution : Arrange these numbers in a place value chart:

TL	L	T-Th	Th	H	T	O
	7	6	4	3	2	9
2	8	6	5	9	0	1
		3	8	6	2	9
1	5	4	2	8	6	0
		2	8	6	5	9

Clearly,

$28659 < 38629 < 764329 < 1542860 < 2865901$

So, ascending order of given numbers is:

28659, 38629, 764329, 1542860, 2865901



Example 2 : Arrange the following numbers in ascending order:

1834059, 1060502, 7210591, 653108, 5100293

Solution : Arrange these numbers in a place value chart:

TL	L	T-Th	Th	H	T	O
1	8	3	4	0	5	9
1	0	6	0	5	0	2
7	2	1	0	5	9	1
	6	5	3	1	0	8
5	1	0	0	2	9	3

Clearly,

$653108 < 1060502 < 1834059 < 5100293 < 7210591$

So, ascending order of given numbers is:

653108, 1060502, 1834059, 5100293, 7210591



**Teacher's
Note:**

Ask the children to stand in a descending order by their roll numbers.

Example 3 : Arrange the following numbers in descending order:

32659, 2926542, 856492, 9862952, 28695

Solution : Arrange these numbers in a place value chart:

TL	L	T-Th	Th	H	T	O
		3	2	6	5	9
2	9	2	6	5	4	2
	8	5	6	4	9	2
9	8	6	2	9	5	2
		2	8	6	9	5

Clearly,

$9862952 > 2926542 > 856492 > 32659 > 28695$

So, descending order of given numbers is:

9862952, 2926542, 856492, 32659, 28695

Example 4 : Arrange the following numbers in descending order:

8340251, 2856495, 4462593, 3406820, 1050608

Solution : Arrange these numbers in a place value chart:

TL	L	T-Th	Th	H	T	O
8	3	4	0	2	5	1
2	8	5	6	4	9	5
4	4	6	2	5	9	3
3	4	0	6	8	2	0
1	0	5	0	6	0	8

Clearly,

$8340251 > 4462593 > 3406820 > 2856495 > 1050608$

So, descending order of given numbers is:

8340251, 4462593, 3406820, 2856495, 1050608

Exercise 1.7

1. Arrange the following numbers in ascending order:

- (a) 28652, 1296482, 20359, 786421, 8906542
- (b) 764259, 305912, 83386, 2864951, 9721600
- (c) 32862, 43702, 864295, 984658, 29075
- (d) 8420596, 3456203, 59651, 289345, 127890
- (e) 432595, 205962, 110465, 831025, 734265
- (f) 335546, 232105, 106259, 789650, 983459

2. Arrange the following numbers in descending order:

- (a) 28659, 129659, 206542, 3065986, 30765
- (b) 73652, 834590, 76345, 3012349, 7349830
- (c) 24685, 983456, 70029, 134569, 7432659
- (d) 8465429, 9640590, 34596, 7502869, 576089
- (e) 721253, 8210659, 101059, 554051, 625981
- (f) 430596, 1203462, 764210, 9834059, 3840024



Mental Maths

Answer the following:

1. Write the number 100 more than 35900. _____
2. Write the greatest number that can be formed using the digits 0,1,2,3,4,5.

3. Find the place value of 5 in 17,581. _____
4. What is the successor of 5876? _____

Maths Lab Activity

Materials required: Paper sheet and a pencil

Steps:

1. Write all the alphabet in order.
2. Assign each alphabet a code. These codes may follow a pattern.

A	B	C	D	E	F	G	H	I	J	K	L	M
1	2	3	4	5	6	7	8	9	10	11	12	13
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
14	15	16	17	18	19	20	21	22	23	24	25	26

3. Make a group of two students each, and one of the student from the pair will write a word.
4. The partner will develop a number for the given word through assigned codes.
5. Now, the other pair will read and write that number.

Example: The given word is CARE

C - 3 A - 1 R - 18 E - 5

The secret code for given word is 31,185.

2

Roman Numbers



Learning Objectives

By the end of this lesson, students will be able to:

- Learn how to count using Roman numerals .
- Solve simple maths problems using Roman numerals.
- Create charts of Roman numerals and their Arabic equivalents.



Warm-Up

Complete the cross number using Hindu- Arabic numerals.

a →	b ↓		c →		
					d ↓
		e →			
	f →			g →	
h ↓		i →	j ↓		
			k →		

Across	Down
(a) $X + IV$	(b) $L - X$
(c) $LX + I$	(C) $LX + VI$
(e) $XX + XI$	(d) $CX + VI$
(f) $L + XXVII$	(h) $LXXX + II$
(g) $XL + VI$	(J) $XL + IX$
(i) $L + IV$	
(k) $XC + V$	



Teacher's Note:

Ask the children to write their birth date in Roman numerals.

In the class III, we have learnt roman numbers upto XL (40).

Roman Numbers From I (1) to C (100).

Hindu-Arabic Numerals	Roman Numerals	Hindu-Arabic Numerals	Roman Numerals	Hindu-Arabic Numerals	Roman Numerals	Hindu-Arabic Numerals	Roman Numerals
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



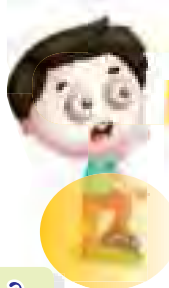
Facts to Know

Roman Numerals were invented as a means of trading.





How To Write Roman Numerals?



Quick Tip

If a symbol comes after another symbol, then you add it to the symbol before it. For example, VI = 6 since V = 5 and I = 1.

Rule 1 : Repetition of a roman number means addition.

For example, III = $1 + 1 + 1 = 3$
 XX = $10 + 10 = 20$

Note: Symbols V, L and D can never be repeated.

Rule 2 : When a smaller number is written on the right of a larger number, we add smaller to the larger one.

For example, VII = $5 + 1 + 1 = 7$
 XI = $10 + 1 = 11$
 XV = $10 + 5 = 15$
 LX = $50 + 10 = 60$



Rule 3 : When a smaller number is written on the left of a larger number, we subtract smaller from the larger one.

For example, IV = $5 - 1 = 4$
 IX = $10 - 1 = 9$
 XL = $50 - 10 = 40$
 XC = $100 - 10 = 90$

Rule 4 : When a smaller numeral is placed between the two larger numerals, then the smaller numeral is always subtracted from the larger numeral immediately following it.

For example: XIV = $10 + (5 - 1) = 14$
 XIX = $10 + (10 - 1) = 19$
 XXIX = $10 + 10 + (10 - 1) = 29$
 XLIX = $(50 - 10) + (10 - 1) = 49$



Solved Examples

Example 1 : Write the roman numerals for the following Hindu-Arabic numerals:

- (a) 56 (b) 88 (c) 73 (d) 92

Solution :

(a) $56 = 50 + 6$
 $= \text{LVI}$

(b) $88 = 80 + 8$
 $= \text{LXXXVIII}$

(c) $73 = 70 + 3$
 $= \text{LXXIII}$

(d) $92 = 90 + 2$
 $= \text{XCII}$



Think Wisely

Hey! I am a roman number.

I am X years old and my friend is 2 years older than me.
 So, tell my friend's age in roman numbers.

Exercise 2.1

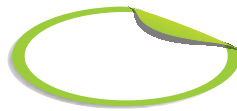
1. Write the Roman numerals for each of the following Hindu-Arabic numerals:

- (a) 19 (b) 48 (c) 64 (d) 59
 (e) 70 (f) 99 (g) 500 (h) 1000

2. Write the Hindu-Arabic numerals for each of the following Roman numerals:

- (a) C (b) LIX (c) XXIII (d) LXXXVI
 (e) XCVIII (f) LXXVII (g) LXII (h) XL

3. Compare (> or <) the following Roman numerals:

- (a) XXXVI  XXXIV (b) LXV  XLVIII





(c) C



(d) XCIX



(e) XXVI



(f) XLII



Mental Maths

Answer in one word.

1. Convert 56 into roman numerals. _____
2. What will be the result of $18 \times 3 - 14$ in roman numerals? _____
3. In roman numerals, what is the sum of LXIV and XXVI? _____
4. Which is greater IV or X? _____



Maths Lab Activity

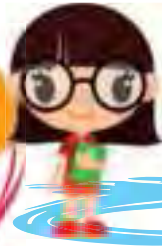
Materials required: Paper and a pencil

Steps:

Few addition equations have been given. Check whether these are right or wrong. If there is any mistake, correct it and write the reason for it.

Equation	Correction	Reason
1. II + II = VI	II + II = IV	When a smaller letter is placed on the left of the bigger number, it means subtraction. Hence, the correct way of writing 4 in roman is IV
2. L + V = LIIIII		
3. XX + X = XXVV		
4. V + IV = IX		



**Learning Objectives**

By the end of this lesson, students will be able to:

- Add numbers upto 7 digits.
- Solve addition story sums.
- Know the place values of the numbers to ten Lakhs.
- Use the addition principles to frame story sums.

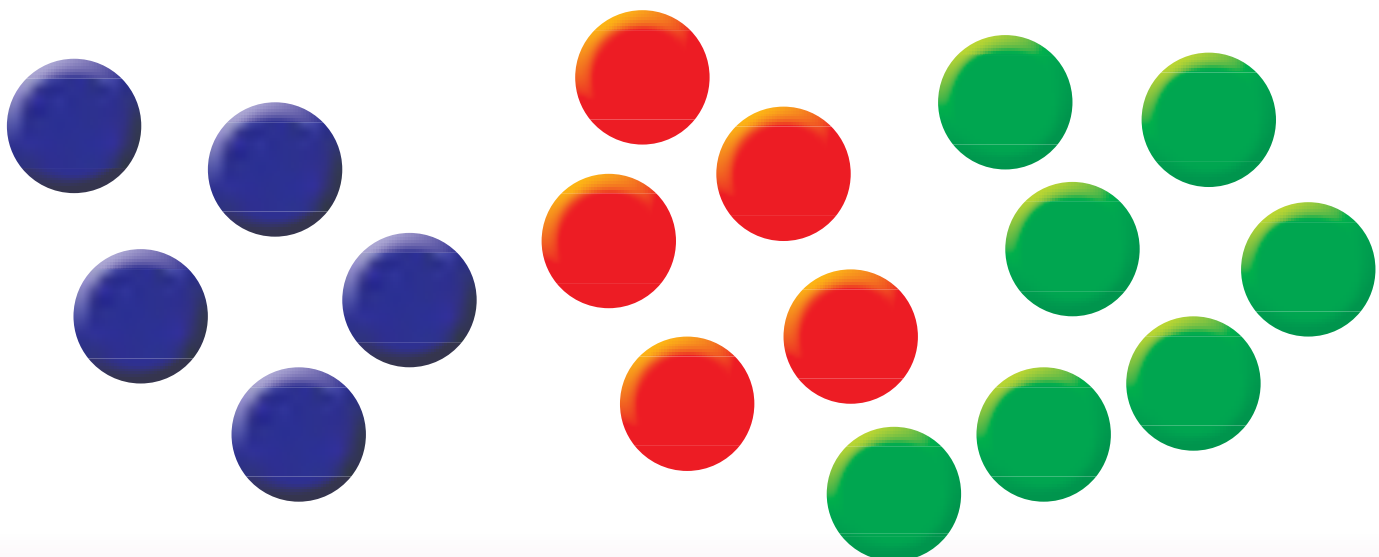
**Warm-Up**

Count and write the total number of dots.

Add blue dots with green.- _____

Add green dots with red. - _____

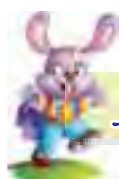
Add blue, green and red dots. - _____



In class III, we have learnt the addition of numbers upto 4-digits.

Now, we will extend it upto 7-digits

Solved Examples



Addition Without Carry

Example 1 : Add: 103731, 235014 and 440253

Solution :

	L	T	Th	Th	H	T	O
	1	0	3	7	3	1	
	2	3	5	0	1	4	
+	4	4	0	2	5	3	
	7	7	8	9	9	8	

Steps:

- Step 1 :** Add ones $1 + 4 + 3 = 8$ ones
Step 2 : Add tens $3 + 1 + 5 = 9$ tens
Step 3 : Add hundreds $7 + 0 + 2 = 9$ hundreds
Step 4 : Add thousands $3 + 5 + 0 = 8$ thousands
Step 5 : Add ten thousands $0 + 3 + 4 = 7$ ten thousands
Step 6 : Add lakhs $1 + 2 + 4 = 7$ lakhs

Sum = 778998



Teacher's Note:

Ask kids to add the total number of alphabet in their names to the total alphabet in their friend's name.

Example 2 :

Add: 4351062, 1210513, 3010202 and 1400021

Solution :

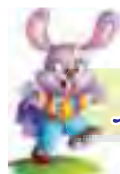
	TL	L	T-Th	Th	H	T	O
	4	3	5	1	0	6	2
	1	2	1	0	5	1	3
	3	0	1	0	2	0	2
+	1	4	0	0	0	2	1
	9	9	7	1	7	9	8



Steps:

- Step 1** : Add ones $2 + 3 + 2 + 1 = 8$ ones
- Step 2** : Add tens $6 + 1 + 0 + 2 = 9$ tens
- Step 3** : Add hundreds $0 + 5 + 2 + 0 = 7$ hundreds
- Step 4** : Add thousands $1 + 0 + 0 + 0 = 1$ thousands
- Step 5** : Add ten thousands $5 + 1 + 1 + 0 = 7$ ten thousands
- Step 6** : Add lakhs $3 + 2 + 0 + 4 = 9$ lakhs
- Step 7** : Add ten lakhs $4 + 1 + 3 + 1 = 9$ ten lakhs

Sum = 9971798



Addition With Carry

Example 3 :

Add: 364291, 283723 and 786928

Solution :

	L	T-Th	Th	H	T	O
	2	1	1	1	1	
	3	6	4	2	9	1
	2	8	3	7	2	3
+	7	8	6	9	2	8
	1	4	3	4	9	4



Normally, while doing calculations we do not write place value headings.

Steps:

- Step 1** : Add ones
 $1 + 3 + 8 = 12$ ones
 $= 1$ ten + 2 ones
 (write carry 1 to the tens column and 2 under ones column)



Step 2 : Add tens

$$\begin{aligned} 1 (\text{carried}) + 9 + 2 + 2 &= 14 \text{ tens} \\ &= 1 \text{ hundred} + 4 \text{ tens} \end{aligned}$$

(write 1 carry to the hundreds column and 4 under tens column)

Step 3 : Add hundreds

$$\begin{aligned} 1 (\text{carried}) + 2 + 7 + 9 &= 19 \text{ hundreds} \\ &= 1 \text{ thousand} + 9 \text{ hundreds} \end{aligned}$$

(write 1 carry to the thousands column and 9 under hundreds column)

Step 4 : Add thousands

$$\begin{aligned} 1 (\text{carried}) + 4 + 3 + 6 &= 14 \text{ thousands} \\ &= 1 \text{ ten thousand} + 4 \text{ thousands} \end{aligned}$$

(write 1 carry to the ten thousands column and 4 under thousands column.)

Step 5 : Add ten thousands

$$\begin{aligned} 1 (\text{carried}) + 6 + 8 + 8 &= 23 \text{ ten thousands} \\ &= 2 \text{ lakhs} + 3 \text{ ten thousands} \end{aligned}$$

(write 2 carry to the lakhs column and 3 under ten thousands column)

Step 6 : Add lakhs

$$\begin{aligned} 2 (\text{carried}) + 3 + 2 + 7 &= 14 \text{ Lakhs} \\ &= 1 \text{ ten lakh} + 4 \text{ lakhs} \end{aligned}$$

(write 14 under lakhs column)

$$\text{Sum} = 1434942$$

Example 4 : Add: 384651, 1240259, 904259 and 425627

Solution :

	TL	L	T-Th	Th	H	T	O
	1	1	1	1	1	2	
		3	8	4	6	5	1
	1	2	4	0	2	5	9
		9	0	4	2	5	9
+		4	2	5	6	2	7
	2	9	5	4	7	9	6



Steps:

Step 1 : Add ones

$$\begin{aligned} 1 + 9 + 9 + 7 &= 26 \text{ ones} \\ &= 2 \text{ ten} + 6 \text{ ones} \end{aligned}$$

(write carry 2 to the tens column and 6 under ones column)





Step 2 : Add tens

$$\begin{aligned} 2 \text{ (carried)} + 5 + 5 + 5 + 2 &= 19 \text{ tens} \\ &= 1 \text{ hundred} + 9 \text{ tens} \end{aligned}$$

(write 1 carry to the hundreds column and 9 under tens column)

Step 3 : Add hundreds

$$\begin{aligned} 1 \text{ (carried)} + 6 + 2 + 2 + 6 &= 17 \text{ hundreds} \\ &= 1 \text{ thousand} + 7 \text{ hundreds} \end{aligned}$$

(write 1 carry to the thousands column and 7 under hundreds column)

Step 4 : Add thousands

$$\begin{aligned} 1 \text{ (carried)} + 4 + 0 + 4 + 5 &= 14 \text{ thousands} \\ &= 1 \text{ ten thousand} + 4 \text{ thousands} \end{aligned}$$

(write 1 carry to the ten thousands column and 4 under thousands column.)

Step 5 : Add ten thousands

$$\begin{aligned} 1 \text{ (carried)} + 8 + 4 + 0 + 2 &= 15 \text{ ten thousands} \\ &= 1 \text{ lakhs} + 5 \text{ ten thousands} \end{aligned}$$

(write 1 carry to the lakhs column and 5 under ten thousands column)

Step 6 : Add lakhs

$$\begin{aligned} 1 \text{ (carried)} + 3 + 2 + 9 + 4 &= 19 \text{ lakhs} \\ &= 1 \text{ ten lakh} + 9 \text{ lakhs} \end{aligned}$$

(write 1 carry to the ten lakhs column and 9 under lakhs column)

Step 7 : Add ten lakhs

$$\begin{aligned} 1 \text{ (carried)} + 1 &= 2 \text{ ten Lakhs} \\ \text{(write 2 under ten lakhs column)} \end{aligned}$$

$$\text{Sum} = 2954796$$



Finding Missing Digits

Example 5 : Find the missing digits:

	7	2		5
		6	2	2
+	3		9	1
1	2	6	5	



Facts to Know

Additions were first devised by Brahmagupta of India. This was known during medieval Europe as "Modus Indorum" or Method of the Indians.



Solution : Add ones:

$$5 + 2 + 1 = 8 \text{ ones}$$

Add tens:

$$2 + 9 = 11 \text{ tens} = 1 \text{ hundred} + 1 \text{ ten}$$

But, in the sum there are 5 tens

∴ Missing digit must be 4.

Add hundreds:

$$1 + 2 + 6 = 9 \text{ hundreds}$$

But, in the sum there are 6 hundreds

∴ Missing digit must be 7 with carried over 1.

Add thousands:

$$1 + 7 + 3 = 11 \text{ thousands} = 1 \text{ ten thousand} + 1 \text{ thousand}$$

But, in the sum there are 2 thousands

∴ Missing digit must be 1.

1	1			
7	2	4	5	
1	6	2	2	
+	3	7	9	1
1	2	6	5	8

Exercise 3.1



1. Add:

(a)

2	3	5	0	2
+	1	3	2	1

(b)

7	6	5	2	3
+	2	3	4	7

(c)

9	8	6	7	2	4
7	3	4	0	9	3
+	8	5	3	2	0

(d)

2	8	7	6	9	5
	4	3	2	0	2
+	9	7	0	8	2

(e)

7	6	5	4	3	2
	3	9	0	2	6
		5	9	8	8
+	2	7	6	4	0

(f)

8	3	3	4	0	5
6	7	5	9	8	7
2	8	6	1	4	3
+	9	8	7	6	2





2. Arrange the following numbers in columns and then find the sum:

- (a) 734562, 235973, 186429
- (b) 934562, 734009, 5462
- (c) 8346562, 9264, 98395, 10645
- (d) 228465, 746625, 7326, 9834
- (e) 36125, 421020, 13596, 73102
- (f) 54320, 731021, 71020, 240219



3. Fill the missing digits:

(a)

	2	8		6
	5		2	5
+		5	8	9
1	4	3	6	

(b)

	7		3	4
	2	2		6
+		3	5	9
1	5	8	3	

4. Find the sum of the largest 4-digit number and smallest 5-digit number.



Properties of Addition

1. Order Property of Addition:

If any two numbers are added in any order, then their sum remains the same.

For example, $43562 + 28395 = 71957$

$$28395 + 43562 = 71957$$

So, $43562 + 28395 = 28395 + 43562$



2. Grouping Property of Addition:

If three or more numbers are added in different groups, then their sum remains the same in all cases.

$$(342 + 242) + 179 = 342 + (242 + 179)$$

$$584 + 179 = 342 + 421$$

$$763 = 763$$



3. Additive Property of Zero

When zero is added to a number, then the value of the number does not change.

For example, $46528 + 0 = 46528$
 $0 + 76459 = 76459$



4. Additive Property of One:

When one is added to a number, then it gives the successor of the number as its sum.

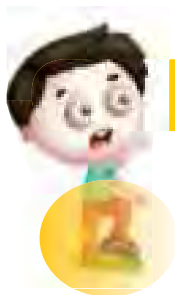
For example, $7342 + 1 = 7343$



Exercise 3.2

1. Fill in the blanks:

- (a) $7642 + 9683 = \dots\dots\dots + 7642$
- (b) $10289 + 25468 = 25468 + \dots\dots\dots$
- (c) $(38594 + 28679) + 34702 = \dots\dots\dots + (28679 + 34702)$
- (d) $28679 + (54709 + 87679) = (28679 + \dots\dots\dots) + 87679$
- (e) $76429 + \dots\dots\dots = 76429$
- (f) $\dots\dots\dots + 28762 = 28762$
- (g) $48679 + 0 = \dots\dots\dots$



Quick Tip

Use the compensation method for adding large numbers, "Compensation" is where you round up a number (to make adding easier) and then take away the extra after you have added.

For e.g.

$$\begin{aligned} 5992 + 126 \\ = 6000 + 126 \\ = 6126 - 8 \\ = 6118 \end{aligned}$$



Word Problems

Solved Examples

Example 1 : There are 48651 men, 34605 women and 29586 children in a town. What is the population of that town?

Solution :

		2	1	1	1	← Carry
Number of men	=	4	8	6	5	1
Number of women	=	3	4	6	0	5
Number of children	=	+	2	9	5	8
Total population of a town	=	1	1	2	8	4

Hence, the total population of that town is 1,12,842.

Example 2 : There are 10569 computer books, 36642 mathematics books, 28469 hindi books and 48679 english books in a school library. What is the total number of books in the school library?

Solution :

		2	2	2	2	← carry
Number of computer books	=	1	0	5	6	9
Number of mathematics books	=	3	6	6	4	2
Number of hindi books	=	2	8	4	6	9
Number of english books	=	+	4	8	6	7
Total number of books	=	1	2	4	3	5

Hence, the total number of books in the school library is 1,24,359.

Example 3 : A refrigerator manufacturing factory produced 28465 refrigerators in January, 43509 refrigerators in February and 70402 refrigerators in March. How many refrigerators did the factory produce altogether in these three months?

Solution :	Number of refrigerators produced in January =	2	8	4	6	5	
	Number of refrigerators produced in February=	4	3	5	0	9	
	Number of refrigerators produced in March =	+	7	0	4	0	2
	Total number of refrigerators produced in these three months =	1	4	2	3	7	6

Hence, the total number of refrigerators produced in these three months is 1,42,376.

Framing Word Problems

Framing word problem means to design or write the word problem according to the given facts.

Example 4 : Frame the word problems for each of the following addition facts:

(a) $2652 + 3879 = 6531$

(b) $18260 + 54389 = 72649$

- Solution:**
- (a) Rajat spent ₹ 2652 and Sona spent ₹ 3879 on shopping. How much money did they both spend together?
- (b) Shreya purchased a tablet costing ₹ 18260 and a notebook costing ₹ 54389. How much money did she spend in all?



Think Wisely

Aakash's age is more than 25 years, but less than 30 years. His age is in an odd number and is a multiple of 3.
Aakash is $25 + \underline{\hspace{2cm}}$ years old.

Exercise 3.3

Solve the following word problems:

1. A factory produced 28679 cold-drinks in January. 30729 cold-drinks in February and 19809 cold-drinks in March. How many cold-drinks did the factory produced altogether in these three months?
2. A number exceeds 1280596 by 4829. What is the number?



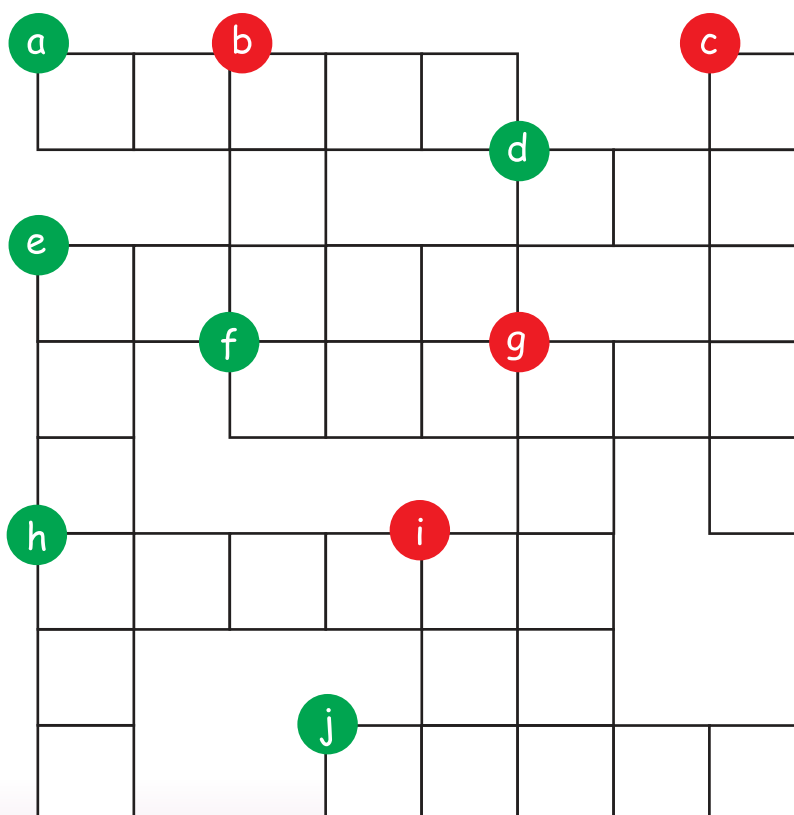


3. Mr. Verma deposits ₹ 18,620, ₹ 30,500 and ₹ 80,000 in the bank in three successive weeks. How much money does he deposit in the bank in these three successive weeks?
4. Raj travels 86,430 km by aeroplane, 50,589 km by train and 30,469 km by helicopter. How much distance did he cover altogether?
5. Mr. Bansal spent ₹ 42,500 on LED, ₹ 40,560 on laptop and ₹ 42,999 on mobile phone. How much money did he spend in all?
6. In an examination, 42569 students passed. If the number of failures be 10425, find the number of students who appeared in the examination.
7. **Frame the word problems for each of the following addition facts:**
- (a) $2867 + 59463 = 62330$
- (b) $15970 + 38999 + 28050 = 83019$
- (c) $10967 + 59000 + 2817 = 72784$



Mental Maths

Solve the puzzle.



Across	Down
(a) $83457 + 0$	(b) $4284 + 1$
(d) $1 + 508$	(c) successor of 99998
(e) $62776 + 100$	(e) $587476 + 100000$
(f) $534768 + 1$	(g) $67777 + 10000$
(h) $455457 + 1000$	(i) $32547 + 564 = \underline{\hspace{2cm}} + 32547$
(j) $74770 + 10$	



Materials required: 2 Sets of number cards from 0 to 9.

Steps:

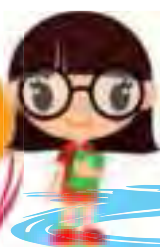
1. The teacher will divide the class into groups of five students.
2. Shuffle the number cards. Students will take turns drawing a card each.
3. The group will make a 5 - digit number from it.
4. Repeat the above steps with another group.
5. Now, the groups will add these 2 numbers.
6. The group will be able to add up the numbers first will be the winner.

Example Group 1: 6 4 3 2 1

$$\begin{array}{r} \text{Group 2: } + 59087 \\ \hline 12\ 3408 \end{array}$$



4



Subtraction



Learning Objectives

By the end of this lesson, students will be able to:

- Subtract numbers upto 7 digits.
- Apply the property of subtraction to solve story sums.
- Use borrowing methods to subtract.



Warm-Up

Count the number of objects in the box and take away the odd object.



Teacher's Note:

Ask the kids to add up the number of pages of any 5 books they have and deduct the number of pages given in their Maths book.





In class III, we have learnt the subtraction of numbers upto 4-digits.

Now, we will extend it upto 7-digits.



The greater number is called **minuend**.

The smaller number is called **subtrahend**.

The result obtained after the subtraction is called **difference**.

Solved Examples



Subtraction Without Borrow

Example 1 : Subtract:

34052 from 56387



Solution:

T-Th	Th	H	T	O	
5	6	3	8	7	← Minuend
- 3	4	0	5	2	← Subtrahend
2	2	3	3	5	← Difference

Steps:

- Step 1 :** Subtract ones
 $7 - 2 = 5$ ones
- Step 2 :** Subtract tens
 $8 - 5 = 3$ tens
- Step 3 :** Subtract hundreds
 $3 - 0 = 3$ hundreds
- step 4 :** Subtract thousands
 $6 - 4 = 2$ thousands
- Step 5 :** Subtract ten thousands
 $5 - 3 = 2$ ten thousands
 $\therefore$ Difference = 22335



Example 2 : Subtract:

362015 from 974056

Solution:

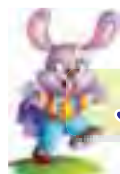
L	T-Th	Th	H	T	O	
9	7	4	0	5	6	← Minuend
- 3	6	2	0	1	5	← Subtrahend
6	1	2	0	4	1	← Difference

Steps:

- Step 1 :** Subtract ones
 $6 - 5 = 1$ ones
- Step 2 :** Subtract tens
 $5 - 1 = 4$ tens
- Step 3 :** Subtract hundreds
 $0 - 0 = 0$ hundreds
- step 4 :** Subtract thousands
 $4 - 2 = 2$ thousands
- Step 5 :** Subtract ten thousands
 $7 - 6 = 1$ ten thousands



Step 6 : Subtract lakhs
 $9 - 3 = 6$ lakhs
 $\therefore$ Difference = 612041



Subtraction With Borrow



Quick Tip

When we borrow 1 from next higher unit, we borrow 10 units of smaller units.

Example 3 : Subtract: 384675 from 573051

Solution :

	L	T	Th	H	T	O	
	4	16	12	9	14	11	← After Borrowing
	5	7	3	0	5	1	← Minuend
-	3	8	4	6	7	5	← Subtrahend
	1	8	8	3	7	6	← Difference

Check

Subtrahend + Difference = Minuend

	3	8	4	6	7	5	Subtrahend
+	1	8	8	3	7	6	Difference
	5	7	3	0	5	1	Minuend

$\therefore$ Difference = 188376

Example 4 : Subtract: 324658 from 704259

Solution :

	L	T	Th	H	T	O	
	6	9	13	12			← After Borrowing
	7	0	4	2	5	9	← Minuend
-	3	2	4	6	5	8	← Subtrahend
	3	7	9	6	0	1	← Difference



Check

Subtrahend + Difference = Minuend

	3	2	4	6	5	8	Subtrahend
+	3	7	9	6	0	1	Difference
	7	0	4	2	5	9	Minuend

$\therefore$ Difference = 379601



Finding Missing Digits

Example 5 : Find the missing digits.

$$\begin{array}{r} 8 \quad \square \quad 6 \quad 5 \\ - 7 \quad 3 \quad \square \quad 2 \\ \hline \square \quad 4 \quad 8 \quad \square \end{array}$$

Solution : Subtract ones

$$5 - 2 = 3$$

Missing digit must be 3.

Subtract tens

Minuend < difference (6 < 8)

$\therefore$ Borrowing 1, $16 - 8 = 8$.

Missing digit must be 8.

Subtract hundreds

1 has been given away from minuend.

$\therefore$ Missing digit = $4 + 3 + 1 = 8$

Subtract thousands

$$8 - 7 = 1$$

Missing digit must be 1.

Example 6 : Find the missing subtrahend:

$$\begin{array}{r} \overset{6}{7} \overset{16}{6} 4 \overset{7}{8} \overset{12}{2} \quad \leftarrow \text{Minuend} \\ - \square \square \square \square \square \quad \leftarrow \text{Subtrahend} \\ \hline 3 \quad 8 \quad 0 \quad 5 \quad 6 \quad \leftarrow \text{Difference} \end{array}$$

Solution : We know that,

$$\text{Minuend} - \text{Difference} = \text{Subtrahend}$$

$$\begin{array}{r} 7 \quad 6 \quad 4 \quad 8 \quad 2 \quad \leftarrow \text{Minuend} \\ - 3 \quad 8 \quad 0 \quad 5 \quad 6 \quad \leftarrow \text{Difference} \\ \hline 3 \quad 8 \quad 4 \quad 2 \quad 6 \quad \leftarrow \text{Subtrahend} \end{array}$$

$\therefore$ Missing Subtrahend = 38426

Facts to Know

Early use of the minus sign that we use today was discovered in a German manuscript dating from 1481. After studying this manuscript, Johannes Widman published his book *Mercantile Arithmetic*, using the minus sign to indicate subtraction.

$$\begin{array}{r} 8 \quad 8 \quad 6 \quad 5 \\ - 7 \quad 3 \quad 8 \quad 2 \\ \hline 1 \quad 4 \quad 8 \quad 3 \end{array}$$



Example 7 : What number is 2065 less than 38406?

Solution : Required number
 $= 38406 - 2065$
 $= 36341$

		3	10		
3	8	4	0	6	
-	2	0	6	5	
3	6	3	4	1	

Example 8 : What number should be added to 28765 to get 48000?

Solution : Required number
 $= 48000 - 28765$
 $= 19235$

3	17	9	9	10	
4	8	10	10	0	
-	2	8	7	6	5
1	9	2	3	5	

Exercise 4.1

1. Subtract:

(a)

7	6	8	9	6	
-	4	3	5	0	2

(b)

3	8	6	7	9	
-	1	7	0	5	3

(c)

8	0	6	5	4	9	
-	2	8	9	7	8	3

(d)

7	0	8	0	4	5	
-	3	4	9	7	5	8

(e)

9	8	6	4	2	5	
-	8	9	7	6	8	7

(f)

7	6	0	0	4	2	
-	3	9	7	6	8	3



2. Find the difference:

- (a) Minuend = 980056,
 (b) Minuend = 740265,
 (c) Minuend = 840052,
 (d) Minuend = 556172,

- Subtrahend = 794868
 Subtrahend = 365432
 Subtrahend = 109831
 Subtrahend = 296459





3. Fill the missing digits:

(a)

$$\begin{array}{r} 3 \quad \square \quad 4 \quad 2 \\ - 1 \quad 9 \quad \square \quad 4 \\ \hline \square \quad 7 \quad 6 \quad \square \end{array}$$

(b)

$$\begin{array}{r} 7 \quad \square \quad 4 \quad \square \quad 3 \\ - 5 \quad 3 \quad \square \quad 6 \quad 5 \\ \hline \square \quad 7 \quad 2 \quad 8 \quad \square \end{array}$$

4. Fill the missing subtrahend:

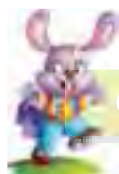
(a)

$$\begin{array}{r} 8 \quad 3 \quad 0 \quad 5 \quad 9 \\ - \square \quad \square \quad \square \quad \square \quad \square \\ \hline 4 \quad 6 \quad 2 \quad 8 \quad 5 \end{array}$$

(b)

$$\begin{array}{r} 9 \quad 0 \quad 5 \quad 4 \quad 5 \quad 6 \\ - \square \quad \square \quad \square \quad \square \quad \square \quad \square \\ \hline 5 \quad 4 \quad 9 \quad 8 \quad 7 \quad 8 \end{array}$$

5. What number is 1028 less than 54652?
6. What number is 4020 less than 38465?
7. What number should be added to 128645 to get 734021?
8. What number should be added to 384659 to get 400295?



Properties of Subtraction

1. When zero is subtracted from a number, then the value of the number does not change.

For example,

$$4625 - 0 = 4625$$



2. When one is subtracted from a number, then it gives the predecessor of the number as its difference.

For example,

$$73462 - 1 = 73461$$



3. When a number is subtracted from itself, then it gives zero as the difference.

For example,

$$2842 - 2842 = 0$$



Exercise 4.2

1. Fill in the blanks:

(a) $4395 - \dots = 4395$

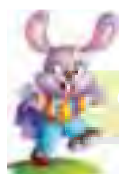
(b) $7695 - \dots = 0$

(c) $28965 - \dots = 0$

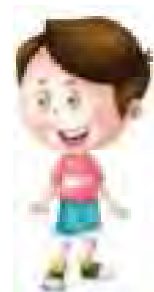
(d) $38729 - 38729 = \dots$

(e) $5402 - 1 = \dots$

(f) $63495 - \dots = 63494$



Word Problems



Solved Examples

Example 1 : Mr. Sharma had ₹ 78000. He spent ₹ 56980. How much money is left with him?

Solution : Total money with Mr. Sharma = ₹ $\begin{array}{r} 78000 \\ - 56980 \\ \hline 21020 \end{array}$

Money spent by Mr. Sharma = ₹ 56980

Money left with him = ₹ 21020



So, Mr. Sharma has left with ₹ 21,020

Example 2 : The sum of two numbers is 75642. If one of the number is 37465, find the other number.

Solution : Sum of two numbers = $\begin{array}{r} 75642 \\ - 37465 \\ \hline 38177 \end{array}$

One number = 37465

Other number = 38177



So, the other number is 38,177

Example 3 : The price of a desktop is ₹ 25,540 and that of a laptop is ₹ 32,250. Which costs more and by how much?



Solution : The price of a desktop = ₹ 25,540

The price of a laptop = ₹ 32,250

Clearly, $32,250 > 25,540$.

∴ The laptop costs more than the desktop.

Difference in their prices

$$= ₹(32250 - 25,540) = ₹ \begin{array}{r} 11\ 12 \\ 3\ 2\ 2\ 5\ 0 \end{array}$$

$$= - ₹ \begin{array}{r} 2\ 5\ 5\ 4\ 0 \end{array}$$

$$= ₹ 6710$$

$$\begin{array}{r} ₹\ 0\ 6\ 7\ 1\ 0 \end{array}$$

∴ The laptop costs more than desktop by ₹ 6710.



Framing Word Problems

Example 4 : Frame the word problems for the following subtraction facts:

(a) $5649 - 2899 = 2750$

(b) $9000 - 4000 = 5000$

Solution : (a) Rakhi's mother gave her ₹ 5649. She spent ₹ 2899. How much money is left with her?

(b) Mr. Kush have to travel 9000 km. He covered 4000 km. How much distance he has to travel now?



Think Wisely

Out of 32708 voters on the list, only 27269 voters voted. _____ voters did not participate in the election.

Exercise 4.3

Solve the following word problems:

1. Mr. Bansal earns ₹ 9,86,700 per year. He spends ₹ 58,800. How much money did he save?
2. There are 9872 passengers in a train. 4895 of them got down at one station. How many passengers are left in the train?





- $3876 - 2894 = 982$
- $76459 - 50806 = 25653$
- $28965 - 10432 = 18533$
- $5000 - 2000 = 3000$
- $40205 - 20200 = 20005$



A. Tick the correct answers:

- 52



B. Fill in the blanks:

1. The difference between the smallest 5-digit number and the largest 4-digit number is _____
2. $45521 - \underline{\hspace{2cm}} = 45421$

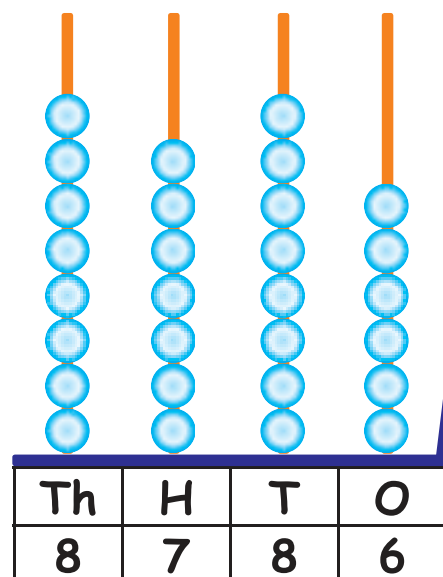


Materials required: Spike abacus with 4 spikes and four different coloured beads (many beads of each colour)

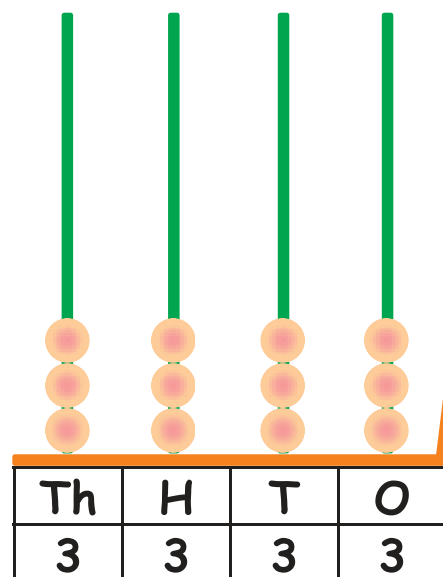
Steps:

1. This activity will be done in groups of 7 to 8 children.
2. Each group will be given a spike abacus and many different coloured beads.
3. The teacher will write a subtraction sum on the blackboard.

For Example: $8786 - 5453$. The student will put the beads as per the first number, i.e. 8786 on the abacus.

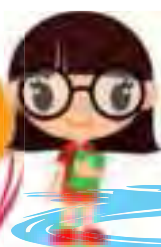


4. Then, another student will remove the beads from those on the abacus as per the second numbers, i.e. 5453. So, the number of beads left is 3333.
5. The result will be noted be $8786 - 5453 = 3333$.
6. All the beads will then be removed.
7. The teacher will write on the blackboard 5453 and 3333 and ask the children to add to find out if subtraction is correct or not.
8. The student will put the beads on the abacus as per the first number which is 5453.
9. Another student will add more beads as per the second number which is 3333.
10. The result will be noted as $5453 + 3333 = 8786$.
11. The subtraction sum is thus verified.



More such problems will be given and solved.





Multiplication



Learning Objectives

By the end of this lesson, students will be able to:

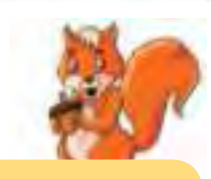
- Apply properties of multiplication.
- Know how to multiply numbers with more than two digits and different numbers of digits.
- Frame story sums based on multiplication.



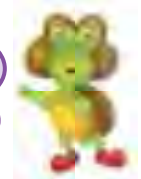
Warm-Up

I have 5 boxes. If I put 25 apples in each box, how many apples do I have? _____





In class III, we have learnt the multiplication of a given number by a number consisting upto two digits.



Now, we will extend the multiplication of a given number by a number consisting upto 3-digits.



The number to be multiplied is called **multiplicand**.

The number by which we multiply is called **multiplier**.

The result obtained after the multiplication is called **product**.

Let us first learn some of the properties of multiplication.



Properties of Multiplication

1. **Multiplication Property of Zero:**

The product of a number by zero is always zero.

For example,

$$0 \times 0 = 0$$

$$73 \times 0 = 0$$

$$279 \times 0 = 0$$

$$7642 \times 0 = 0$$



2. Multiplication Property of One:

The product of a number by 1 is the number itself.

For example,

$$28 \times 1 = 28$$

$$173 \times 1 = 173$$

$$2867 \times 1 = 2867$$



3. Ordering Property of Multiplication (Commutative Property):

The product of the two numbers does not change even if we change the order of the numbers.

For example,

$$2 \times 76 = 76 \times 2 = 152$$

$$28 \times 42 = 42 \times 28 = 1176$$

4. Grouping Property of Multiplication (Associative Property):

The product of the numbers does not change even if we change the groupings.

For example,

$$(2 \times 5) \times 8 = 2 \times (5 \times 8)$$

$$10 \times 8 = 2 \times 40$$

$$80 = 80$$

$$\text{So, } (2 \times 5) \times 8 = 2 \times (5 \times 8)$$



5. Distributive Property of Multiplication over Addition:

This property is used for multiplying large numbers.

According to this property, the product of a sum of two or more numbers and a given number is equal to the sum of the individual products of the numbers forming the sum and the given number.

For example,

$$2 \times (5 + 6) = (2 \times 5) + (2 \times 6)$$

$$2 \times 11 = 10 + 12$$

$$22 = 22$$

$$\text{So, } 2 \times (5 + 6) = (2 \times 5) + (2 \times 6)$$



Teacher's Note:

Ask the students to multiply their birthdate by the sum of their teacher's and their partner's birthdates.





Multiplication by 10, 100, 1000 etc.

1. To multiply a given number by 10, insert one zero to the right of the given number.

For example:

$$425 \times 10 = 4250$$

2. To multiply a given number by 100, insert two zeros to the right of the given number.

For example,

$$7642 \times 100 = 764200$$

3. To multiply a given number by 1000, insert three zeros to the right of the given number.

For example,

$$1784 \times 1000 = 1784000$$



Multiplication by 20, 30,...90

In order to multiply a number by 20, 30, ... 90, first multiply the number by 2, 3, ...9 and then insert one zero to the right of the product.

For example,

$$\begin{aligned} &764 \times 30 \\ &= (764 \times 3) \times 10 \\ &= 2292 \times 10 \\ &= 22920 \end{aligned}$$



Multiplication by 200, 300,...900

In order to multiply a number by 200, 300,...900, first multiply the number by 2,3,...9 and then insert two zeros to the right of the product.

For example,

$$\begin{aligned} &285 \times 500 \\ &= (285 \times 5) \times 100 \\ &= 1425 \times 100 \\ &= 142500 \end{aligned}$$





Multiplication by 2000, 3000,...9000

In order to multiply a number by 2000, 3000, ...9000, first multiply the number by 2,3,...9, and then insert three zeros to the right of the product.

For example,

$$\begin{aligned} & 2865 \times 4000 \\ &= (2865 \times 4) \times 1000 \\ &= 11460 \times 1000 \\ &= 11460000 \end{aligned}$$

Solved Examples

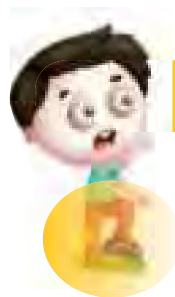
Example 1 :

Use suitable grouping to find the following products:

- (a) $4 \times 16 \times 25$
- (b) $5 \times 86 \times 20$

Solution :

- (a) $4 \times 16 \times 25$
 $= (4 \times 25) \times 16$
 $= 100 \times 16$
 $= 1600$
- (b) $5 \times 86 \times 20$
 $= (5 \times 20) \times 86$
 $= 100 \times 86$
 $= 8600$



Quick Tip

Every multiplication has a twin, which may be easier to remember. For example, if you forget 15×11 , you might remember $11 \times 15 = 165$

Example 2 :

Find the products of the following:

- (a) 29×90
- (b) 73×800
- (c) 285×6000
- (d) 732×7000





Solution :

- (a) 29×90
 $= (29 \times 9) \times 10$
 $= 261 \times 10$
 $= 2610$
- (b) 73×800
 $= (73 \times 8) \times 100$
 $= 584 \times 100$
 $= 58400$
- (c) 285×6000
 $= (285 \times 6) \times 1000$
 $= 1710 \times 1000$
 $= 1710000$
- (d) 732×7000
 $= (732 \times 7) \times 1000$
 $= 5124 \times 1000$
 $= 5124000$



Exercise 5.1

1. Fill in the blanks:

- (a) $289 \times \dots\dots\dots = 0$
- (b) $\dots\dots\dots \times 742 = 0$
- (c) $7642 \times 0 = \dots\dots\dots$
- (d) $130 \times \dots\dots\dots = 130$
- (e) $2865 \times 1 = \dots\dots\dots$
- (f) $136 \times 245 = \dots\dots\dots \times 136$
- (g) $\dots\dots\dots \times 7469 = 9969 \times 7469$
- (h) $289 \times (742 \times 365) = (\dots\dots\dots \times 742) \times 365$
- (i) $(\dots\dots\dots \times 283) \times 542 = 340 \times (283 \times 542)$



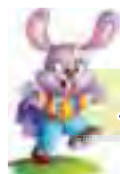
- (j) $17 \times (83 + 26) = (17 \times \dots) + (17 \times 26)$
 (k) $\dots \times (42 + 53) = (12 \times 42) + (12 \times 53)$
 (l) $9 \times (16 + \dots) = (9 \times 16) + (9 \times 29)$
 (m) $429 \times 10 = \dots$
 (n) $\dots \times 100 = 386500$
 (o) $295 \times \dots = 295000$

2. Use suitable grouping to find the products of the following:

- (a) $2 \times 465 \times 50$ (b) $5 \times 289 \times 20$
 (c) $4 \times 125 \times 386$ (d) $25 \times 189 \times 4$
 (e) $500 \times 1296 \times 2$

3. Find the products of the following:

- (a) 85×20 (b) 649×40
 (c) 273×70 (d) 322×800
 (e) 504×9000 (f) 2815×6000



Multiplication By 3-Digit Numbers

Solved Examples

Example 1 : Multiply 412 by 279

Solution :

4 1 2	
× 2 7 9	
3 7 0 8	← (412 × 9)
2 8 8 4 0	← (412 × 70)
+ 8 2 4 0 0	← (412 × 200)
1 1 4 9 4 8	

$$\therefore 412 \times 279 = 114948$$

Another Method:

$$\text{We have, } 279 = 200 + 70 + 9$$

$$\text{So, } 412 \times 279 = 412 \times (200 + 70 + 9)$$





$$\begin{aligned}
 &= 412 \times 200 + 412 \times 70 + 412 \times 9 \\
 &= 82400 + 28840 + 3708 \\
 &= 114948
 \end{aligned}$$

Example 2 : Multiply 2467 by 124

Solution :

2 4 6 7	
× 1 2 4	
9 8 6 8	← (2467 × 4)
4 9 3 4 0	← (2467 × 20)
+ 2 4 6 7 0 0	← (2467 × 100)
3 0 5 9 0 8	

$$\therefore 2467 \times 124 = 305908$$

Another Method:

$$\text{We have, } 124 = 100 + 20 + 4$$

$$\begin{aligned}
 \text{So, } 2467 \times 124 &= 2467 \times (100 + 20 + 4) \\
 &= 2467 \times 100 + 2467 \times 20 + 2467 \times 4 \\
 &= 246700 + 49340 + 9868 \\
 &= 305908
 \end{aligned}$$



Exercise 5.2

1. Multiply:

(a)

2 6 9
× 8 4 2

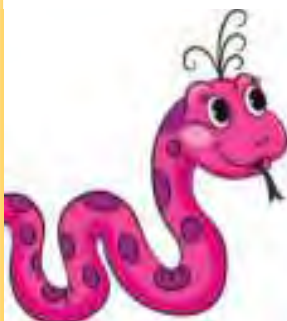
(b)

5 4 2
× 2 0 9



(c)

$$\begin{array}{r} 3865 \\ \times 428 \\ \hline \\ \hline \end{array}$$



(d)

$$\begin{array}{r} 7642 \\ \times 356 \\ \hline \\ \hline \end{array}$$

(e)

$$\begin{array}{r} 846 \\ \times 594 \\ \hline \\ \hline \end{array}$$



(f)

$$\begin{array}{r} 240 \\ \times 153 \\ \hline \\ \hline \end{array}$$

(g)

$$\begin{array}{r} 5629 \\ \times 302 \\ \hline \\ \hline \end{array}$$

(h)

$$\begin{array}{r} 7642 \\ \times 972 \\ \hline \\ \hline \end{array}$$

2. Find the products of the following:

- (a) 365 by 349
- (b) 286 by 985
- (c) 2764 by 128
- (d) 9856 by 382
- (e) 3642 by 165
- (f) 1729 by 315
- (g) 5422 by 972
- (h) 5708 by 708



Facts to Know

The oldest known multiplication tables were used by the Babylonians about 4000 years ago.



Word Problems

Example 1 : There are 545 mango trees in an orchard. Each mango tree has 295 mangoes. How many mangoes are there in the orchard?

Solution : Number of mango trees = 545
 Number of mangoes on each tree = 295
 Total number of mangoes in orchard = 545×295

$$\begin{array}{r}
 545 \\
 \times 295 \\
 \hline
 2725 \\
 49050 \\
 + 109000 \\
 \hline
 160775
 \end{array}$$



So, there are 1,60,775 mangoes in the orchard.

Example 2 : A man purchased a calculator costing ₹ 245. What will be the cost of 2045 such calculators?

Solution : Number of calculators = 2045
 Cost of 1 calculator = ₹ 245
 Cost of 2045 calculators = ₹ (2045×245)

$$\begin{array}{r}
 2045 \\
 \times 245 \\
 \hline
 10225 \\
 81800 \\
 + 409000 \\
 \hline
 501025
 \end{array}$$



So, the cost of 2045 calculators is ₹ 5,01,025



Example 3 : An iron costs ₹ 1245. How much will 140 irons cost?

Solution : Cost of an iron = ₹ 1245

Cost of 140 irons = ₹ (1245 × 140)

	1	2	4	5	
	×	1	4	0	
	0	0	0	0	
	4	9	8	0	0
+	1	2	4	5	0
	1	7	4	3	0



Hence, the cost of 140 irons is ₹ 174300.

Framing Word Problems

Example 4 : Frame the word problems for the following multiplication facts:

(a) $285 \times 172 = 49020$

(b) $3892 \times 246 = 957432$

Solution : (a) A man purchased a box of chocolate costing ₹ 285. What is the cost of 172 such chocolate boxes?

(b) There are 3892 balls in a packet. How many balls are there in 246 such packets?



Think Wisely

What is 'S' if $6 \times 4 = 3 \times S$?

Exercise 5.3

Solve the following word problems:

1. Mr. Gupta earns ₹ 9000 per month. How much will he earn in 112 months?
2. A book shelf contains 542 books. How many books will be there in 246 such book shelves?





3. The cost of a refrigerator is ₹ 7842. What is the cost of 286 such refrigerators?
4. A train carries 2869 passengers in a day. How many passengers will it carry in a year?
Hint: Take 1 year = 365 days
5. A packet contains 3640 marbles. How many marbles are there in 450 such packets?
6. The cost of washing machine is ₹ 5439. Find the cost of 124 such washing machines?
7. The cost of a tablet is ₹ 17,511. Find the cost of 236 such tablets.
8. **Frame the word problems for the following multiplication facts:**
(a) $234 \times 765 = 179010$
(b) $986 \times 205 = 202130$
9. Multiply the largest 4-digit number by the largest 3-digit number.



Mental Maths

Answer the following:

1. What is the product of all the numbers in the dial of a telephone?

2. $(91 \times 101) \times 1,321 = 91 \times (\text{_____} \times 1,321)$
3. How many minutes are there in the month of May? _____
4. Find the cost of 175 transistors if each transistor costs 500? _____





Materials required: Cards with multiplication sentences written on it.

Steps:

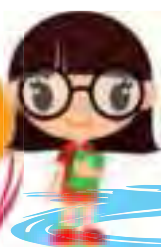
1. The teacher will write multiplication sentences on the cards.
2. One student from each pair will select one card randomly.
3. Let's say one pair has selected 48×36 .
4. One student will solve it on the board as follows:

$$\begin{array}{r} 48 \\ \times 36 \\ \hline 288 \\ 1440 \\ \hline 1728 \end{array}$$

5. While the other student of that pair will solve it as 36×48 in the notebook.
6. Accuracy and speed will be taken into account to award points to each student.



6



Division



Learning Objectives

By the end of this lesson, students will be able to:

- Determine that division is dividing objects into equal groups.
- Divide up to 4- digit numbers.
- Apply the properties of division to solve story sums.
- Check the answer of division.



Warm-Up

Division means equal distribution or equal sharing of things.

If 45 chocolates are shared among 5 children,
So how many chocolates will each child get?



Facts to Know

The division sign which we use was introduced by the Swiss mathematician, Johann Heinrich Rahn, in his work Teutsche Algebra (1659).





Division is the inverse or an opposite operation of multiplication.



The number which is to be divided is called **dividend**.



The number by which division is to be done is called **divisor**.

The number (or answer) obtained after carrying out the division is called **quotient**.

The number left in the end after the process of division which cannot be further divided is called **remainder**.

Lets first learn some of the properties of division.



Properties of Division

1. If a number is divided by 1, then the quotient is the number itself.

For example,

$$24 \div 1 = 24$$



2. If a non zero number is divided by itself, then the quotient is 1.

For example,

$$746 \div 746 = 1$$



3. If a zero is divided by a non-zero number, then the quotient is zero

For example,

$$0 \div 243 = 0$$

4. If a non-zero number is divided by zero, then it has no meaning.

For example,

$$249 \div 0 = \text{No meaning}$$



**Teacher's
Note:**

Ask the students to divide the total number of Sundays in their summer vacation by the sum of the current year, which is [2024]. Instruct them to write the remainder and quotient as well.

Exercise 6.1

1. Fill in the blanks:

(a) $276 \div \dots = 276$

(b) $149 \div 1 = \dots$

(c) $462 \div \dots = 1$

(d) $296 \div 296 = \dots$

(e) $\dots \div 279 = 0$

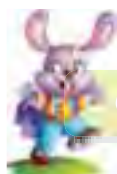
(f) $0 \div 186 = \dots$

(g) $\dots \div 1 = 580$

(h) $\dots \div 143 = 1$

(i) If a non-zero number is divided by itself, then the quotient is $\dots$.

(j) If a zero is divided by a non-zero number, then the quotient is $\dots$.



Division By 2-Digit And 3-Digit Numbers

Checking Division

$$\text{Dividend} = (\text{Divisor} \times \text{Quotient}) + \text{Remainder}$$



Quick Tip

Remainder is always less than the divisor.

Solved Examples

Example 1 : Divide 226 by 12 and also check the answer.

Solution :

Step 1 : As divisor is 2-digit number, take first two digits of dividend that is 22.

$$22 > 12$$

$$\text{Now, } 12 \times 1 = 12 \text{ and } 12 \times 2 = 24$$

$$\text{Since, } 12 < 22 \text{ and } 24 > 22.$$

Thus, 12 goes into 22, 1 time.

Write 1 in quotient

Subtract 12 from 22 to get 10.

Bring down 6 to make 106.

Step 2 : Now, $12 \times 8 = 96$ and $12 \times 9 = 108$

$$\text{Since, } 96 < 106 \text{ and } 108 > 106$$

Thus, 12 goes into 106, 8 times.

Write 8 in quotient

Subtract 96 from 106 to get 10, as remainder.

$$\therefore \text{ Quotient} = 18$$

$$\text{Remainder} = 10$$

$$\begin{array}{r} 18 \\ 12 \overline{) 226} \\ \underline{- 12} \\ 106 \\ \underline{- 96} \\ 10 \end{array}$$



CHECK

$$\begin{aligned} \text{Dividend} &= (\text{Divisor} \times \text{Quotient}) + \text{Remainder} \\ &= (12 \times 18) + 10 \\ &= 216 + 10 \\ &= 226 \end{aligned}$$

Thus, answer is verified.

$$\begin{array}{r} 12 \\ \times 18 \\ \hline 96 \\ 120 \\ \hline 216 \\ + 10 \\ \hline 226 \end{array}$$

← Divisor
← Quotient
← Remainder
← Dividend





Example 2 : Divide 6842 by 29 and also check the answer.

Solution :

Step 1 : As divisor is 2-digit number, take first two digits of dividend that is 68.

$$68 > 29$$

Now, $29 \times 2 = 58$ and $29 \times 3 = 87$

Since, $58 < 68$ and $87 > 68$

Thus, 29 goes into 68, 2 times.

Write 2 in quotient

Subtract 58 from 68 to get 10.

Bring down 4 to make 104.

Step 2 : Now, $29 \times 3 = 87$ and $29 \times 4 = 116$

Since $87 < 104$ and $116 > 104$

Thus, 29 goes into 104, 3 times.

Subtract 87 from 104 to get 17.

Bring down 2 to make 172.

Step 3 : Now, $29 \times 5 = 145$ and $29 \times 6 = 174$

Since, $145 < 172$ and $174 > 172$

Thus, 29 goes into 145, 5 times.

Write 5 in quotient

Subtract 145 from 172 to get 27, as remainder.

Quotient = 235

Remainder = 27

$$\begin{array}{r} 235 \\ 29 \overline{) 6842} \\ \underline{- 58} \\ 104 \\ \underline{- 87} \\ 172 \\ \underline{- 145} \\ 27 \end{array}$$



CHECK

$$\begin{aligned} \text{Dividend} &= (\text{Divisor} \times \text{Quotient}) + \text{Remainder} \\ &= (29 \times 235) + 27 \\ &= 6815 + 27 \\ &= 6842 \end{aligned}$$

Thus, answer is verified.

$$\begin{array}{r} 235 \leftarrow \text{Quotient} \\ \times 29 \leftarrow \text{Divisor} \\ \hline 2115 \\ 4700 \\ \hline 6815 \\ + 27 \leftarrow \text{Remainder} \\ \hline 6842 \leftarrow \text{Dividend} \end{array}$$



Example 3 : Divide 1742 by 43 and also check the answer.

Solution :

Step 1 : As divisor is 2-digit number take first two digit of dividend that is 17.
 $17 < 43$, so take next digit 4.

$$174 > 43$$

Now we divide

$$\text{Now, } 43 \times 4 = 172$$

$$\text{and } 43 \times 5 = 215$$

Since, $172 < 174$ and $215 > 174$.

Thus 43 goes into 174, 4 times.

Write 4 in quotient

Subtract 172 from 174 to get 2

Bring down 2 to make 22.

Step 2 : Since, $22 < 43$
which cannot be further divided, write 0 in quotient.
Subtract 0 from 22 to get 22 as remainder.

$$\text{Quotient} = 40$$

$$\text{Remainder} = 22$$

$$\begin{array}{r} 40 \\ 43 \overline{) 1742} \\ \underline{-172} \\ 22 \\ \underline{-00} \\ 22 \end{array}$$



CHECK

$$\begin{aligned} \text{Dividend} &= (\text{Divisor} \times \text{Quotient}) + \text{Remainder} \\ &= (43 \times 40) + 22 \\ &= 1720 + 22 \\ &= 1742 \end{aligned}$$

Thus, answer is verified.

$$\begin{array}{r} 43 \\ \times 40 \\ \hline 00 \\ 1720 \\ \hline 1720 \\ + 22 \\ \hline 1742 \end{array}$$

← Divisor
← Quotient
← Remainder
← Dividend

Example 4 : Divide 2865 by 102 and also check the answer.

Solution :

Step 1 : As divisor has 3-digits take first three digits of the dividend *i.e.* 286

$$286 > 102$$

$$\text{Now, } 102 \times 2 = 204 \text{ and } 102 \times 3 = 306$$





Since, $204 < 286$ and $306 > 286$

Thus, 102 goes into 286, 2 times.

Write 2 in quotient

Subtract 204 from 284 to get 82.

Bring down 5 to make 825

Step 2: Now, $102 \times 8 = 816$ and $102 \times 9 = 918$

Since, $816 < 825$ and $918 > 825$

Thus, 102 goes into 825, 8 times.

Write 8 in quotient

Subtract 816 from 825 to get 9 as remainder.

Quotient = 28

Remainder = 9

$$\begin{array}{r} 28 \\ 102 \overline{) 2865} \\ \underline{-204} \\ 825 \\ \underline{-816} \\ 9 \end{array}$$

CHECK

$$\begin{aligned} \text{Dividend} &= (\text{Divisor} \times \text{Quotient}) + \text{Remainder} \\ &= (102 \times 28) + 9 \\ &= 2856 + 9 \\ &= 2865 \end{aligned}$$

Thus, answer is verified.

$$\begin{array}{r} 102 \\ \times 28 \\ \hline 816 \\ + 2040 \\ \hline 2856 \\ + 9 \\ \hline 2865 \end{array}$$

← Divisor
← Quotient
← Remainder
← Dividend

Example 5 : Divide 78465 by 192 and also check the answer.

Solution :

Step 1: The divisor has 3-digits, so we take first 3-digits of the dividend, *i.e.* 784

$784 > 192$

Now, $192 \times 4 = 768$ and $192 \times 5 = 960$

Since, $768 < 784$ and $960 > 784$

Thus 192 goes into 784, 4 times.

Write 4 in quotient

Subtract 768 from 784 to get 16.

Bring down 6 to make 166.

$$\begin{array}{r} 408 \\ 192 \overline{) 78465} \\ \underline{-768} \\ 1665 \\ \underline{-1536} \\ 129 \end{array}$$



Step 2: Now, $166 < 192$

So, put 0 in the quotient and bring down 5 to make 1665

Step 3: Now, $192 \times 8 = 1536$ and $192 \times 9 = 1728$

Since, $1536 < 1665$ and $1728 > 1665$

Thus, 192 goes into 1665, 8 times.

Write 8 in quotient

Subtract 1536 from 1665, to get 129, as remainder.

$\therefore$ Quotient = 408

Remainder = 129

CHECK

$$\begin{aligned}\text{Dividend} &= (\text{Divisor} \times \text{Quotient}) + \text{Remainder} \\ &= (192 \times 408) + 129 \\ &= 78336 + 129 \\ &= 78465\end{aligned}$$

Thus, answer is verified.

192	← Divisor
× 408	← Quotient
1536	
0000	
+ 76800	
78336	
+ 129	← Remainder
78465	← Dividend

Exercise 6.2

1. Divide and also check the answer:

(a) 342 by 12

(b) 862 by 94

(c) 1746 by 15

(d) 2862 by 43

(e) 38645 by 82

(f) 27440 by 95

2. Find the quotient and remainder. Also verify the answers:

(a) 1896 by 146

(b) 7042 by 459

(c) 3895 by 109

(d) 98645 by 729

(e) 92095 by 502

(f) 76405 by 812

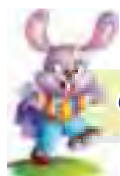


3. Find the quotient and remainder, when:

- (a) Dividend = 4659, Divisor = 52
- (b) Dividend = 98640, Divisor = 129

4. Find the dividend, when:

- (a) Quotient = 145, Divisor = 42, Remainder = 0
- (b) Quotient = 29, Divisor = 15, Remainder = 12
- (c) Quotient = 231, Divisor = 56, Remainder = 102



Division By 10, 100 and 1000

1. If the divisor is 10, then the last digit (or ones place digit) of the dividend is the remainder and the number formed by the remaining digits of the dividend is the quotient.

Examples : If $63 \div 10$, then Quotient = 6, Remainder = 3

If $20 \div 10$, then Quotient = 2, Remainder = 0

If $149 \div 10$, then Quotient = 14, Remainder = 9

If $2842 \div 10$, then Quotient = 284, Remainder = 2

If $4000 \div 10$, then Quotient = 400, Remainder = 0

2. If the divisor is 100, then the last two digits (ones and tens place digits) of the dividend is the remainder and the number formed by the remaining digits of the dividend is the quotient.

Examples : If $986 \div 100$, then Quotient = 9, Remainder = 86

If $700 \div 100$, then Quotient = 7, Remainder = 0

If $2859 \div 100$, then Quotient = 28, Remainder = 59

If $8302 \div 100$, then Quotient = 83, Remainder = 2

If $76429 \div 100$, then Quotient = 764, Remainder = 29

3. If the divisor is 1000, then the last three digits (ones, tens and hundreds place digits) of the dividend is the remainder and the number formed by the remaining digits of the dividend is the quotient.

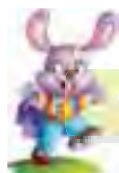


Examples : If $2853 \div 1000$, then Quotient = 2, Remainder = 853
 If $2000 \div 1000$, then Quotient = 2, Remainder = 0
 If $7640 \div 1000$, then Quotient = 7, Remainder = 640
 If $53429 \div 1000$, then Quotient = 53, Remainder = 429
 If $82058 \div 1000$, then Quotient = 82, Remainder = 58

Exercise 6.3

1. Find the quotient and remainder:

- | | |
|-----------------------|------------------------|
| (a) $245 \div 10$ | (b) $740 \div 10$ |
| (c) $500 \div 10$ | (d) $7865 \div 10$ |
| (e) $342 \div 100$ | (f) $800 \div 100$ |
| (g) $2709 \div 100$ | (h) $39025 \div 100$ |
| (i) $7642 \div 1000$ | (j) $9000 \div 1000$ |
| (k) $83429 \div 1000$ | (l) $102465 \div 1000$ |



Word Problems

Example 1 : 2865 chocolates have to be packed in 12 boxes. Each box contains equal number of chocolates. How many chocolates will be there in each box? How many chocolates are left unpacked?

Solution : Number of chocolates to be packed = 2865
 Number of boxes = 12
 Number of chocolates in each box = $2865 \div 12$
 $\therefore$ Quotient = 238
 Remainder = 9



Thus, there will be 238 chocolates in each box and 9 chocolates are left unpacked.

$$\begin{array}{r}
 238 \\
 12 \overline{) 2865} \\
 \underline{- 24} \\
 46 \\
 \underline{- 36} \\
 105 \\
 \underline{- 96} \\
 9
 \end{array}$$



Example 2 : There are 7342 birds brought in a zoo. If there are 120 cages and each cage has equal number of birds, then how many birds are there in each cage? How many birds are left?

Solution : Number of birds brought in a zoo = 7342
 Number of cages in a zoo = 120
 Number of birds in each cage = $7342 \div 120$
 $\therefore$ Quotient = 61
 Remainder = 22

$$\begin{array}{r} 61 \\ 120 \overline{) 7342} \\ \underline{- 720} \\ 142 \\ \underline{- 120} \\ 22 \end{array}$$

Thus, there are 61 birds in each cage and 22 birds are left.

Example 3 : The product of two numbers is 1092. If one number is 26, find the other number.

Solution : Product of two numbers = 1092
 One number = 26
 Other number = $1092 \div 26$
 $\therefore$ Quotient = 42
 Remainder = 0

Thus, the other number is 42.

Framing Word Problems

Example 4 : Frame the word problems for the following division facts:

- (a) $7465 \div 20$ (b) $38426 \div 172$

Solution: (a) There are 7465 sweets is to be distributed among 20 children. Each children will get equal number of sweets. How many sweets will each child get and how many sweets left?
 (b) If there are 38426 chairs to be kept in 142 rows and each row has equal number of chairs, then how many chairs will be kept in each row? How many chairs are left?



Exercise 6.4

Solve the following word problems:

1. 3086 marbles were packed equally in 56 boxes. How many marbles were packed in each box? How many marbles were remain unpacked?
2. If the cost of 98 irons is ₹ 75,362, then what is the cost of each iron?
3. The product of two numbers is 1288. If one number is 23, find the other number.
4. A train covers 37440 km in 48 hours. How much distance does it cover in 1 hour?
5. 86429 mangoes were packed equally in 126 boxes. How many mangoes were packed in each box? How many mangoes were remain unpacked?
6. If the cost of 86 notebooks is ₹ 2236, what is the cost of each notebook?
7. 37392 pens were packed equally in 82 boxes. How many pens were packed in each box?
8. Frame the word problems for the following division facts:
 - (a) $7642 \div 29$
 - (b) $346 \div 14$
 - (c) $1248 \div 122$
 - (d) $76925 \div 543$
 - (e) $3845 \div 162$
 - (f) $5062 \div 149$



Simplification Involving Fundamental Operations

As we know, there are four
fundamental operations:
Addition, Subtraction,
Multiplication and Division.



Sometimes, a problem may contain more than one operation at a time. In such cases, we have to use all the fundamental operations together. To solve such problems, we follow **DMAS Rule**.

DMAS stands for:

D for Division

M for Multiplication

A for Addition

S for Subtraction

Solved Examples

Example 1 : Simplify the following:

- (a) $16 \times 5 + 2$
- (b) $12 \div 2 \times 6 + 5 - 3$
- (c) $92 + 5 \times 2 - 4 \div 2$
- (d) $7629 + 8435 \div 5 \times 3 - 80$

Solution : (a) $16 \times 5 + 2$

$$= 80 + 2$$

$$= 82$$

(Multiplication, $16 \times 5 = 80$)

(Addition, $80 + 2 = 82$)

- (b) $12 \div 2 \times 6 + 5 - 3$

$$= 6 \times 6 + 5 - 3$$

$$= 36 + 5 - 3$$

$$= 41 - 3$$

$$= 38$$

(Division, $12 \div 2 = 6$)

(Multiplication, $6 \times 6 = 36$)

(Addition, $36 + 5 = 41$)

(Subtraction, $41 - 3 = 38$)

- (c) $92 + 5 \times 2 - 4 \div 2$

$$= 92 + 5 \times 2 - 2$$

$$= 92 + 10 - 2$$

$$= 102 - 2$$

$$= 100$$

(Division, $4 \div 2 = 2$)

(Multiplication, $5 \times 2 = 10$)

(Addition, $92 + 10 = 102$)

(Subtraction, $102 - 2 = 100$)



$$\begin{aligned}
 (d) \quad & 7629 + 8435 \div 5 \times 3 - 80 \\
 & = 7629 + 1687 \times 3 - 80 \quad (\text{Division, } 8435 \div 5 = 1687) \\
 & = 7629 + 5061 - 80 \quad (\text{Multiplication, } 1687 \times 3 = 5061) \\
 & = 12690 - 80 \quad (\text{Addition, } 7629 + 5061 = 12690) \\
 & = 12610 \quad (\text{Subtraction, } 12690 - 80 = 12610)
 \end{aligned}$$

Example 2 : Fill the boxes with appropriate symbols:

(a) $24 \quad \square \quad 3 = 8 \quad \square \quad 1 = 9 \quad \square \quad 3 = 27 \quad \square \quad 5 = 22$

(b) $16 \quad \square \quad 2 = 32 \quad \square \quad 8 = 4 \quad \square \quad 2 = 6 \quad \square \quad 2 = 4$

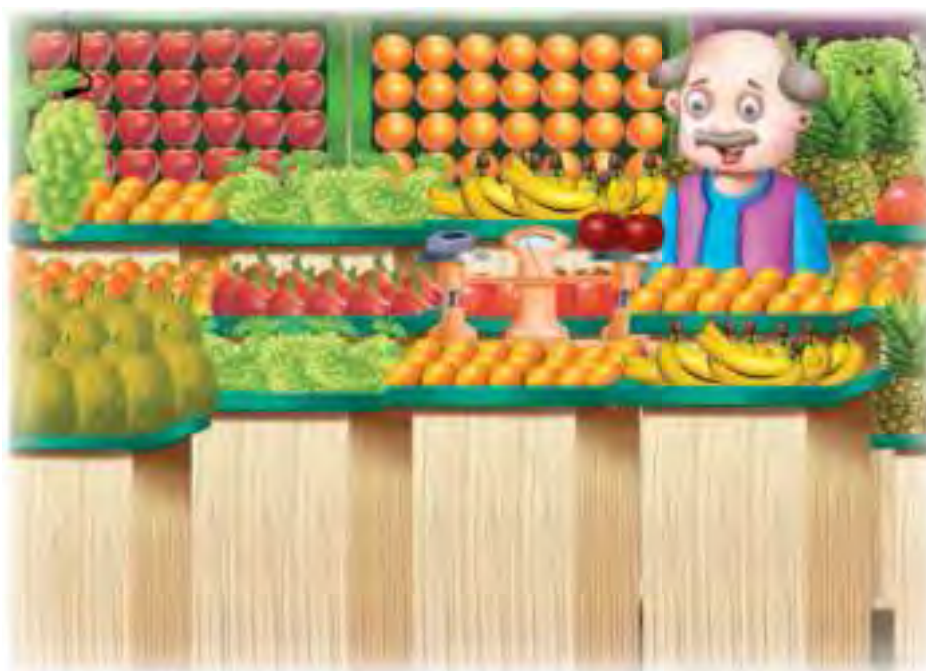
Solution : (a) $24 \quad \div \quad 3 = 8 \quad + \quad 1 = 9 \quad \times \quad 3 = 27 \quad - \quad 5 = 22$

(b) $16 \quad \times \quad 2 = 32 \quad \div \quad 8 = 4 \quad + \quad 2 = 6 \quad - \quad 2 = 4$



Think Wisely

Mr. John owns a neighbourhood grocery store. He has 56 oranges to arrange in rows for his window display. He has 4 rows in her window. How many oranges will there be in each row if he puts the same number in each row?





Exercise 6.5

1. Simplify the following:

- (a) $249 + 6 - 4 \div 2 \times 13$
- (b) $18 \times 2 + 40 \div 4 - 6$
- (c) $7642 \times 2 - 2059 + 1400 \div 7$
- (d) $38462 + 10596 \div 2 \times 5 - 1102$
- (e) $50650 \div 5 \times 200 + 3426 - 1020$
- (f) $286 \times 12 \div 6 + 742 - 168$



2. Fill the boxes with appropriate symbols:

- (a) $12 \quad \square \quad 6 = 2 \quad \square \quad 5 = 10 \quad \square \quad 2 = 12 \quad \square \quad 3 = 9$
- (b) $5 \quad \square \quad 4 = 20 \quad \square \quad 2 = 10 \quad \square \quad 6 = 4 \quad \square \quad 3 = 7$
- (c) $3 \quad \square \quad 15 = 18 \quad \square \quad 3 = 6 \quad \square \quad 3 = 18 \quad \square \quad 2 = 16$
- (d) $20 \quad \square \quad 5 = 15 \quad \square \quad 3 = 45 \quad \square \quad 9 = 5 \quad \square \quad 5 = 10$



Mental Maths

Fill in the blanks:

- If twice of a number is 64, find the half of the number _____.
- Take away $4225/65$ from 165 _____.
- When zero is divided by a non- zero number the quotient is _____.
- When a number is divided by 1, the quotient is the _____ itself.





Materials required:

1. Two white boards with markers.
2. 2 sets of chits with digits 0 to 9 written on them.
3. A set of playing cards.

Steps:

1. This activity will be carried out by dividing the children into 2 teams.
2. Each team will have a set of chits marked 0 to 9
3. Five chits will be taken out by each team, e.g. team A: 8,0, 3,4,2 and team B: 3, 6,9,5,1
4. Now, leader of each team draws a card from the pack. Let us say 'a nine' and 'a jack' (11).
5. Team A will work with the biggest dividend formed by the five digits. Team B will work with the smallest dividend formed by the five digits.
6. Team A has the divisor 9. Team B has the divisor 11 (jack).
7. Dividing correctly gets 5 marks.





Multiples And Factors



Learning Objectives

By the end of this lesson, students will be able to:

- Explain the relationship between factors and multiples.
- Take out LCM and HCF of the numbers given.
- Know about prime and composite numbers.
- Solve problems involving factors and multiples.



Warm-Up

Study the table below and complete the rows of multiples of numbers 1-8.

X	1	2	3	4	5	6	7	8	9	10
2	2	4				12		16		
3	3				15					
4	4									
5	5								45	
6	6									
7	7	14								
8	8									





Multiples



The number obtained after the product of two given numbers is known as multiple of that numbers.

For example:

- (i) $7 \times 3 = 21$
 $\therefore 21$ is a multiple of 7 and 3.
- (ii) $5 \times 2 = 10$
 $\therefore 10$ is a multiple of 5 and 2.
- (iii) $6 \times 3 = 18$
 $\therefore 18$ is a multiple of 6 and 3.
- (iv) $9 \times 7 = 63$
 $\therefore 63$ is a multiple of 9 and 7.
- (v) $7 \times 5 = 35$
 $\therefore 35$ is a multiple of 7 and 5.



Solved Examples

Example 1 : Find the first five multiples of 2.

Solution : $2 \times 1 = 2$, $2 \times 2 = 4$, $2 \times 3 = 6$, $2 \times 4 = 8$, $2 \times 5 = 10$

Thus, 2, 4, 6, 8, 10 are the first five multiples of 2.

Example 2 : Write the multiples of 5.

Solution : 5, 10, 15, 20, 25, 30, 35, and so on.

Example 3 : Find the 8th multiple of 12.

Solution : 8th multiple of 12 = 12×8
= 96.





Example 4 : Find the 4th multiple of 8.

Solution : 4th multiple of 8 = 8×4
= 32.

Example 5 : Is 180 a multiple of 15?

Solution : Let's divide 180 by 15
Clearly, 180 is exactly divisible by 15.
Yes, 180 is a multiple of 15.

Example 6 : Is 7462 a multiple of 32?

Solution : Let's divide 7462 by 32.

$$\begin{array}{r}
 233 \\
 32 \overline{) 7462} \\
 \underline{- 64} \\
 106 \\
 \underline{- 96} \\
 102 \\
 \underline{- 96} \\
 6
 \end{array}$$



Clearly, 7462 is not exactly divisible by 32.
Thus, 7462 is not a multiple of 32.

Example 7 : Show that:

(a) 7465 is not a multiple of 23

(b) 725 is a multiple of 25.

Solution : (a) Let's divide 7465 by 23.

$$\begin{array}{r}
 324 \\
 23 \overline{) 7465} \\
 \underline{- 69} \\
 56 \\
 \underline{- 46} \\
 105 \\
 \underline{- 92} \\
 13
 \end{array}$$



Clearly, 7465 is not exactly divisible by 23.
Thus, 7465 is not a multiple of 23.

(b) Let's divide 725 by 25.

$$\begin{array}{r} 29 \\ 25 \overline{) 725} \\ \underline{- 50} \\ 225 \\ \underline{- 225} \\ 0 \end{array}$$

Clearly, 725 is exactly divisible by 25.
Thus, 725 is a multiple of 25.



Properties of Multiples

1. Every number is a multiple of 1.

Examples:

Multiples of 1 are:

1, 2, 3, 4, 98, 99, 100, 101, 1000, 1001,, so on

2. Every non-zero number has **unlimited number** of multiples.

Examples:

Multiples of 3 are:

3, 6, 9, 12, 36, 39, 102, 105,

Multiples of 10 are:

10, 20, 30, 100, 110, 1000,

3. Every non-zero number is a multiple of itself.
or, the first multiple of a number is the number itself.

Examples:

$$15 \times 1 = 15$$

So, 15 is a multiple of 15.

$$23 \times 1 = 23$$

So, 23 is a multiple of 23.



4. All the multiples of a given number are either equal to or greater than the given number.

Examples:

Multiples of 4 are: 4, 8, 12, 16, 20, 24,

Multiples of 6 are: 6, 12, 18, 24, 30, 36,



Least Common Multiple (LCM)

The smallest common multiple of two or more numbers is called **Least Common Multiple (LCM)**.

Solved Examples

Example 1 : Find the LCM of 8 and 12.

Solution : Multiples of 8: 8, 16, 24, 32, 40, 48, 56, 64, 72,

Multiples of 12: 12, 24, 36, 48, 60, 72, 84,

Common multiples of 8 and 12 are:

24, 48, 72,

$\therefore$ LCM of 8 and 12 is 24.

Example 2 : Find the LCM of 2, 3 and 4.

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

Multiples of 3: 3, 6, 9, 12, 15, 18, 21, 24, 27,

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

Common multiples of 2, 3 and 4 is 12, 24,

$\therefore$ LCM of 2, 3 and 4 is 12.

Exercise 7.1

1. Write the first 6 multiples of 9.
2. Write the first 4 multiples of 15.
3. Write the first 3 multiples of 17.



4. Write the first 7 multiples of 10.
5. Write the 4th multiple of 7.
6. Write the 8th multiple of 24.
7. Write the 10th multiple of 173.
8. Write the 2nd multiple of 459.
9. Show that 936 is a multiple of 9.
10. Show that 8643 is not a multiple of 25.
11. Is 1711 is a multiple of 29?
12. Is 44184 is a multiple of 56?
13. Is 7846 is a multiple of 15?
14. Is 83453 is a multiple of 26?
15. Find the LCM of:

(a) 4 and 6

(b) 2 and 8

(c) 6 and 12

(d) 3, 6 and 8

(e) 5, 10 and 20

(f) 6, 8 and 9



Factors

Factor is a number which exactly divides the given number, without leaving any remainder.

Solved Examples

Example 1 : Find all the factors of 24.

Solution : We have,

$$24 = 1 \times 24$$

$$24 = 2 \times 12$$

$$24 = 3 \times 8$$

$$24 = 4 \times 6$$

$\therefore$ All the factors of 24 are: 1, 2, 3, 4, 6, 8, 12, 24

Example 2 : Is 7 a factor of 420?

Solution : Let's divide 420 by 7





$$\begin{array}{r} 60 \\ 7 \overline{) 420} \\ \underline{- 42} \\ 00 \end{array}$$

Clearly, 420 is exactly divisible by 7.
 $\therefore$ 7 is a factor of 420.

Example 3 : Is 5 is a factor of 3462 ?

Solution : Let's divide 3462 by 5.

$$\begin{array}{r} 692 \\ 5 \overline{) 3462} \\ \underline{- 30} \\ 46 \\ \underline{- 45} \\ 12 \\ \underline{- 10} \\ 2 \end{array}$$

Clearly, 3462 is not exactly divisible by 5.
 $\therefore$ 5 is not a factor of 3462.

Example 4 : Show that 82 is a factor of 61992.

Solution : Let's divide 61992 by 82.

$$\begin{array}{r} 756 \\ 82 \overline{) 61992} \\ \underline{- 574} \\ 459 \\ \underline{- 410} \\ 492 \\ \underline{- 492} \\ 0 \end{array}$$

Clearly, 61992 is exactly divisible by 82.
 $\therefore$ 82 is a factor of 61992.

Example 5 : Show that 29 is not a factor 7642.

Solution : Let's divide 7642 by 29.



$$\begin{array}{r}
 263 \\
 29 \overline{) 7642} \\
 \underline{- 58} \\
 184 \\
 \underline{174} \\
 102 \\
 \underline{- 87} \\
 15
 \end{array}$$



Clearly, 7642 is not exactly divisible by 29.
 $\therefore$ 29 is not a factor of 7642.



Properties of Factors

1. 1 is a smallest factor of every number.

Examples:

48 is divisible by 1

59 is divisible by 1

Thus, it is clear that 1 is a smallest factor of every number.

2. Every non-zero number has limited number of factors.

Examples:

Factors of 8 are: 1, 2, 4, 8

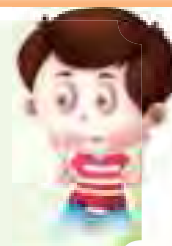
Factors of 15 are: 1, 3, 5, 15

3. Every non-zero number is a largest factor of itself.

Examples:

Largest factor of 8 is 8

Largest factor of 15 is 15



4. All the factors of a given number are either less than or equal to the given number.

Examples:

Factors of 12 are: 1, 2, 3, 4, 6, 12

Factors of 18 are: 1, 2, 3, 6, 9, 18





Highest Common Factor (HCF)

The highest number (or factor) which divides two or more numbers exactly is called **Highest Common Factor (HCF)**.

HCF is also known as **GCD (Greatest Common Divisor)**.

Solved Examples

Example 1 : Find the HCF of 12 and 18.

Solution : $12 = 1 \times 12$

$$12 = 2 \times 6$$

$$12 = 3 \times 4$$

$\therefore$ Factors of 12 are: 1, 2, 3, 4, 6, 12.

$$18 = 1 \times 18$$

$$18 = 2 \times 9$$

$$18 = 3 \times 6$$

$\therefore$ Factors of 18 are: 1, 2, 3, 6, 9, 18.

$\therefore$ Common factors of 12 and 18 are: 1, 2, 3, 6.

Thus, HCF of 12 and 18 is 6.

Example 2 : Find the HCF of 4 and 5.

Solution : $4 = 1 \times 4$

$$4 = 2 \times 2$$

$\therefore$ Factors of 4 are: 1, 2, 4.

$$5 = 1 \times 5$$

$\therefore$ Factors of 5 are: 1, 5.

$\therefore$ Common factors of 4 and 5 is 1

Thus, HCF of 4 and 5 is 1.



Exercise 7.2

1. Is 8 a factor of 648 ?
2. Is 11 a factor of 121 ?
3. Is 3 a factor of 1762 ?
4. Is 12 a factor of 946 ?
5. Find all the factors of:
(a) 63 (b) 49
(c) 72 (d) 24
6. Show that 14 is a factor of 448.
7. Show that 12 is not a factor of 129.
8. Show that 10 is a factor of 120.
9. Show that 19 is not a factor of 1965.
10. Find the HCF of:
(a) 3 and 9 (b) 15 and 45
(c) 18 and 24 (d) 27 and 36



Test of Divisibility

Divisibility by 2:

A given number is divisible by 2, if its ones place digit is even digit *i.e.* 0, 2, 4, 6 or 8.

For example : 912, 236, 528, 130 are divisible by 2.

Even Numbers

Numbers which are divisible by 2 are known as even numbers.

For example,

16, 128, 830, 946, etc.



Odd Numbers

Numbers which are not divisible by 2 are known as odd numbers.

For example,

129, 453, 1867, 1241, etc.



Divisibility by 3:

A given number is divisible by 3, if the sum of digits is divisible by 3.

- Examples:** (a) Consider the number 54306
Sum of digits = $5 + 4 + 3 + 0 + 6 = 18$
18 is divisible by 3.
So, 54306 is divisible by 3.
- (b) Consider the number 28301
Sum of digits = $2 + 8 + 3 + 0 + 1 = 14$
14 is not divisible by 3.
So, 28301 is not divisible by 3.



Divisibility by 4:

A given number is divisible by 4, if the number formed by its last two digits is also divisible by 4.

- Examples:**
- (a) Consider the number 7648
Last two digits = 48
48 is divisible by 4.
So, 7648 is divisible by 4.
- (b) Consider the number 2802
Last two digits = 02
2 is not divisible by 4.
So, 2802 is not divisible by 4.



Divisibility by 5:

A given number is divisible by 5, if its ones place digit is either 0 or 5.

For example:

2490, 450, 625, 2895, etc. are divisible by 5

Divisibility by 6:

A given number is divisible by 6, if it is divisible by both 2 and 3.

Examples:

- (a) Consider the number 26904
Its ones place digit is 4.



So, the number is divisible by 2.

Sum of digits = $2 + 6 + 9 + 0 + 4 = 21$

21 is divisible by 3.

So, the number is divisible by 3.

Thus, 26904 is divisible by both 2 and 3.

Hence, it is divisible by 6.

(b) Consider the number 27381

Its ones place digit is 1.

So, the number is not divisible by 2.

Hence, 27381 is not divisible by 6.

(c) Consider the number 23578

Its ones place digit is 8.

So, the number is divisible by 2.

Sum of digits = $2 + 3 + 5 + 7 + 8 = 25$

25 is not divisible by 3.

So, the number is not divisible by 3.

Hence, 23578 is not divisible by 6.



Divisibility by 9:

A given number is divisible by 9, if the sum of the digits is divisible by 9.

Examples: (a) Consider the number 62154

Sum of digits = $6 + 2 + 1 + 5 + 4 = 18$

18 is divisible by 9.

So, 62154 is divisible by 9.

(b) Consider the number 53927

Sum of digits = $5 + 3 + 9 + 2 + 7 = 26$

26 is not divisible by 9.

So, 53927 is not divisible by 9.



Divisibility by 10:

A given number is divisible by 10, if its ones place digit is zero (0).

For example:

250, 580, 6800, 9760, etc. are divisible by 10.



Prime Numbers And Composite Numbers

Prime Numbers

A number having exactly two factors is known as **prime number**.

For example:

2, 3, 5, 7, 11, 13, 17, 19, 23, etc. are the prime numbers.

2 is the smallest **even prime number**.

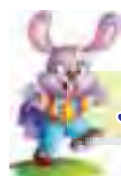
3 is the smallest **odd prime number**.

Composite Numbers

A number having more than two factors is known as **composite number**.

For example:

4, 6, 8, 9, 10, 12, 14, etc. are the composite numbers.



Sieve Of Eratosthenes



Teacher's Note:

Tell students that 1 is neither a prime nor a composite number.

Eratosthenes, a Greek mathematician gave a method for finding out the prime numbers. Let's write numbers from 1 to 100.

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

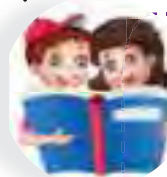


- Step 1** : Cross out 1
Step 2 : Cross out all the multiples of 2, except 2.
Step 3 : Cross out all the multiples of 3, except 3.
Step 4 : Cross out all the multiples of 5, except 5.
Step 5 : Cross out all the multiples of 7, except 7.

Now, circle all the uncrossed numbers.

Thus, all the prime numbers from 1 to 100 are:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43,
 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97



Facts to Know

2 is the smallest and the only even prime number. All the other prime numbers are odd.

Exercise 7.3

1. Fill in the blanks:

- Numbers which are divisible by are known as even numbers.
- Numbers which are not divisible by 2 are known as numbers.
- Prime numbers has exactly factors.
- numbers have more than two factors.
- The smallest prime number is
- The smallest odd prime number is
- is neither a prime nor a composite number.
- The smallest even composite number is
- The smallest odd composite number is
- and are prime numbers between 3 and 11.



2. Which of the following numbers are divisible by 2?

- | | |
|-----------|-----------|
| (a) 26794 | (b) 38463 |
| (c) 1050 | (d) 97642 |
| (e) 30705 | (f) 6427 |

3. Which of the following numbers are divisible by 3?

- | | |
|-----------|----------|
| (a) 25101 | (b) 3672 |
| (c) 55321 | (d) 2345 |
| (e) 14397 | (f) 2482 |

4. Which of the following numbers are divisible by 4?

- | | |
|----------|----------|
| (a) 2864 | (b) 2749 |
|----------|----------|



- (c) 39740 (d) 4448
(e) 409321 (f) 5373

5. Which of the following numbers are divisible by 5?

- (a) 2556 (b) 3850
(c) 2965 (d) 4522
(e) 6895 (f) 7660

6. Which of the following numbers are divisible by 6?

- (a) 2910 (b) 4359
(c) 22896 (d) 64201
(e) 45492 (f) 5124

7. Which of the following numbers are divisible by 9?

- (a) 1328 (b) 67635
(c) 3852 (d) 6678
(e) 1143 (f) 73201

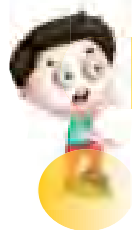
8. Which of the following numbers are divisible by 10?

- (a) 2450 (b) 2890
(c) 6405 (d) 3485
(e) 98002 (f) 56300

9. Write all the prime numbers less than 20.

10. Write all the prime numbers between 25 and 40.

11. Write all the composite numbers between 37 and 47.



Quick Tip

The quickest way to find the factors of a number is to divide it by the smallest prime number (bigger than 1) that goes into it evenly with no remainder.



Prime Factorization

Prime factorization is a method of expressing the composite number as the product of prime factors.

A number can be resolved into its prime factors by building factor tree.



Building A Factor Tree



Steps to build a factor tree are as follows:

Step 1 : Find the least prime number by which the given number is divisible.



- Step 2** : Now, resolve the number into two factors, taking this prime number as one of the factor.
- Step 3** : Again further resolve the second factor into two factors, out of which at least one factor is prime.
- Step 4** : Go on splitting the factors, until you get all the prime factors.
- Step 5** : Now circle all the prime factors.

Solved Examples

Example 1 : Find the prime factors of the following numbers by building a factor tree:

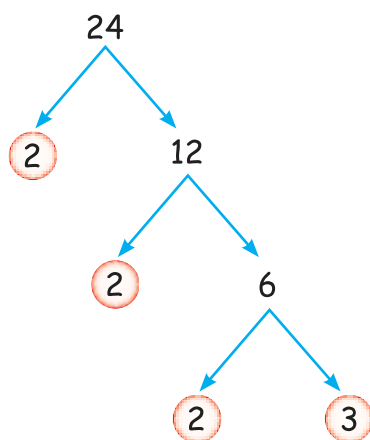
(a) 24

(b) 76

(c) 126

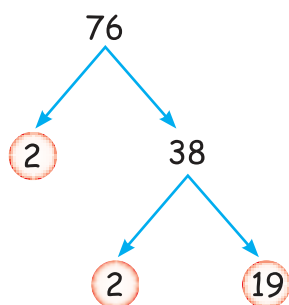
(d) 145

Solution : (a)



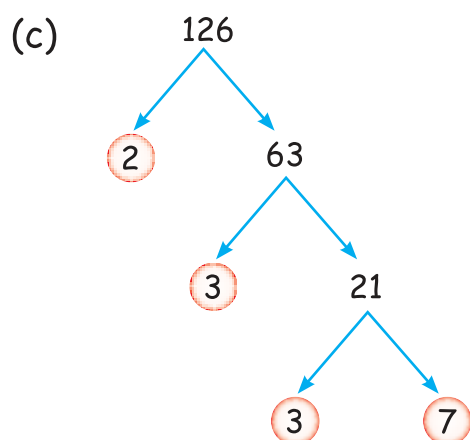
Thus, the prime factors of 24 are:
 $2 \times 2 \times 2 \times 3$

(b)

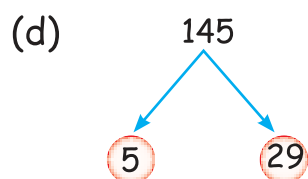


Thus, the prime factors of 76 are:
 $2 \times 2 \times 19$





Thus, the prime factors of 126 are:
 $2 \times 3 \times 3 \times 7$



Thus, the prime factors of 145 are:
 5×29



Exercise 7.4

Find the prime factors of the following numbers, by building a factor tree:

- | | |
|---------|---------|
| 1. 48 | 2. 56 |
| 3. 81 | 4. 60 |
| 5. 72 | 6. 36 |
| 7. 50 | 8. 96 |
| 9. 125 | 10. 164 |
| 11. 121 | 12. 140 |





Think Wisely

If I have 10 coloured beads. How can I arrange them in different ways? Find out using multiples.



Mental Maths

Answer the following:

1. Write first 12 multiples of:

12

2. Write the first 10 prime numbers.

3. Make prime factors:

15= _____ x _____

50= _____ x _____ x _____

60= _____ x _____ x _____ x _____



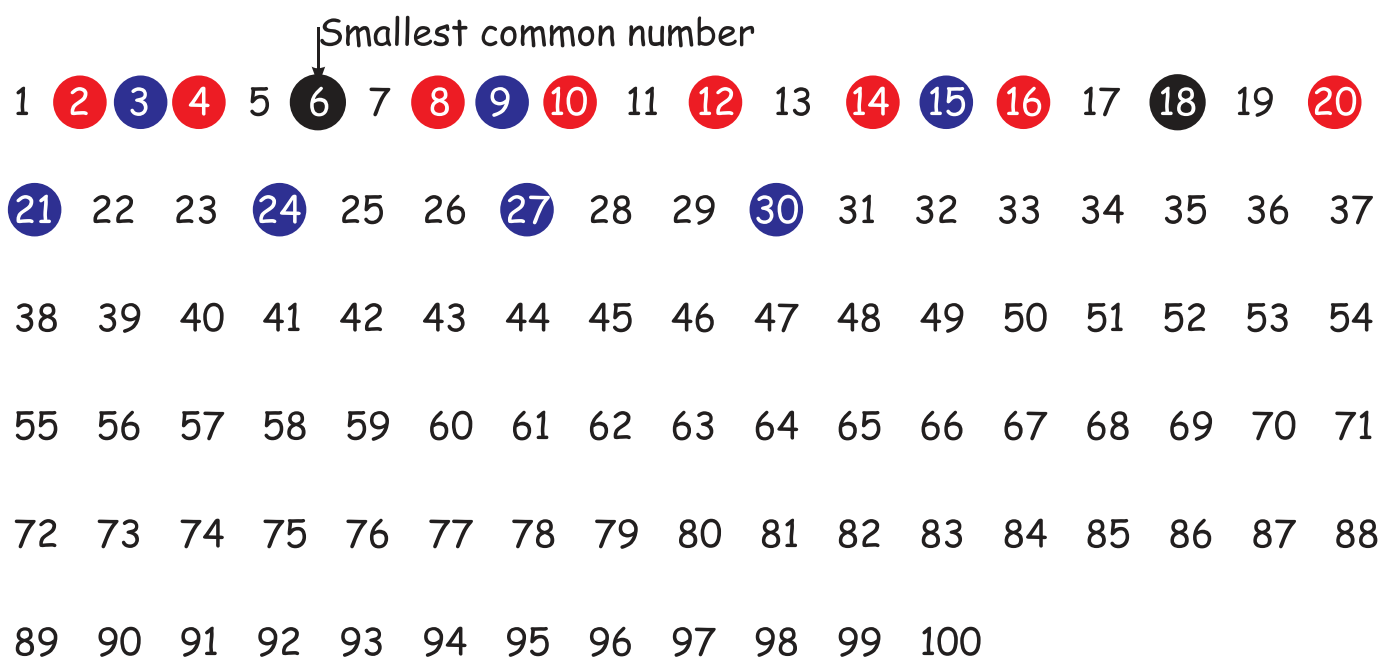


Maths Lab Activity

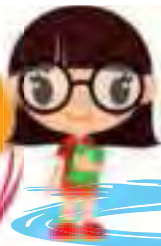
Materials required: A 10 x 10 squared paper, crayons, one sheet of paper to write down the observation.

Steps:

1. On the squared paper, numbers from 1 to 100 are to be written.
 - With a red crayon, counting in 2s, all squares holding the numbers to be coloured, e.g 2, 4, 6.
 - Counting in 3s will be done using a blue crayon, e.g 3, 6, 9, 12.
 - The teacher asks the students to observe if there are numbers which need both colours and write them down.
 - The smallest common number is to be circled.
2. Now, using the tables of 6 and 8, and with two different crayons (green, yellow) such squares coming in the tables of 6 and 8 are coloured.
 - The numbers coloured by the table of 6 are written down. The numbers coloured by the table of 8 are also written down.
 - The smallest common number is circled.
3. If there is time, 2 more numbers can be taken.
4. The sheets should be displayed in the class.



8



Fractional Numbers



Learning Objectives

By the end of this lesson, students will be able to:

- Know types of fractions.
- Identify proper and improper fractions.
- Test whether the fractions are equivalent or not.
- Simplify the fractions.



Warm-Up

Write fractions of the shaded part.







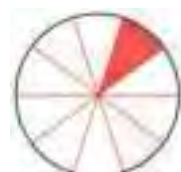








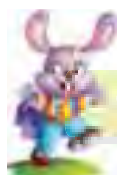








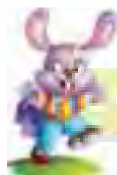
Fraction means 'part of a whole'



Types of Fractions

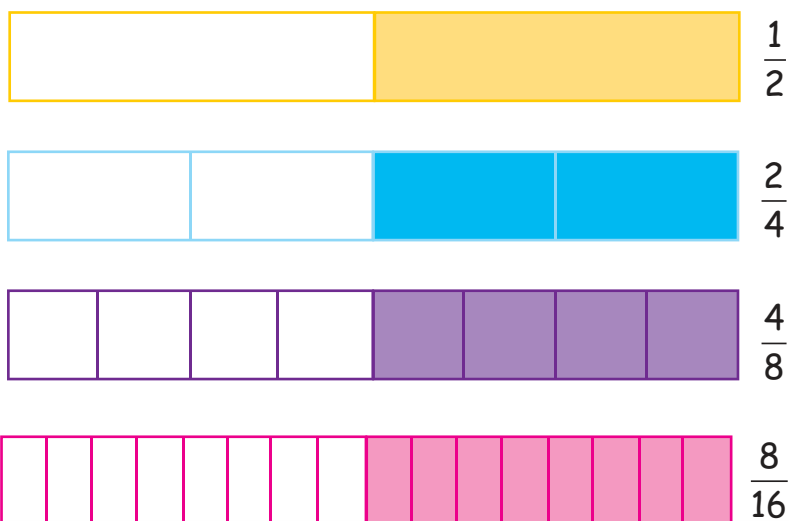
Following are the different types of fractions:

1. Equivalent fractions
2. Like and Unlike fractions
3. Proper and Improper fractions
4. Unit fractions
5. Mixed fractions



Equivalent Fractions

Two fractions are said to be equivalent if their cross products, *i.e.* {(Numerator of first x Denominator of second) and (Denominator of first x Numerator of second)} are equal.



Example : Let us consider the following example:
Clearly, the shaded portions represented by above figures are equal.
So, the fractions

$$\frac{1}{2} = \frac{2}{4} = \frac{4}{8} = \frac{8}{16}, \text{ etc.}$$

are equivalent fractions.

Rules for building equivalent fractions:

Rule 1 : Multiply the numerator and denominator by the same non-zero number.

Examples : $\frac{1 \times 2}{2 \times 2} = \frac{2}{4}$, $\frac{1 \times 3}{2 \times 3} = \frac{3}{6}$, $\frac{1 \times 4}{2 \times 4} = \frac{4}{8}$, etc

So, $\frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$, etc. are equivalent fractions.

Rule 2 : Divide the numerator and denominator by the same non-zero number.

Examples : $\frac{8 \div 2}{16 \div 2} = \frac{4}{8}$, $\frac{4 \div 2}{8 \div 2} = \frac{2}{4}$, $\frac{2 \div 2}{4 \div 2} = \frac{1}{2}$, etc.

So, $\frac{4}{8}$, $\frac{2}{4}$, $\frac{1}{2}$, etc. are equivalent fractions.

Solved Examples

Example 1 : Write the next four equivalent fractions of $\frac{3}{7}$.

Solution : $\frac{3}{7} = \frac{3 \times 2}{7 \times 2} = \frac{3 \times 3}{7 \times 3} = \frac{3 \times 4}{7 \times 4} = \frac{3 \times 5}{7 \times 5}$

$$\therefore \frac{3}{7} = \frac{6}{14} = \frac{9}{21} = \frac{12}{28} = \frac{15}{35}$$

Thus, $\frac{6}{14}$, $\frac{9}{21}$, $\frac{12}{28}$ and $\frac{15}{35}$ are the next four equivalent fractions of $\frac{3}{7}$.

Finding the equivalent fraction with the given numerator or denominator

Example 2 : Write the equivalent fractions of the following:

(a) $\frac{3}{5}$ with numerator 12

(b) $\frac{2}{7}$ with denominator 42

(c) $\frac{36}{72}$ with numerator 3

(d) $\frac{60}{75}$ with denominator 5



Solution : We have to find the missing numerals.

(a) $\frac{3}{5} = \frac{12}{?}$

To get 12 in the numerator we multiply 3 by 4.

$\therefore$ We also multiply the denominator by 4.

$$\frac{3}{5} = \frac{3 \times 4}{5 \times 4} = \frac{12}{20}$$

Thus, $\frac{3}{5}$ and $\frac{12}{20}$ are equivalent fractions.



(b) $\frac{2}{7} = \frac{?}{42}$

To get 42 in the denominator, we multiply 7 by 6.

$\therefore$ We also multiply the numerator by 6.

$$\frac{2}{7} = \frac{2 \times 6}{7 \times 6} = \frac{12}{42}$$

Thus, $\frac{2}{7}$ and $\frac{12}{42}$ are equivalent fractions.



(c) $\frac{36}{72} = \frac{3}{?}$

To get 3 in the numerator, we divide 36 by 12.

$\therefore$ We also divide the denominator by 12.

$$\frac{36}{72} = \frac{36 \div 12}{72 \div 12} = \frac{3}{6}$$

Thus, $\frac{36}{72}$ and $\frac{3}{6}$ are equivalent fractions.



(d) $\frac{60}{75} = \frac{?}{5}$

To get 5 in the denominator, we divide 75 by 15.

$\therefore$ We also divide the numerator by 15.

$$\frac{60}{75} = \frac{60 \div 15}{75 \div 15} = \frac{4}{5}$$

Thus, $\frac{60}{75}$ and $\frac{4}{5}$ are equivalent fractions.





Testing Whether the Fractions are Equivalent or Not:

If the cross product of two fractions are equal, then they are said to be equivalent fractions.

For example : Let us consider the following two fractions:

$$\frac{3}{5} \text{ and } \frac{6}{10}$$

Cross multiply:

$$\frac{3}{5} \times \frac{6}{10}$$

$$3 \times 10 = 30 \text{ and } 5 \times 6 = 30$$

$\therefore$ Both the cross products are equal.

Hence, the fractions $\frac{3}{5}$ and $\frac{6}{10}$ are equivalent.



Example 3 : Are the following fractions equivalent?

(a) $\frac{5}{7}$ and $\frac{25}{35}$

(b) $\frac{2}{8}$ and $\frac{26}{32}$

Solution : (a) Cross multiply:

$$\frac{5}{7} \times \frac{25}{35}$$

$$5 \times 35 = 175 \text{ and } 7 \times 25 = 175$$

$\therefore$ Both the cross products are equal.

Hence, the fractions $\frac{5}{7}$ and $\frac{25}{35}$ are equivalent.

(b) Cross multiply:

$$\frac{2}{8} \times \frac{26}{32}$$

$$2 \times 32 = 64 \text{ and } 8 \times 26 = 208$$

$\therefore$ Both the cross products are not equal.

Hence, the fractions $\frac{2}{8}$ and $\frac{26}{32}$ are not equivalent.



Teacher's Note:

Ask the students to identify something in their home they could divide into fractions, such as a pizza or crayons, and divide. Have them draw their fraction or take a picture to share.



Exercise 8.1

1. Write the next four equivalent fractions of the following:

(a) $\frac{2}{3}$

(b) $\frac{6}{7}$

(c) $\frac{1}{4}$

(d) $\frac{3}{10}$

2. Find the missing numerals:

(a) $\frac{2}{7} = \frac{?}{14}$

(b) $\frac{3}{8} = \frac{?}{48}$

(c) $\frac{5}{8} = \frac{40}{?}$

(d) $\frac{3}{5} = \frac{27}{?}$

(e) $\frac{81}{45} = \frac{?}{5}$

(f) $\frac{22}{44} = \frac{?}{4}$

(g) $\frac{42}{70} = \frac{3}{?}$

(h) $\frac{50}{60} = \frac{5}{?}$

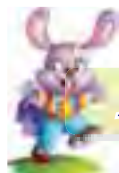
3. Are the following fractions equivalent?

(a) $\frac{7}{5}$ and $\frac{49}{35}$

(b) $\frac{8}{9}$ and $\frac{63}{42}$

(c) $\frac{2}{8}$ and $\frac{4}{16}$

(d) $\frac{3}{5}$ and $\frac{9}{15}$



Like And Unlike Fractions

Like fractions has the same denominators.

For example : $\frac{2}{7}, \frac{3}{7}, \frac{5}{7}, \frac{8}{7}$, etc. are like fractions.

Unlike fractions has the different denominators.

For example : $\frac{1}{2}, \frac{3}{4}, \frac{5}{7}, \frac{2}{9}$, etc. are unlike fractions.



Exercise 8.2

1. Write whether the following groups are of like fractions or unlike fractions:

(a) $\frac{3}{8}, \frac{7}{8}, \frac{9}{8}$

(b) $\frac{2}{7}, \frac{5}{9}, \frac{4}{16}, \frac{23}{16}$



$$(c) \frac{1}{2}, \frac{2}{2}, \frac{3}{2}, \frac{4}{2}, \frac{5}{2}$$

$$(d) \frac{6}{7}, \frac{5}{9}$$

$$(e) \frac{3}{5}, \frac{7}{2}, \frac{6}{8}, \frac{4}{29}, \frac{5}{3}$$

$$(f) \frac{1}{6}, \frac{4}{6}, \frac{5}{6}, \frac{3}{6}, \frac{2}{6}$$

$$(g) \frac{2}{10}, \frac{3}{10}, \frac{6}{10}, \frac{7}{10}, \frac{8}{10}$$

$$(h) \frac{1}{2}, \frac{3}{7}, \frac{4}{5}, \frac{6}{8}, \frac{9}{10}$$

2. Write any four like fractions with the following denominators:

$$(a) 7$$

$$(b) 12$$

$$(c) 5$$

$$(d) 10$$



Proper And Improper Fractions

Fractions in which numerator is less than the denominator are known as **proper fractions**.

Numerator < Denominator

For example,

$\frac{1}{2}, \frac{3}{5}, \frac{7}{9}, \frac{8}{17}$, etc are the proper fractions.

Fractions in which denominator is less than the numerator are known as **improper fractions**.

Numerator > Denominator

For example,

$\frac{3}{2}, \frac{5}{4}, \frac{7}{3}, \frac{15}{10}$, etc are the improper fractions.



Exercise 8.3

1. A fraction in which numerator is less than the denominator are known as fraction.
2. A fraction in which numerator is greater than the denominator are known as fraction.
3. Write whether the following are the proper or improper fractions?

$$(a) \frac{7}{2}$$

$$(b) \frac{6}{9}$$

$$(c) \frac{72}{80}$$

$$(d) \frac{1}{5}$$

$$(e) \frac{32}{12}$$

$$(f) \frac{5}{3}$$

$$(g) \frac{10}{23}$$

$$(h) \frac{19}{17}$$



Unit Fractions

Fractions with numerator 1 are known as **unit fractions**.

For example:

$\frac{1}{2}, \frac{1}{5}, \frac{1}{10}, \frac{1}{12}$, etc are the unit fractions.

Exercise 8.4

- Unit fractions have the numerator
- Which of the following are the unit fractions?

(a) $\frac{3}{5}$

(b) $\frac{7}{2}$

(c) $\frac{1}{6}$

(d) $\frac{1}{12}$

(e) $\frac{6}{12}$

(f) $\frac{1}{89}$

(g) $\frac{72}{14}$

(h) $\frac{1}{3}$

Mixed Fractions

When an improper fraction is written as a combination of a whole number and a **proper fraction**, then it is said to be a **mixed fraction**.

For example :

Let us consider the fraction $\frac{5}{2}$

We write,

$$= \frac{5}{2} = 5 \div 2$$

Quotient $\rightarrow 2\frac{1}{2}$ ← Remainder
← Denominator

$$\begin{array}{r} 2 \overline{) 5} \\ - 4 \\ \hline 1 \end{array}$$

Mixed Fractions, $\frac{\text{Numerator}}{\text{Denominator}} = \text{Quotient} \frac{\text{Remainder}}{\text{Denominator}}$

So, $\frac{5}{2}$ can be written as, $2\frac{1}{2} = 2 + \frac{1}{2}$

$2\frac{1}{2}$ is a mixed fraction.

Converting an improper fraction into a mixed fraction:

Step 1 : Divide the numerator by denominator.

Step 2 : Write the quotient as a whole number and remainder as a numerator and the divisor is written as a denominator.

i.e.
$$\text{Mixed Fractions} = \text{Quotient} \frac{\text{Remainder}}{\text{Divisor}}$$

Labels: Quotient → Whole number, Remainder → Numerator, Divisor → Denominator

Solved Examples

Example 1 : Convert the following improper fractions into mixed fractions:

(a) $\frac{3}{2}$

(b) $\frac{25}{12}$

Solution : (a) $\frac{3}{2} = 3 \div 2$

On dividing 3 by 2, we get

$$\begin{array}{r} 1 \\ 2 \overline{) 3} \\ \underline{- 2} \\ 1 \end{array}$$

Quotient = 1

Remainder = 1

We know,

Mixed fraction = Quotient $\frac{\text{Remainder}}{\text{Denominator}}$

So, $\frac{3}{2} = 1 \frac{1}{2}$

(b) $\frac{25}{12} = 25 \div 12$

On dividing 25 by 12, we get

$$\begin{array}{r} 2 \\ 12 \overline{) 25} \\ \underline{24} \\ 1 \end{array}$$

Quotient = 2, Remainder = 1

So, $\frac{25}{12} = 2 \frac{1}{12}$



Converting a mixed fraction into an improper fraction:

Step 1 : Multiply the whole number (*i.e.* quotient) by the denominator (*i.e.* divisor).

$$\text{Whole Number} \times \text{Denominator}$$

Step 2 : Add the numerator (*i.e.* remainder) to this product.

Step 3 : Write this number in place of numerator.

Step 4 : Denominator will remain same.

Example 2 : Convert the following mixed fractions into improper fractions:

(a) $3\frac{4}{7}$

(b) $9\frac{2}{8}$

Solution : (a) $3\frac{4}{7}$

$$\begin{aligned}\text{Improper fraction} &= 3 + \frac{4}{7} \\ &= \frac{(7 \times 3) + 4}{7} \\ &= \frac{25}{7}\end{aligned}$$

(b) $9\frac{2}{8}$

$$\begin{aligned}\text{Improper fraction} &= \frac{(9 \times 8) + 2}{8} \\ &= \frac{74}{8}\end{aligned}$$



Exercise 8.5

1. Which of the following are the mixed fractions?

(a) $5\frac{1}{2}$

(b) $\frac{6}{8}$

(c) $\frac{12}{29}$

(d) $3\frac{7}{8}$

(e) $3\frac{5}{7}$

(f) $\frac{12}{19}$

(g) $\frac{76}{20}$

(h) $7\frac{3}{29}$

2. Convert the following improper fractions into mixed fractions:

(a) $\frac{23}{7}$

(b) $\frac{64}{3}$

(c) $\frac{25}{10}$

(d) $\frac{55}{2}$

(e) $\frac{63}{5}$

(f) $\frac{72}{7}$

(g) $\frac{42}{5}$

(h) $\frac{74}{4}$



3. Convert the following mixed fractions into improper fractions:

(a) $1\frac{1}{3}$

(b) $3\frac{6}{8}$

(c) $2\frac{3}{5}$

(d) $12\frac{1}{7}$

(e) $6\frac{1}{12}$

(f) $5\frac{3}{10}$

(g) $2\frac{1}{5}$

(h) $3\frac{2}{7}$



Fractions In The Simplest Form

Simplest form means **lowest term**.

Let us consider the following example:

$\frac{1}{2} = \frac{2}{4} = \frac{4}{8} = \frac{8}{16}$, are the equivalent fractions.

$\frac{1}{2}$ is the simplest form of $\frac{8}{16}$, because there is no number except 1 that divides 1 and 2, exactly.



Quick Tip

Keep on dividing the numerator and denominator by their common factors, until they have no more common factors except 1.

Solved Examples

Example 1 : Reduce the following fractions into simplest form:

(a) $\frac{12}{38}$

(b) $\frac{42}{70}$

Solution :

(a) Prime factorization of numerator, $12 = 2 \times 2 \times 3$

Prime factorization of denominator, $38 = 2 \times 19$

Now, $\frac{12}{38} = \frac{2 \times 2 \times 3}{2 \times 19} = \frac{2 \times 3}{19} = \frac{6}{19}$



(b) $\frac{42}{70}$

Prime factorization of numerator,

$$42 = 2 \times 3 \times 7$$

Prime factorization of denominator,

$$70 = 2 \times 5 \times 7$$

$$\text{Now, } \frac{42}{70} = \frac{2 \times 3 \times 7}{2 \times 5 \times 7} = \frac{3}{5}$$



Exercise 8.6

1. Which of the following fractions are in simplest form?

(a) $\frac{3}{9}$

(b) $\frac{6}{7}$

(c) $\frac{8}{12}$

(d) $\frac{1}{5}$

(e) $\frac{7}{9}$

(f) $\frac{12}{27}$

(g) $\frac{2}{3}$

(h) $\frac{26}{52}$

2. Reduce the following fractions into their simplest form:

(a) $\frac{15}{25}$

(b) $\frac{10}{50}$

(c) $\frac{500}{600}$

(d) $\frac{27}{63}$

(e) $\frac{81}{90}$

(f) $\frac{25}{50}$

(g) $\frac{205}{310}$

(h) $\frac{49}{63}$



Facts to Know

The line that separates the numerator and the denominator is called a vinculum, which is also the word used to describe 'a connecting band of tissue, such as that attaching a flexor tendon to the bone of a finger or toe'.



Comparison of Fractions

Comparing Like Fractions

It is very easy to compare like fractions. The fraction having greater numerator has the greater value.



For example : Comparing, $\frac{3}{6}$ and $\frac{5}{6}$
 Since, $3 < 5$
 So, $\frac{3}{6} < \frac{5}{6}$.

Comparing Unlike Fractions:

To compare unlike fractions, first convert them into like fractions.

For example : Comparing, $\frac{12}{35}$ and $\frac{16}{30}$

Changing into like fractions,

Prime factorization of $30 = 2 \times 3 \times 5$

Prime factorization of $35 = 5 \times 7$

Now, $\frac{30}{35} = \frac{2 \times 3 \times 5}{5 \times 7} = \frac{6}{7}$

On cross multiplication, $\frac{30}{35} \times \frac{6}{7}$

30×7 and 35×6

So, $\frac{12 \times 6}{35 \times 6}$ and $\frac{16 \times 7}{30 \times 7}$

$\frac{72}{210}$ and $\frac{112}{210}$

$\frac{72}{210} < \frac{112}{210}$

Thus, $\frac{12}{35} < \frac{16}{30}$



Comparing A Mixed Fraction with An Improper Fraction:

Let us consider an example,

Comparing: $2\frac{1}{5}$ and $\frac{6}{5}$

First change the mixed fraction into an improper fraction.

$2\frac{1}{5} = \frac{2 \times 5 + 1}{5} = \frac{11}{5}$

Now, compare the cross multiplications of the fractions:

$\frac{11}{5} \times \frac{6}{5}$

11×5 and 6×5

55 and 30

$\therefore 55 > 30$

Thus, $2\frac{1}{5} > \frac{6}{5}$.

Comparing Two Mixed Fractions





Solved Examples

Example 1 : Compare $2\frac{3}{5}$ and $1\frac{2}{7}$

Solution : First we compare the whole number of the fractions

$$2\frac{3}{5} \text{ and } 1\frac{2}{7}$$

$$2 > 1.$$

$$\text{Thus, } 2\frac{3}{5} > 1\frac{2}{7}$$

Example 2 : Compare $2\frac{6}{7}$ and $2\frac{5}{9}$

Solution : As the whole numbers of both fractions are equal, so we now compare their fractional parts, *i.e.*

$$\frac{6}{7} \text{ and } \frac{5}{9}$$

By cross multiplication

$$\frac{6}{7} \times \frac{5}{9}$$

$$6 \times 9 \text{ and } 7 \times 5$$

$$54 \text{ and } 35$$

$$\therefore 54 > 35$$

$$\text{So, } \frac{6}{7} > \frac{5}{9}$$

$$\text{Thus, } 2\frac{6}{7} > 2\frac{5}{9}.$$



Think Wisely

I have 18 tiles of four prime colours. $\frac{1}{2}$ are blue. $\frac{1}{3}$ are green. $\frac{1}{9}$ are red.

- How many yellow tiles are there?



Exercise 8.7

1. Compare ($<$, $>$, $=$) the following fractions:

(a) $\frac{1}{4} \square \frac{5}{4}$

(b) $\frac{2}{8} \square \frac{1}{8}$

(c) $\frac{6}{12} \square \frac{1}{2}$

(d) $\frac{3}{9} \square \frac{3}{8}$

(e) $\frac{5}{4} \square \frac{2}{8}$

(f) $\frac{4}{20} \square \frac{1}{5}$

(g) $1\frac{2}{3} \square \frac{6}{8}$

(h) $6\frac{2}{9} \square \frac{56}{9}$

(i) $3\frac{5}{7} \square 8\frac{2}{9}$

(j) $2\frac{3}{6} \square 5\frac{1}{2}$

(k) $1\frac{3}{5} \square 1\frac{6}{8}$

(l) $3\frac{19}{10} \square 3\frac{6}{5}$



Mental Maths

A. Fill in the blanks

- Reciprocal of 5 is _____.
- $\frac{7}{8}$ and $\frac{8}{13}$ are _____ fractions.
- 0.7 in fractional form is _____.

B. Write equivalent fraction for each.

1. $\frac{2}{10} = \square$

2. $\frac{1}{3} = \square$

3. $\frac{5}{7} = \square$

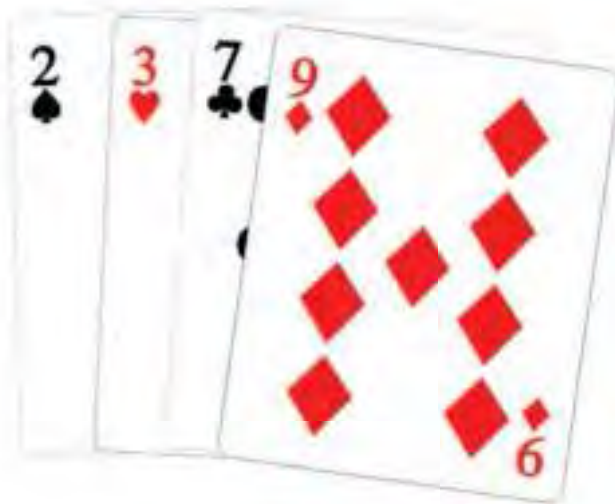
4. $\frac{3}{5} = \square$





Maths Lab Activity

Materials required: Playing cards, paper, pencil



Steps:

1. This activity can be done in groups of five each.
2. One student will divide deck of cards evenly among the players.
3. All the other students will turn over two cards from their respective deck and place them in front of themselves.
4. One card would be the numerator and one would be the denominator to fraction.
5. Now the players will calculate who has the largest fraction.
6. The player who has formed the largest fraction will get 5 points.



Teacher's Note:

A time limit can be set for the activity.





Learning Objectives

By the end of this lesson, students will be able to:

- Identify the whole number and fractional parts of a decimal.
- Convert decimals into common fractions.
- Recognize connections between decimal numbers and place values.

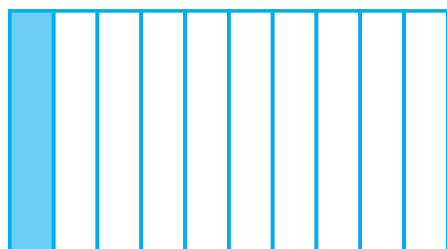


Warm-Up

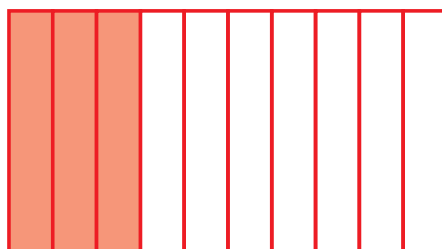
There are ten children attending Neha's birthday party. Her mother cuts the cake into 10 equal parts. Each part is one-tenth of the whole cake.

Look at the following figures. Each figure has been divided into ten equal parts. How many parts are shaded? Write a fraction below each figure.

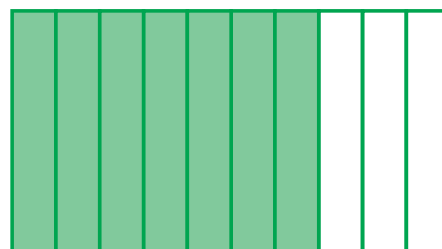
One - tenth



Three-tenths



Seven-tenths





Teacher's Note:

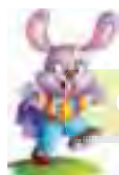
Ask pupils to explain what they know about ones, tens, and hundreds.



The word '**Decimal**' originates from the Latin word '**Decem**', which means '**tenth**'. The fractions which have the denominators like 10, 100, 1000, etc. are known as **decimal fractions**.

Examples, $\frac{8}{10}$, $\frac{4}{100}$, $\frac{52}{100}$, $\frac{63}{1000}$, etc.

are all decimal fractions.



Place Value Chart



Thousands 1000	Hundreds 100	Tens 10	Ones 1	Point (.)	Tenths $\frac{1}{10}$ (.1)	Hundredths $\frac{1}{100}$ (.01)	Thousandths $\frac{1}{1000}$ (.001)
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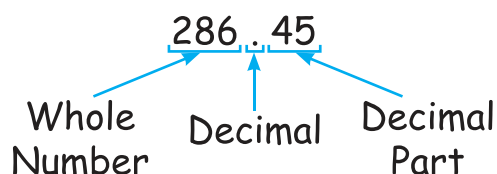
The place value of a digit becomes one tenths $\left(\frac{1}{10}\right)$ one hundredths $\left(\frac{1}{100}\right)$ and one thousandths $\left(\frac{1}{1000}\right)$ etc. as we move from left to right after the decimal (point).

Decimals are used to represent a number less than 1.

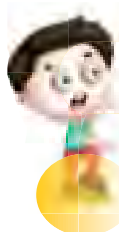
Decimal or point is introduced after the ones place.

A decimal fraction has two parts, *i.e.* a whole number and a decimal part.

For example,



So, the numbers to the left of decimal are whole numbers and the numbers to the right of decimal are decimal fractions.



Quick Tip

The 'dec' in decimal means ten, and refers to the fact that each position in a decimal number corresponds to ten times more than the next position along. For example, the number 325.31 means 3 hundreds, 2 tens, 5 ones, 3 tenths and 1 hundredth.





Writing Decimal Fractions

.29 can be written as 0.29

82 can be written as 82.0

So, absence of any of the part can be represented by using 0.



Decimal Fractions With Denominator 10 (Tenth):

Fractional Number	Common Fraction	Decimal Fraction	Read as
1 tenth	$\frac{1}{10}$	.1	Decimal one or Point one
2 tenths	$\frac{2}{10}$	.2	Decimal two or Point two
5 tenths	$\frac{5}{10}$	.5	Decimal five or Point five
8 tenths	$\frac{8}{10}$	.8	Decimal eight or Point eight
9 tenths	$\frac{9}{10}$	.9	Decimal nine or Point nine

A decimal fraction with denominator 10 has only one digit after the decimal point.

Thus, $\frac{1}{10} = .1$, $\frac{2}{10} = .2$, $\frac{5}{10} = .5$, $\frac{8}{10} = .8$, $\frac{9}{10} = .9$, etc.



Decimal Fractions With Denominator 100 (Hundredths)

Fractional Number	Common Fraction	Decimal Fraction	Read as
1 hundredth	$\frac{1}{100}$	.01	Point zero one
2 hundredths	$\frac{2}{100}$	.02	Point zero two
10 hundredths	$\frac{10}{100}$	.10	Point one zero
72 hundredths	$\frac{72}{100}$	.72	Point seven two
96 hundredths	$\frac{96}{100}$	.96	Point nine six

A decimal fraction with denominator 100 has two digits after the decimal point.

Thus, $\frac{1}{100} = .01$, $\frac{2}{100} = .02$, $\frac{10}{100} = .10$, $\frac{72}{100} = .72$, $\frac{96}{100} = .96$, etc.

Decimal Fractions With Denominator 1000 (Thousandths)

Fractional Number	Common Fraction	Decimal Fraction	Read as
1 thousandth	$\frac{1}{1000}$	.001	Point zero zero one
4 thousandths	$\frac{4}{1000}$	.004	Point zero zero four
18 thousandths	$\frac{18}{1000}$	.018	Point zero one eight
100 thousandths	$\frac{100}{1000}$	.100	Point one zero zero
896 thousandths	$\frac{896}{1000}$	.896	Point eight nine six

A decimal fraction with denominator 1000 has three digits after the decimal point.

Thus, $\frac{1}{1000} = .001$, $\frac{4}{1000} = .004$, $\frac{18}{1000} = .018$, $\frac{100}{1000} = .100$, $\frac{896}{1000} = .896$, etc.

Rules for Converting Decimals Into Common fractions:

Step 1 : Write the decimal number without decimal as the numerator.

Step 2 : Write the denominator by forming a number with as many zeros to the right of 1 as in the number of decimal places in the given number.

Examples :

$$2.8 = \frac{28}{10},$$

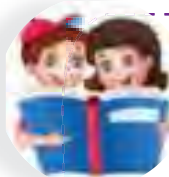
$$5.62 = \frac{562}{100},$$

$$3.856 = \frac{3856}{1000},$$

$$0.08 = \frac{8}{100},$$

$$0.5 = \frac{5}{10},$$

$$0.006 = \frac{6}{1000}, \text{ etc.}$$



Facts to Know

Decimals, as they look today, were used by John Napier, a Scottish mathematician who developed the use of logarithms for carrying out calculations. The modern decimal point became the standard in England in 1619.



Expanded Form of Decimals

Let us consider the decimal number,
546.289

Now, arrange the digits of the number in place value chart.

Hundreds (100)	Tens (10)	Ones (1)	Point Or Decimal	Tenths $\left(\frac{1}{10}\right)$	Hundredths $\left(\frac{1}{100}\right)$	Thousandths $\left(\frac{1}{1000}\right)$
5	4	6	.	2	8	9

So,

$$546.289$$

$$= 5 \text{ hundreds} + 4 \text{ tens} + 6 \text{ ones} + 2 \text{ tenths} + 8 \text{ hundredths} + 9 \text{ thousandths}$$

$$= 500 + 40 + 6 + \frac{2}{10} + \frac{8}{100} + \frac{9}{1000}$$

Solved Examples

Example 1 : Write the number names of the following decimals:

(a) 0.02

(b) 12.56

(c) 910.205

(d) 8.002



- Solution :**
- (a) 0.02 = Point zero two
 - (b) 12.56 = Twelve point five six
 - (c) 910.205 = Nine hundred ten point two zero five
 - (d) 8.002 = Eight point zero zero two

Example 2 : Write the following fractions as decimals:

- (a) $\frac{4}{10}$
- (b) $\frac{29}{100}$
- (c) $\frac{3}{100}$
- (d) $\frac{450}{1000}$
- (e) $\frac{62}{1000}$
- (f) $\frac{9}{1000}$

- Solution :**
- (a) $\frac{4}{10} = 0.4$
 - (b) $\frac{29}{100} = 0.29$
 - (c) $\frac{3}{100} = 0.03$
 - (d) $\frac{450}{1000} = 0.450$
 - (e) $\frac{62}{1000} = 0.062$
 - (f) $\frac{9}{1000} = 0.009$



Example 3 : Write the following decimals into common fractions:

- (a) 0.2
- (b) 0.07
- (c) 10.27
- (d) 16.2
- (e) 28.295
- (f) 63.002

- Solution :**
- (a) $0.2 = \frac{2}{10}$
 - (b) $0.07 = \frac{7}{100}$
 - (c) $10.27 = \frac{1027}{100}$
 - (d) $16.2 = \frac{162}{10}$
 - (e) $28.295 = \frac{28295}{1000}$
 - (f) $63.002 = \frac{63002}{1000}$



Example 4 : Write the following number in expanded form:

(a) 528.102

Solution : (a) 528.102

Arranging the digits in a place value chart:

Hundreds (100)	Tens (10)	Ones (1)	Decimal Or Point	Tenths $\left(\frac{1}{10}\right)$	Hundredths $\left(\frac{1}{100}\right)$	Thousandths $\left(\frac{1}{1000}\right)$
5	2	8	.	1	0	2

So, 528.102

= 5 hundreds + 2 tens + 8 ones + 1 tenth + 0 hundredth + 2 thousandths

$$= 500 + 20 + 8 + \frac{1}{10} + \frac{2}{1000}$$

$$\therefore \text{Expanded form of } 528.102 = 500 + 20 + 8 + \frac{1}{10} + \frac{2}{1000}$$

Example 5 : Write the following in short form:

(a) $500 + 60 + 7 + \frac{2}{10} + \frac{3}{100} + \frac{9}{1000}$

Solution : (a) $500 + 60 + 7 + \frac{2}{10} + \frac{3}{100} + \frac{9}{1000}$

= 5 hundreds + 6 tens + 7 ones + 2 tenths + 3 hundredths + 9 thousandths

Writing the number in place value chart:

Hundreds	Tens	Ones	Decimal Or Point	Tenths	Hundredths	Thousandths
5	6	7	.	2	3	9

$\therefore$ Short form of

$$500 + 60 + 7 + \frac{2}{10} + \frac{3}{100} + \frac{9}{1000} = 576.239$$



Think Wisely

Rounding to the nearest tenth makes me 203.5.

Rounding to the nearest hundredth tenth makes me 203.46. The sum of my digits is 15. Carry me out to the thousandth place.

What number am I ?

Exercise 9.1

1. Write the number names of the following decimals:

- | | | |
|-----------|-----------|------------|
| (a) 0.03 | (b) 7.625 | (c) 83.021 |
| (d) 85.20 | (e) 0.912 | (f) 0.008 |

2. Write the following fractions as decimals:

- | | | |
|----------------------|------------------------|-----------------------|
| (a) $\frac{5}{10}$ | (b) $\frac{89}{100}$ | (c) $\frac{42}{1000}$ |
| (d) $\frac{8}{1000}$ | (e) $\frac{699}{1000}$ | (f) $\frac{80}{1000}$ |

3. Write the following decimals as common fractions:

- | | | |
|-----------|-----------|------------|
| (a) 0.62 | (b) 0.798 | (c) 0.07 |
| (d) 0.009 | (e) 0.060 | (f) 28.960 |

4. Write the following numbers in expanded form:

- | | | |
|-------------|------------|-------------|
| (a) 259.502 | (b) 64.09 | (c) 280.007 |
| (d) 838.072 | (e) 76.582 | (f) 288.976 |

5. Write the following in short form:

- | | |
|--|--|
| (a) $50 + 6 + \frac{1}{10} + \frac{2}{100} + \frac{5}{1000}$ | (b) $500 + 20 + 9 + \frac{2}{10} + \frac{6}{1000}$ |
| (c) $200 + 7 + \frac{9}{10} + \frac{5}{1000}$ | (d) $700 + 60 + 5 + \frac{2}{10} + \frac{5}{100} + \frac{6}{1000}$ |
| (e) $200 + 7 + \frac{9}{1000}$ | (f) $\frac{8}{10} + \frac{5}{100}$ |



Mental Maths

Match the fractions to the decimals.

- | | |
|--------------------|-----------|
| (a) $\frac{1}{10}$ | (i) 0.6 |
| (b) $\frac{3}{6}$ | (ii) 0.4 |
| (c) $\frac{2}{5}$ | (iii) 0.3 |
| (d) $\frac{3}{10}$ | (iv) 0.1 |
| (e) $\frac{3}{5}$ | (v) 0.5 |





Materials required: Cut out a strip of chart paper, 20 cm in length. Using a scale and pencil, divide it into 10 equal parts. This is your decimal strip of tenths. Each part represents 0.1 or one-tenth of the strip.

0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

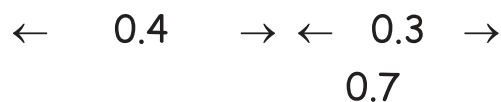
Steps:

1. Use the strip to add 0.4 and 0.3
2. 0.4 → colour four parts on the strip to represent 0.4
3. 0.3 → colour three parts on the strip to represent 0.3
4. How many parts are coloured? 7 parts.

5. This represents seven-tenths or 0.7



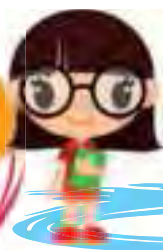
6. Therefore, $0.4 + 0.3 =$ _____



7. Try this activity with different decimals.



10



Money



Learning Objectives

By the end of this lesson, students will be able to:

- Explain money and the factors that determine its value.
- Compare and contrast currency values.
- Make bills.



Warm-Up

Look at the notes and multiply it to make a 100 rupee note.



$$\boxed{2} \times$$



$$\boxed{} \times$$



$$\boxed{} \times$$



$$\boxed{} \times$$



Teacher's Note:

Show real notes to the students and ask them to observe the notes and write 5 things which are written on it.



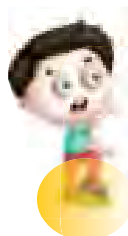


We all are familiar with Rupees (₹) and paise (p).
Let's study something about money.



All the notes have numbers and these numbers are written on one side of the note.

Governor of the RBI signs all the notes, except ₹ 1. ₹ 1 note is signed by secretary ministry of finance.



Quick Tip

To convert paise into rupees and paise, place a dot or point after 2 digits from the right.

8295 paise = ₹ 82.95

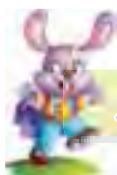


There are 15 languages on any Indian rupee note.



We can exchange the soiled notes in any of the bank.

We see the photograph of Gandhi ji on ₹ 5, ₹ 10, ₹ 20, ₹ 50, ₹ 100, ₹ 200 and ₹ 500 note.



Making Bills

It is very important to learn how to make bills, as we always have to pay our bill when we go for a shopping.

Making bill is very simple.



Facts to Know

In India, all coins and currency notes are issued by the Reserve Bank of India.

- Step 1 :** Write the quantity, item and cost of each item (unit cost).
- Step 2 :** Multiply the unit cost by quantity (or number of items) to get total cost.
- Step 3 :** Add the total cost of all the items to get the grand total.

Solved Examples

Example 1 : Prepare the bills of the customer who have purchased the following items from the stationary shop:



S.No.	Quantity	Item	Unit Cost
1	5	Eraser	₹ 3
2	4	Sharpner	₹ 2.25
3	12	Pencil	₹ 3.5
4	2	Note Book	₹ 12.75
5	3	Ruler	₹ 6.5



Solution : To prepare bill, we first multiply the quantity of each item with unit cost and then add total cost of each item to get grand total.

S.No.	Quantity	Item	Unit Cost	Total Cost
1	5	Eraser	₹ 3.00	₹ 15.00
2	4	Sharpner	₹ 2.25	₹ 9.00
3	12	Pencil	₹ 3.50	₹ 42.00
4	2	Note Book	₹ 12.75	₹ 25.50
5	3	Ruler	₹ 6.50	₹ 19.50
			Grand Total	₹ 111.00

Thus, the customer has to pay ₹ 111.

Example 2 : Make the bill for the following purchase:

5 kg sugar at the rate of ₹ 38 per kg

10 kg rice at the rate of ₹ 40 per kg

8 kg wheat at the rate of ₹ 25 per kg

4 kg tea at the rate of ₹ 80.5 per kg

7 kg dal at the rate of ₹ 26.25 per kg



Solution :

S.No.	Quantity	Item	Unit Cost	Total Cost
1	5 kg	Sugar	₹ 38.00	₹ 190.00
2	10 kg	Rice	₹ 40.00	₹ 400.00
3	8 kg	Wheat	₹ 25.00	₹ 200.00
4	4 kg	Tea	₹ 80.50	₹ 322.00
5	7 kg	Dal	₹ 26.25	₹ 183.75
			Grand Total	₹ 1295.75

∴ Grand total = ₹ 1295.75

Think Wisely

One table costs ₹ 1068.85 and a chair costs ₹ 2005.25. If the bicycle costs ₹ 20 more than the sum of cost of one table and one chair, find the cost of bicycle.

Exercise 10.1

1. Prepare the bill of the customer who have purchased the following items from the departmental store:



S.No.	Quantity	Item	Unit Cost	Total Cost
1	4	T-Shirts	₹ 506	
2	4 pairs	Trousers	₹ 660	
3	2	Towels	₹ 250	
4	12	Hankeys	₹ 12.50	
Grand Total				

2. Make the bills for each of the following purchases:

- (a) Sweets shop:

10 Rasgullas at ₹ 8.50 per piece
12 Rasmalai at ₹ 15.25 per piece
8 Gulab Jamuns at ₹ 12.50 per piece
2 kg Halwa at ₹ 220 per kg



- (b) Archies gallery:

2 greeting cards at ₹ 80 per card
10 soft toys at ₹ 550 per piece
8 dolls at ₹ 860 per piece
6 pack of cards at ₹ 195 per pack
12 basket balls at ₹ 58 per piece





Mental Maths

A. Convert into paise

1. ₹ 10.20 - _____
2. ₹ 50.75 - _____
3. ₹ 100.25 - _____

B. Separate rupees and paise

1. ₹ 150.08 - _____
2. ₹ 145.50 - _____
3. ₹ 90.50 - _____



Maths Lab Activity

Materials required: Books of different subjects

Steps:

1. The teacher asks the children to bring out their textbooks.
2. He/she shows the printed cost of the books to them and asks them to write their prices on a paper sheet.

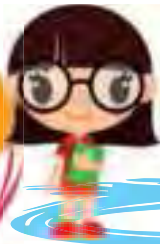


Maths	: ₹ 25.80
English	: ₹ 40.50
Hindi Reader	: ₹ 90.40
Social Studies	: ₹ 80.75
Science	: ₹ 55.00

3. Now, the teacher asks the following questions from children.

- What is the total cost of all the books?
- What is the cost of the Hindi Reader in rupees and paise separately?
- Which book is cheaper- Science or Maths and by how much?
- Which book is the most expensive?





Measuring Time



Learning Objectives

By the end of this lesson, students will be able to:

- Know about a.m. and p.m.
- Convert days into hours, hours into minutes and minutes into seconds.
- Represent time in 12 hours and 24 hours clock time.
- Add and subtract time.



Warm-Up

Observe the clock and tick the correct time.



It's half past three.
It's half past four.
It's half past five.



It's half past two.
It's half past three.
It's half past one.



It's a quarter to four.
It's a quarter to six.
It's a quarter to five.



It's half past ten.
It's half past eight.
It's half past nine.



It's one o'clock.
It's twelve o'clock.
It's two o'clock.



It's eleven o'clock.
It's twelve o'clock.
It's ten o'clock.



It's six o'clock.
It's half past twelve.
It's twelve o'clock.



It's a quarter to twelve.
It's three o'clock.
It's quarter past twelve.



It's twelve o'clock.
It's five o'clock.
It's half past twelve.





To know how to measure time is very important aspect in our daily life.
Time helps us to prepare our daily schedule in an orderly manner.



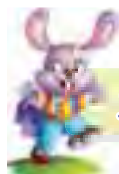
As we Know

- Dial** : The face of the clock is known as dial.
- Divisions** : There are 12 equal **big divisions**, labelled as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 on the face of the clock.

Each big division is divided into five equal **small divisions**.

$\therefore$ **Total number of divisions on the face of Clock = $12 \times 5 = 60$**

- Clock Hands** : Clock has two hands:
- ❖ Minute hand (Longer hand)
 - ❖ Hour hand (Shorter hand)



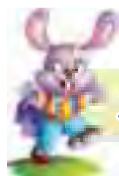
Movement of Minute Hand

Minute hand takes 1 minute to move from one small division to the next small division.



Thus, minute hand covers 60 small divisions (*i.e.* one round on the face of clock) in 1 hour.

$$\therefore 1 \text{ hour} = 60 \text{ minutes}$$



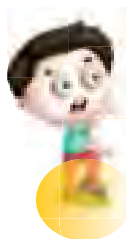
Movement of Hour Hand

Hour hand takes 1 hour to move from one big division (*i.e.* one number to the next number) to the next big division.

Thus, hour hand covers 12 big divisions (*i.e.* one round on the face of clock) in 12 hours.

Hour hand takes 2 full rounds in one day.

$$\therefore 1 \text{ day} = 24 \text{ hours}$$



Quick Tip

1 day = 24 hours

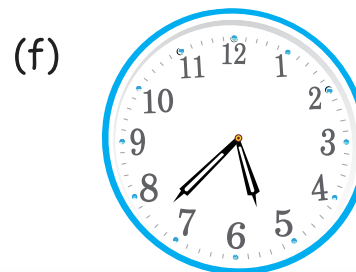
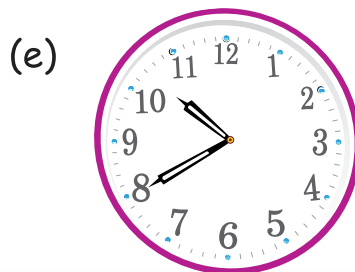
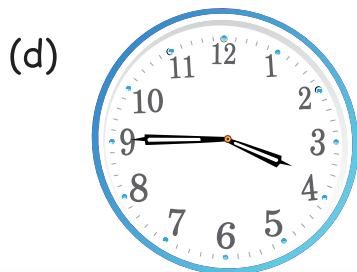
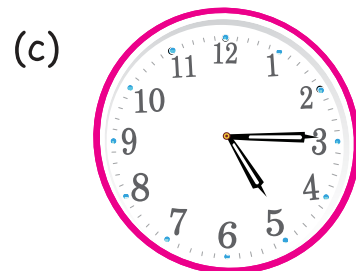
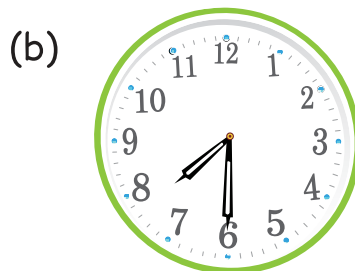
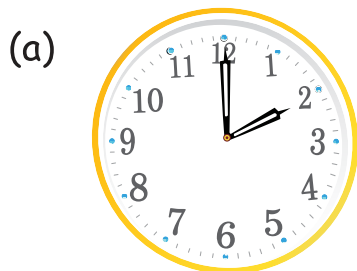
1 hour = 60 minutes

Also, 1 minute = 60 seconds

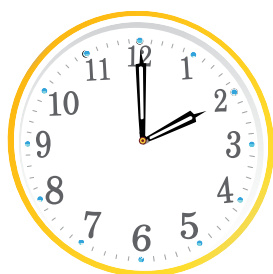
The movements of hour hand and minute hand helps us to read or measure time. The following examples will help us to read the time.

Solved Examples

Example 1 : What time does the following figures of the clock shows?



Solution :



- (a) In this figure, minute hand is at 12 and hour hand is at 2.
 $\therefore$ The time is 2 o' clock.

It can also be written as,

2:00 or 2 o'clock



- (b) In this figure, minute hand is at 6.

So, the minute hand moves

$$= 6 \times 5 = 30 \text{ small divisions.}$$

The hour hand is between 7 and 8

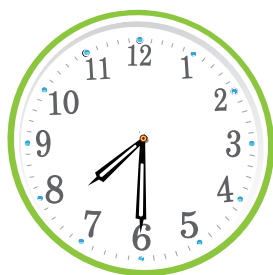
So, the time is between 7 o' clock and 8 o' clock.

$\therefore$ The time is 7:30.

It can also be written as,

7:30 or Half past 7 or 30 minutes past 7

or 30 minutes to 8



- (c) In this figure, minute hand is at 3.

So, the minute hand moves

$$= 3 \times 5 = 15 \text{ small divisions}$$

The hour hand is between 5 and 6.

So, the time is between 5 o'clock and 6 o'clock.

$\therefore$ The time is 5:15.

It can also be written as,

5:15 or 15 minutes past 5 or Quarter past 5



- (d) In this figure, minute hand is at 9.

So, the minute hand moves = 9×5

$$= 45 \text{ small divisions}$$

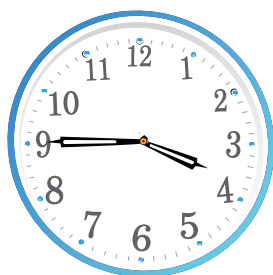
The hour hand is between 3 and 4.

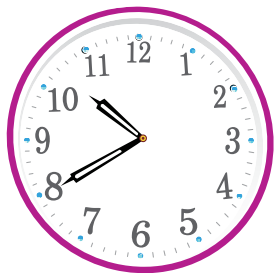
So, the time is between 3 o' clock and 4 o'clock.

$\therefore$ The time is 3:45.

It can also be written as,

3:45 or 45 minutes past 3 or Quarter to 4





(e) In this figure, minute hand is at 8.

So, the minute hand moves

$$= 8 \times 5$$

$$= 40 \text{ small divisions.}$$

The hour hand is between 10 and 11.

So, the time is between 10 o'clock and 11 o'clock.

$\therefore$ The time is 10:40.

It can also be written as,

10:40

or 40 minutes past 10

or 20 minutes to 11

(f) In this figure, minute hand is at 3rd small division after the number 7.

$$\text{So, the minute hand moves} = (7 \times 5 + 3)$$

$$= 38 \text{ small divisions.}$$

The hour hand is between 5 and 6.

So, the time is between 5 o'clock and 6 o'clock.

$\therefore$ The time is 5:38.

It can also be written as,

5:38

or 38 minutes past 5

or 22 minutes to 6

Exercise 11.1

1. What time do the following figures of the clock show? Write in any two different ways:

(a)



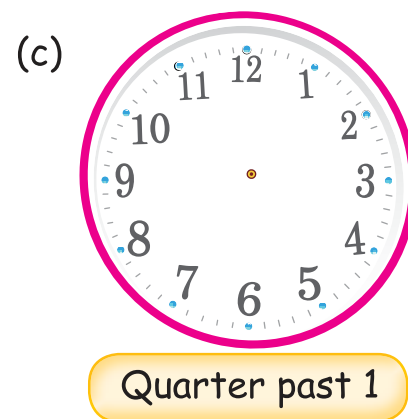
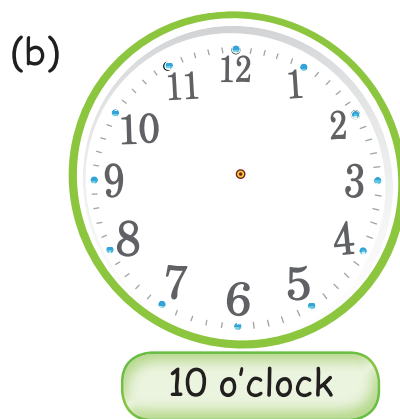
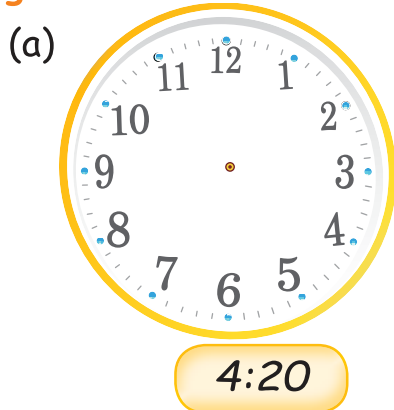
(b)



(c)

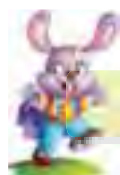


2. Draw the minute hand and hour hand on the following clocks to show the given time:



3. Fill in the blanks:

- 12: 00 = o'clock.
- Half past 5 = minutes to 6.
- Quarter to 8 = minutes past
- Quarter past = 3: 15.
- 50 minutes past 4 = minutes to 5.
- 48 minutes past 9 = minutes to



Use of A.M. and P.M.

As we know,

A.M. or a.m. stands for **Ante Meridian**

P.M. or p.m. stands for **Post Meridian**

The hour hand moves twice a day.

When the time is 12 o'clock, it may be in noon or at mid-night.

If the 12 o'clock is in the noon, then the time is **12 noon**.

If the 12 o'clock is at mid-night, then the time is **12 mid night**.



Facts to Know

- The term "o'clock" is a contraction of the term "of the clock."
- It comes from 15th century references to medieval mechanical clocks.



Teacher's Note:

Apprise students that the time between 12 mid-night and 12 noon is denoted by **a.m.** and the time between 12 noon and 12 mid-night is denoted by **p.m.**





Examples,

5 o'clock in the evening is denoted by 5 p.m.

5 o'clock in the morning is denoted by 5 a.m.

Solved Examples

Example 1 : Write the following time using a.m. or p.m.:

- | | |
|----------------------------|---------------------------------|
| (a) 8:30 in the morning. | (b) 11 o' clock in the morning. |
| (c) 4:15 in the evening. | (d) 9:40 in the night. |
| (e) 45 minutes after noon. | (f) 2:25 after mid-night. |

Solution :

(a) 8:30 a.m.	(b) 11:00 a.m.
(c) 4:15 p.m.	(d) 9:40 p.m.
(e) 12:45 p.m.	(f) 2:25 a.m.

Example 2 : What time it will be:

- | | |
|------------------------------|-------------------------------|
| (a) after 6 hours of 7 a.m.? | (b) before 2 hours of 8 p.m.? |
|------------------------------|-------------------------------|

Solution :

(a) After 6 hours of 7 a.m. the time will be 1 p.m.
(b) Before 2 hours of 8 p.m. the time will be 6 p.m.

Exercise 11.2

1. Write the following time using a.m. or p.m.:

- | | |
|---------------------------|-----------------------------|
| (a) 7:10 in the morning. | (b) 40 minutes after noon. |
| (c) 6:20 in the evening. | (d) 12:20 in the mid-night. |
| (e) 3:16 after mid-night. | (f) 12:15 in the afternoon. |

2. What time it will be:

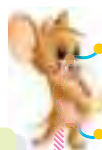
- | | |
|---------------------------------------|----------------------------------|
| (a) after 10 minutes of 12:55 p.m.? | (b) after 2 hours of 4 a.m.? |
| (c) before 4 hours of 8 p.m.? | (d) before 5 minutes of 12 noon? |
| (e) before 5 minutes of 12 mid-night? | (f) after 3 hours of 9 p.m.? |





Addition And Subtraction of Time

Addition and Subtraction of time is some what similar to normal addition and subtraction, respectively.



Remember

- ❖ In short,
- ❖ Hours are denoted as **Hrs**
- ❖ Minutes are denoted as **Mins**
- ❖ Seconds are denoted as **Sec**

Solved Examples

Examples 1 : Add 6 hours 12 minutes and 2 hours 30 minutes.

Solution :

Step 1 : Write in correct columns.

Step 2 : Add minutes

$$12 + 30 = 42 \text{ minutes.}$$

Step 3 : Add hours

$$6 + 2 = 8 \text{ hours}$$

$$\therefore \text{Sum} = 8 \text{ hours } 42 \text{ minutes.}$$



Hrs	Mins
6	12
+ 2	30
8	42

Example 2 : Add 42 minutes 20 seconds and 12 minutes 19 seconds.

Solution :

Step 1 : Write in correct columns.

Step 2 : Add seconds

$$20 + 19 = 39 \text{ seconds}$$

Step 3 : Add minutes

$$42 + 12 = 54 \text{ minutes}$$

$$\therefore \text{Sum} = 54 \text{ minutes } 39 \text{ seconds.}$$



Mins	Sec
42	20
+ 12	19
54	39

Example 3 : Add 2 hours 49 minutes 12 seconds and 3 hours 56 minutes 39 seconds.

Solution :

Step 1 : Write in correct columns.

Step 2 : Add seconds:

$$12 + 39 = 51 \text{ seconds}$$

Hrs	Mins	Sec
2	49	12
+ 3	56	39
5	05	51

Step 3 : Add minutes:

$$49 + 56 = 105 \text{ minutes}$$

$$= 60 \text{ minutes} + 45 \text{ minutes} = 1 \text{ hour} + 45 \text{ minutes}$$

Write 45 in minutes column

and 1 hour as the carry in hours column

Step 4 : Add hours:

$$1 + 2 + 3 = 6 \text{ hours.}$$

$$\therefore \text{Sum} = 6 \text{ hours } 45 \text{ minutes } 51 \text{ seconds.}$$



Example 4 : Subtract 6 hours 23 minutes from 8 hours 46 minutes.

Solution :

Step 1 : Write in correct columns

Step 2 : Subtract minutes:

$$46 - 23 = 23 \text{ minutes}$$

Step 3 : Subtract hours:

$$8 - 6 = 2 \text{ hours}$$

$$\therefore \text{Difference} = 2 \text{ hours } 23 \text{ minutes.}$$

Hrs	Mins
8	46
- 6	23
2	23

Example 5 : Subtract 42 minutes 29 seconds from 60 minutes 36 seconds.

Solution :

Step 1 : Write in correct columns

Step 2 : Subtract seconds:

$$36 - 29 = 7 \text{ seconds}$$

Step 3 : Subtract minutes:

$$60 - 42 = 18 \text{ minutes}$$

$$\therefore \text{Difference} = 18 \text{ minutes } 07 \text{ seconds.}$$

Mins	Sec
5 10	2 16
6 0	3 6
- 4 2	2 9
1 8	0 7

Example 6 : Subtract 2 hours 42 minutes 18 seconds from 4 hours 56 minutes 06 seconds

Solution :

Step 1 : Write in correct columns

Step 2 : Subtract seconds:



We cannot subtract 18 from 6. So we take 1 minutes as a borrow from minutes column So, 1 min = 60 seconds

So, $60 + 6 = 66$ seconds

Now, $= 66 - 18 = 48$ seconds

Step 3 : Subtract minutes:

$56 - 42 = 14$ hours

Step 4 : Subtract hours

$4 - 2 = 2$ hours

$\therefore$ Difference = 2 hours 14 minutes 48 seconds.

Hrs	Mins	Sec
4	56	66
- 2	42	18
2	14	48

Exercise 11.3

1. Add the following:

- 12 hours 25 minutes and 8 hours 20 minutes
- 6 hours 40 minutes and 2 hours 53 minutes
- 10 minutes 20 seconds and 12 minutes 59 seconds
- 58 minutes 23 seconds and 49 minutes 28 seconds
- 6 hours 21 seconds and 4 hours 17 seconds
- 9 hours 2 seconds and 5 hours 59 seconds
- 2 hours 29 minutes 10 seconds and 5 hours 53 minutes 26 seconds
- 3 hours 20 minutes 42 seconds and 7 hours 18 minutes 59 seconds



2. Subtract the following:

- 3 hours 26 minutes from 5 hours 30 minutes
- 10 hours 32 minutes from 12 hours 59 minutes
- 16 minutes 23 seconds from 20 minutes 48 seconds
- 38 minutes 52 seconds from 40 minutes 50 seconds
- 6 hours 48 seconds from 8 hours 53 seconds
- 2 hours 29 seconds from 3 hours 34 seconds
- 4 hours 42 minutes 09 seconds from 5 hours 02 minutes 59 seconds
- 7 hours 28 minutes 42 seconds from 9 hours 59 minutes 06 seconds





Example 3 : Convert the following into seconds:

(a) 29 minutes

(b) 16 minutes 18 seconds

Solution : As we know,

1 minute = 60 seconds

(a) 29 minutes

= (29×60) seconds

= 1740 seconds

(b) 16 minutes 18 seconds

= (16×60) seconds + 18 seconds

= 960 seconds + 18 seconds

= 978 seconds

Exercise 11.4

1. Convert the following into hours:

(a) 12 days

(b) 26 days

(c) 30 days 18 hours

(d) 15 days 6 hours

(e) 42 days 5 hours



2. Convert the following into minutes:

(a) 5 hours

(b) 18 hours

(c) 8 hours 19 minutes

(d) 10 hours 42 minutes

(e) 20 hours 30 minutes

3. Convert the following into seconds:

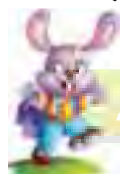
(a) 43 minutes

(b) 56 minutes

(c) 28 minutes 53 seconds

(d) 40 minutes 22 seconds

(e) 12 minutes 50 seconds



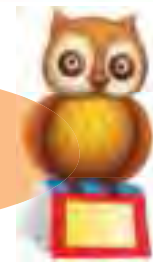
24 Hours Clock Time

Some of the departments like railways, airlines, inter state bus services, etc. use a unique timing system.

This unique timing system is known as 24-hours clock time.

It counts the hours from 1 to 24, instead of dividing the time into a.m. and p.m. Here, the time is expressed in digital format, i.e. in 4-digits. The first two digits denote hours and the next two digits denote minutes.





The mid-night time is expressed as either
0000 hours or
2400 hours.



Representation of Times In Two Types of Clocks

12 Hours Clock Time	24 Hours Clock Time
1 a.m.	0100 hours
2 a.m.	0200 hours
3 a.m.	0300 hours
4 a.m.	0400 hours
5 a.m.	0500 hours
6 a.m.	0600 hours
7 a.m.	0700 hours
8 a.m.	0800 hours
9 a.m.	0900 hours
10 a.m.	1000 hours
11 a.m.	1100 hours
12 noon	1200 hours
1 p.m.	1300 hours
2 p.m.	1400 hours
3 p.m.	1500 hours
4 p.m.	1600 hours
5 p.m.	1700 hours
6 p.m.	1800 hours
7 p.m.	1900 hours
8 p.m.	2000 hours
9 p.m.	2100 hours
10 p.m.	2200 hours
11 p.m.	2300 hours
12 mid-night	2400 hours or 0000 hours



Solved Examples

Example 1 : Change the following 12-hours clock time into 24-hours clock time:

- | | | |
|------------------|---------------|---------------|
| (a) 12:30 a.m. | (b) 4:38 a.m. | (c) 6:40 a.m. |
| (d) 1:00 a.m. | (e) 12 noon | (f) 2:15 p.m. |
| (g) 10:11 p.m. | (h) 7:42 p.m. | (i) 3:29 p.m. |
| (j) 12 mid-night | (k) 8:12 p.m. | (l) 1:20 p.m. |

- Solution :**
- | | |
|------------------|----------------------------|
| (a) 12:30 a.m. | = 1230 hours |
| (b) 4:38 a.m. | = 0438 hours |
| (c) 6:40 a.m. | = 0640 hours |
| (d) 1:00 a.m. | = 0100 hours |
| (e) 12 noon | = 1200 hours |
| (f) 2:15 p.m. | = 1415 hours |
| (g) 10:11 p.m. | = 2211 hours |
| (h) 7:42 p.m. | = 1942 hours |
| (i) 3:29 p.m. | = 1529 hours |
| (j) 12 mid-night | = 2400 hours or 0000 hours |
| (k) 8:12 p.m. | = 2012 hours |
| (l) 1:20 p.m. | = 1320 hours |



Example 2 : Change the following 24-hours clock time into 12-hours clock time:

- | | | |
|----------------|----------------|----------------|
| (a) 0029 hours | (b) 1249 hours | (c) 1420 hours |
| (d) 0500 hours | (e) 1756 hours | (f) 0815 hours |
| (g) 1515 hours | (h) 1618 hours | (i) 2200 hours |
| (j) 1005 hours | (k) 0245 hours | (l) 1320 hours |

- Solution :**
- | | |
|----------------|--------------|
| (a) 0029 hours | = 12:29 a.m. |
| (b) 1249 hours | = 12:49 p.m. |
| (c) 1420 hours | = 2:20 p.m. |
| (d) 0500 hours | = 5:00 a.m. |
| (e) 1756 hours | = 5:56 p.m. |
| (f) 0815 hours | = 8:15 a.m. |



- (g) 1515 hours = 3:15 p.m.
 (h) 1618 hours = 4:18 p.m.
 (i) 2200 hours = 10:00 p.m.
 (j) 1005 hours = 10:05 a.m.
 (k) 0245 hours = 2:45 a.m.
 (l) 1320 hours = 1:20 p.m.



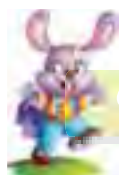
Exercise 11.5

1. Change the following 12-hours clock time into 24-hours clock time:

- | | | |
|----------------|---------------|------------------|
| (a) 12:35 a.m. | (b) 2:36 a.m. | (c) 4:29 a.m. |
| (d) 3:20 a.m. | (e) 1:12 a.m. | (f) 3:45 p.m. |
| (g) 4:12 p.m. | (h) 6:20 p.m. | (i) 10:00 p.m. |
| (j) 11:20 p.m. | (k) 5:16 p.m. | (l) 12 mid night |

2. Change the following 24-hours clock time into 12-hours clock time:

- | | | |
|----------------|----------------|----------------|
| (a) 0042 hours | (b) 1252 hours | (c) 1220 hours |
| (d) 0628 hours | (e) 1845 hours | (f) 1550 hours |
| (g) 1717 hours | (h) 1027 hours | (i) 2000 hours |
| (j) 2400 hours | (k) 0225 hours | (l) 0000 hours |



Time Duration



Time duration means how much time an activity takes to complete a task.

Time duration = Finishing time - Starting time

Finishing time = Starting time + Time duration

Starting time = Finishing time - Time duration



Solved Examples

Example 1 : Find the time duration between 4:00 a.m. and 10 p.m.

Solution :

Step 1 : Convert 10 p.m. into 24-hour clock time

$$10 \text{ p.m.} = 10 + 12 = 22 \text{ hours.}$$

Step 2 : Subtract 4 from 22

$$22 - 4 = 18 \text{ hours}$$

$$\therefore \text{Time duration} = 18 \text{ hours.}$$



Example 2 : Rajat went to market at 1300 hours. He come back home after 2 hours. At what time he come back to his home?

Solution :

$$\begin{aligned} \text{Finishing Time} &= \text{Starting time} + \text{Time duration} \\ &= 1300 \text{ hours} + 2 \text{ hours} \\ &= 1500 \text{ hours} \end{aligned}$$

$\therefore$ To know the time in a.m. or p.m., convert it into 12-hours clock time.

$$1500 \text{ hours} = 3:00 \text{ p.m.}$$

Thus, Rajat come back to his home at 3:00 p.m.

Example 3 : Sona left her house for school at 7:15 a.m. and she reached school at 7:30 a.m. How much time did she take to reach school from her house?

Solution :

$$\begin{aligned} \text{Time duration} &= \text{Finishing time} - \text{Starting time} \\ &= 7:30 \text{ a.m.} - 7:15 \text{ a.m.} \\ &= 15 \text{ minutes} \end{aligned}$$


Hrs	Mins
7	30
- 7	15
0	15

Thus, Sona takes 15 minutes to reach school from her house.



Exercise 11.6

1. Find the time duration between:

- (a) 12 noon and 5:15 p.m. (b) 8:00 a.m. and 1:00 p.m.
(c) 6:55 p.m. and 4:30 a.m. (d) 9:30 p.m. and 12 midnight

2. Karan went to his acting class at 5:15 p.m. and came back home at 6:30 p.m. How much time does he take to come back to his home?

3. Raj starts his evening walk at 1800 hours. He walks for 1 hour. At what time he finish his walk?

4. Raj's school start at 7:30 a.m. and closes at 1:30 p.m. How long does the school work?

5. Ayesha start doing her homework at 5:10 p.m. She finished it at 6:30 p.m. How long did she take to finish her homework?

6. A G.K. competition started at 10:30 a.m. and finished at 12:45 p.m. How long did the competition last?

7. Rajat took part in a cycle race. The race started at 2:30 p.m. and finished at 2:55 p.m. What was the duration of the race ?

8. How many minutes pass between:

- (a) 6 o'clock and quarter to 7.
(b) Quarter past 8 and 15 minutes to 9.
(c) Half past 4 and quarter past 5.
(d) 1 o'clock and quarter past 1.



Think Wisely

A clock is so placed that its minute hand points towards the north-east at 12 noon. In which direction does its hour hand point at 1:30 p.m ?





Mental Maths

Answer the following:

1. 2035 hours = _____ in 12 hour clock.
2. How many minutes are there between 3:40 am and 4:25 am ? _____
3. It takes me 15 minutes to walk to my school. If I leave at 7: 30 a.m. I would reach the school at _____ .
4. What time will it be: hours after 3:30 am?
5. What time will it be: hours after 12 noon?



Maths Lab Activity

Materials required: Paper, pencil

Steps:

1. This activity can be done individually.
2. Here is a blank timeline. Use it to make your personal timeline of a week.





Calendar



Learning Objectives

By the end of this lesson, students will be able to:

- Summarise the uses of calendars.
- Write the dates in an appropriate format.
- Know about centuries, leap years and ordinary years.



Warm-Up

Using the months of the year word cards. Sort the months of the year as a class, leaving a gap for the current month. Ask the following:

January

February

March

April

May

June

July

August

September

October

November

December

- What month are we in? _____
- What month is it next? _____
- How many months are left till the end of the year? _____



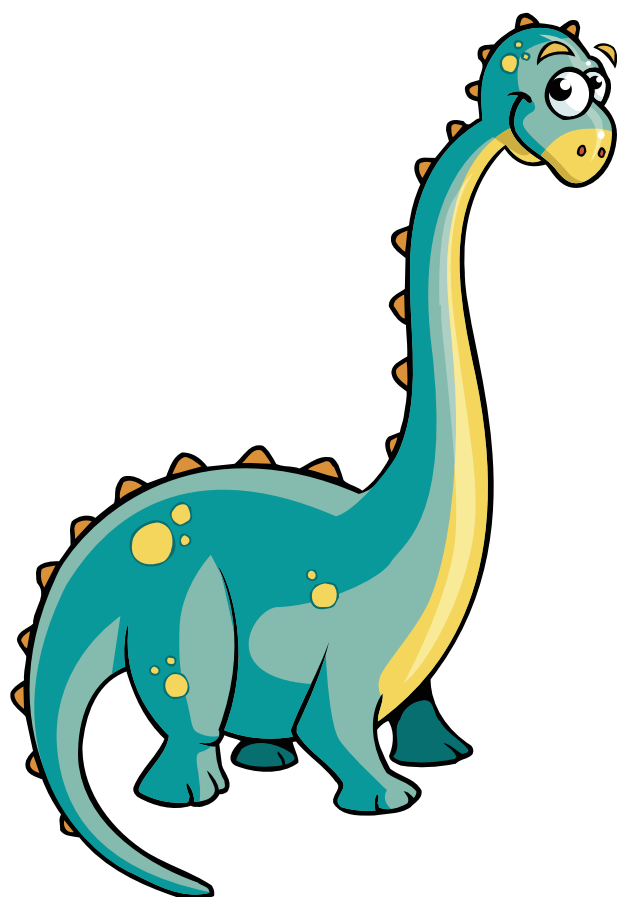


Day, Week, Month And Year



Days of The Week

As we know, there are 7 days in a week.



Monday

Tuesday

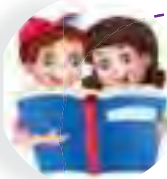
Wednesday

Thursday

Friday

Saturday

Sunday



Facts to Know

The earliest record of a seven-day week dates back to 600 BCE in ancient Babylon, where a holy day was celebrated every seven days starting with a new moon. This period of days corresponds to the main phases of the moon with each quarter falling roughly seven days apart, or every 7.3825 days.





Months Of The Year

There are 12 months in a year.

Months	Number of Days
January	31
February	28 or 29
March	31
April	30
May	31
June	30
July	31
August	31
September	30
October	31
November	30
December	31

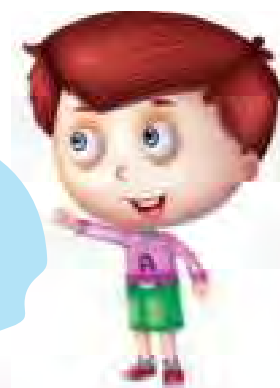


Quick Tip

Use your knuckles to figure out which months have 30/31 days. If the month lands on a knuckle (higher up), it's 31 days otherwise, it's 30 days.



Year which is divisible by 100 is called century.
For example,
1800, 1900, 2000, 2100, etc.



Year other than a century which is divisible by 4 is called leap year. Also, when century is divisible by 400, then it is called leap year.

For example,

1996, 2000, 2004, 2008, etc.

Leap year has 366 days. February of leap year has 29 days.



Teacher's

Note:

Tell the students that the year which is not a leap year, is known as an ordinary year.

For example,

1997, 2001, 2002, 2003, 2005, etc.

An ordinary year has 365 days.

February of an ordinary year has 28 days.

Exercise 12.1

1. Which of the following are centuries?

(a) 2005

(b) 1800

(c) 1986

(d) 1600

(e) 2800

(f) 1006

2. Which of the following are leap years?

(a) 1988

(b) 1986

(c) 2000

(d) 1888

(e) 2007

(f) 1400

3. Which of the following are ordinary years?

(a) 1992

(b) 2005

(c) 1500

(d) 1994

(e) 2014

(f) 2015



Think Wisely

I have 28 days, but every four years I get 29 days. Which month am I?



Calendar

Calendar keeps the record of all the dates and days of the year.
Calendar shows the months, weeks and days of the year.



JANUARY	FEBRUARY	MARCH	APRIL
SUN MON TUE WED THU FRI SAT	SUN MON TUE WED THU FRI SAT	SUN MON TUE WED THU FRI SAT	SUN MON TUE WED THU FRI SAT
1 2 3 4 5 6	1 2 3	1 2	1 2 3 4 5 6
7 8 9 10 11 12 13	4 5 6 7 8 9 10	3 4 5 6 7 8 9	7 8 9 10 11 12 13
14 15 16 17 18 19 20	11 12 13 14 15 16 17	10 11 12 13 14 15 16	14 15 16 17 18 19 20
21 22 23 24 25 26 27	18 19 20 21 22 23 24	17 18 19 20 21 22 23	21 22 23 24 25 26 27
28 29 30 31	25 26 27 28 29	24 25 26 27 28 29 30	28 29 30
31			
MAY	JUNE	JULY	AUGUST
SUN MON TUE WED THU FRI SAT	SUN MON TUE WED THU FRI SAT	SUN MON TUE WED THU FRI SAT	SUN MON TUE WED THU FRI SAT
1 2 3 4	1	1 2 3 4 5 6	1 2 3
5 6 7 8 9 10 11	2 3 4 5 6 7 8	7 8 9 10 11 12 13	4 5 6 7 8 9 10
12 13 14 15 16 17 18	9 10 11 12 13 14 15	14 15 16 17 18 19 20	11 12 13 14 15 16 17
19 20 21 22 23 24 25	16 17 18 19 20 21 22	21 22 23 24 25 26 27	18 19 20 21 22 23 24
26 27 28 29 30 31	23 24 25 26 27 28 29	28 29 30 31	25 26 27 28 29 30 31
30			
SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SUN MON TUE WED THU FRI SAT	SUN MON TUE WED THU FRI SAT	SUN MON TUE WED THU FRI SAT	SUN MON TUE WED THU FRI SAT
1 2 3 4 5 6 7	1 2 3 4 5	1 2	1 2 3 4 5 6 7
8 9 10 11 12 13 14	6 7 8 9 10 11 12	3 4 5 6 7 8 9	8 9 10 11 12 13 14
15 16 17 18 19 20 21	13 14 15 16 17 18 19	10 11 12 13 14 15 16	15 16 17 18 19 20 21
22 23 24 25 26 27 28	20 21 22 23 24 25 26	17 18 19 20 21 22 23	22 23 24 25 26 27 28
29 30	27 28 29 30 31	24 25 26 27 28 29 30	29 30 31



How to write dates?

Dates can be written in any of the following two formats:

Let us take an example,

2nd January 2024

It can be written as,

January 2, 2024

or 2 . 1 . 2024
 ↓ ↓ ↓
 Day Month Year



Solved Examples

Example 1 : Look at the calendar of year 2024 and then answer the following questions:

- (a) On which day does the Gandhi Jayanti fall in the year 2024?
- (b) On which date was the second Monday in January 2024?
- (c) Radha was born on 20th January, 2024. What day was it?

Solution : (a) The Gandhi Jayanti falls on 2nd October, 2024. The day on 2nd October 2024 is Sunday.

So, the Gandhi Jayanti falls on Sunday in year 2024.

- (b) From the calendar of 2024, we find that 3rd January is the first Monday and 10th January is the second Monday.

So, the 10th January is the second Monday in the year 2024.

- (c) Day on 20th January, 2024 was Thursday.

So, Radha was born on Thursday.

Example 2 : Find the number of days from 12th January to 20th February.

Solution : Days left in January = $31 - 12$
 = 19 days

Days in February = 20 days

∴ Total number of days = $19 + 20$
 = 39 days





Example 3 : Find the number of days from 15th March to 12th April.

Solution : Days left in March = $31 - 15$
= 16 days

Days in April = 12 days

$\therefore$ Total number of days = $16 + 12$
= 28 days



Example 4 : Find the number of days from 2nd June to 25th July.

Solution : Days left in June = $30 - 2$
= 28 days

Days in July = 25 days

$\therefore$ Total number of days = $28 + 25$
= 53 days

Example 5 : If 10th October in a certain year was Sunday, then what was the day on 26th October in that year?

Solution : We know that, the same day is repeated after 7 days.

So, the dates for Sunday in October of that year after 10th are 17th, 24th and 31st.

$\therefore$ 24th October was Sunday

$\therefore$ 26th October was Tuesday.

Example 6 : If 5th August in a certain year was Wednesday, then what was the day on 27th August in that year?

Solution : We know that, the same day is repeated after every 7 days.

So, the dates for Wednesday in August of that year after 5th are 12th, 19th and 26th.

$\therefore$ 26th August was Wednesday

$\therefore$ 27th August was Thursday.





Exercise 12.2

1. Write the dates in two formats for the following:

- | | |
|-----------------------|------------------------|
| (a) 23rd October 2010 | (b) 17th March 1986 |
| (c) 1st November 2000 | (d) 31st December 2024 |
| (e) 22nd May 1990 | |

2. Look at the calendar of year 2024 and then answer the following questions:

- (a) On which day does Independence day fall in the year 2024?
- (b) On which date was the first Sunday in February 2024?
- (c) How many Thursdays are there in April in the year 2024 ?

3. Find the number of days from:

- | | |
|----------------------------------|-----------------------------------|
| (a) 15th March to 26th April | (b) 10th May to 2nd June |
| (c) 28th June to 15th July | (d) 13th August to 10th September |
| (e) 15th January to 2nd February | (f) 12th May to 15th June |

- 4. If 7th May in a certain year was Thursday, then what was the day on 23rd May in that year?
- 5. If 8th April in a certain year was Monday, then what was the day on 15th April in that year?
- 6. If 2nd June in a certain year was Tuesday, then what was the day on 20th June in that year?



Mental Maths

Fill in the blanks

- 1. A year having _____ days is called a leap year.
- 2. The first day of the week is _____.
- 3. April, June, September and _____ have 30 days.
- 4. Year which is divisible by _____ is called century.
- 5. _____ is the fifth day of the week.





Maths Lab Activity

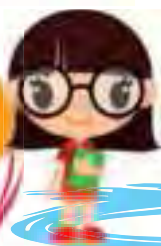
Materials required: Calendar, pen and pencil.

Steps:

1. Write your birthday month in the Month column.
2. Put in the dates according to the current year calendar.
3. Mark the holidays in the red colour.

CALENDAR							
(Month)	SUN	MON	TUE	WED	THU	FRI	SAT





Metric System



Learning Objectives

By the end of this lesson, students will be able to:

- State the units of length, weight and capacity in the metric system
- Convert higher units into lower units and vice-versa.



Warm-Up

In which unit, will you measure the following:

1. The length of a pencil _____
2. The height of a tree _____
3. The distance between two cities _____
4. The capacity of a bucket _____
5. The weight of a pen _____



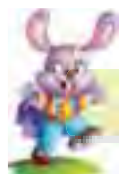
Facts to Know

In ancient times, the length of a foot, the width of a finger, and the distance of a step were all accepted measurements.

The metric system of measurement is used all over the world and it is based on multiples of 10.

The units used in this system use some common words which are mentioned as under:

Words	Kilo	Hecto	Deca	Deci	Centi	Milli
Value	1000	100	10	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

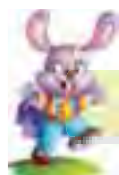


Units Of Length



Metre (m) is the standard unit of length.

Units	Kilometre (km)	Hectometre (hm)	Decametre (dam)	Metre (m)	Decimetre (dm)	Centimetre (cm)	Millimetre (mm)
Value	1000 m	100 m	10 m	1 m	$\frac{1}{10} m$	$\frac{1}{100} m$	$\frac{1}{1000} m$



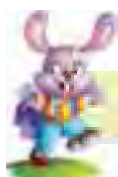
Units Of Mass



Gram (g) is the standard unit of mass.

Units	Kilogram (kg)	Hectogram (hg)	Decagram (dag)	Gram (g)	Decigram (dg)	Centigram (cg)	Milligram (mg)
Value	1000 g	100 g	10 g	1 g	$\frac{1}{10} g$	$\frac{1}{100} g$	$\frac{1}{1000} g$





Units Of Capacity



Litre (l) is the standard unit of capacity.

Units	Kilolitre (kl)	Hectolitre (hl)	Decalitre (dal)	Litre (l)	Decilitre (dl)	Centilitre (cl)	Millilitre (ml)
Value	1000 l	100 l	10 l	1 l	$\frac{1}{10}$ l	$\frac{1}{100}$ l	$\frac{1}{1000}$ l

CONVERSION



Quick Tip



Bigger To Smaller

Kilo	Hecto	Deca	m, g, l	Deci	Centi	Milli
King	Henry's	Daughter	m, g, l	Drinks	Cold	Milk

Smaller To Bigger

When we move from,
Bigger to Smaller

then,
Bigger Unit **Multiply By** → Smaller Unit

When we move from,
Smaller to Bigger

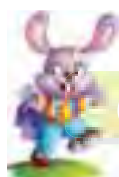
then,
Smaller Unit **Divide By** → Bigger Unit



Exercise 13.1

Fill in the blanks:

1. $1 \text{ km} = \dots\dots\dots \text{ m}$
2. $1 \text{ hm} = \dots\dots\dots \text{ m}$
3. $1 \text{ m} = \dots\dots\dots \text{ cm}$
4. $1 \text{ hg} = \dots\dots\dots \text{ g}$
5. $1 \text{ dg} = \dots\dots\dots \text{ cg}$
6. $1 \text{ cg} = \dots\dots\dots \text{ mg}$
7. $1 \text{ kl} = \dots\dots\dots \text{ l}$
8. $1 \text{ l} = \dots\dots\dots \text{ dl}$
9. $1 \text{ dl} = \dots\dots\dots \text{ ml}$
10. $1 \text{ dag} = \dots\dots\dots \text{ g}$



Conversion of Higher Units into Lower Units

Solved Examples

Example 1 : Convert 5 km into metres

Solution : $1 \text{ km} = 1000 \text{ m}$
 $5 \text{ km} = (5 \times 1000) \text{ m}$
 $= 5000 \text{ m}$

Example 2 : Convert 2 hm into metres

Solution : $1 \text{ hm} = 100 \text{ m}$
 $2 \text{ hm} = (2 \times 100) \text{ m}$
 $= 200 \text{ m}$

Example 3 : Convert 5 m into dm

Solution : $1 \text{ m} = 10 \text{ dm}$
 $5 \text{ m} = (5 \times 10) \text{ dm}$
 $= 50 \text{ dm}$

Example 4 : Convert 12 m into cm

Solution : $1 \text{ m} = 100 \text{ cm}$
 $12 \text{ m} = (12 \times 100) \text{ cm}$
 $= 1200 \text{ cm}$



Example 5 : Convert 7 *kg* into grams

Solution : $1 \text{ kg} = 1000 \text{ g}$
 $7 \text{ kg} = (7 \times 1000) \text{ g}$
 $= 7000 \text{ g}$

Example 6 : Convert 8 *dag* into grams

Solution : $1 \text{ dag} = 10 \text{ g}$
 $8 \text{ dag} = (8 \times 10) \text{ g}$
 $= 80 \text{ g}$

Example 7 : Convert 10 *g* into *mg*

Solution : $1 \text{ g} = 1000 \text{ mg}$
 $10 \text{ g} = (10 \times 1000) \text{ mg}$
 $= 10000 \text{ mg}$

Example 8 : Convert 4 *kℓ* into litres

Solution : $1 \text{ kℓ} = 1000 \text{ ℓ}$
 $4 \text{ kℓ} = (4 \times 1000) \text{ ℓ}$
 $= 4000 \text{ ℓ}$

Example 9 : Convert 7 *ℓ* into *dℓ*

Solution : $1 \text{ ℓ} = 10 \text{ dℓ}$
 $7 \text{ ℓ} = (7 \times 10) \text{ dℓ}$
 $= 70 \text{ dℓ}$



**Teacher's
Note:**

Explain that to change from higher units to lower units, we always multiply the higher unit by the difference between the two units. Also, tell the children that always read the value in the smaller units first and then write.

Exercise 13.2

1. Convert the following units of length:

- | | |
|--------------------------------|-------------------------------|
| (a) 2 <i>km</i> into <i>m</i> | (b) 7 <i>hm</i> into <i>m</i> |
| (c) 8 <i>dag</i> into <i>m</i> | (d) 3 <i>m</i> into <i>cm</i> |
| (e) 5 <i>cm</i> into <i>mm</i> | |

2. Convert the following units of mass:

- | | |
|--------------------------------|--------------------------------|
| (a) 3 <i>kg</i> into <i>g</i> | (b) 7 <i>g</i> into <i>mg</i> |
| (c) 2 <i>dag</i> into <i>g</i> | (d) 5 <i>dg</i> into <i>mg</i> |
| (e) 4 <i>hg</i> into <i>g</i> | |





3. Convert the following units of capacity:

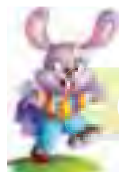
(a) 9 *hl* into *l*

(b) 7 *hl* into *ml*

(c) 8 *cl* into *ml*

(d) 5 *dal* into *l*

(e) 2 *kl* into *l*



Conversion of Mixed Units into Lower Units

Solved Examples

Example 1 : Convert 6 *m* 5 *cm* into *cm*.

Solution : 6 *m* 5 *cm* = 6 *m* + 5 *cm*
= (6 × 100) *cm* + 5 *cm* [∵ 1 *m* = 100 *cm*]
= 600 *cm* + 5 *cm*
= 605 *cm*

Example 2 : Convert 9 *cm* 2 *mm* into *mm*.

Solution : 9 *cm* 2 *mm* = 9 *cm* + 2 *mm*
= (9 × 10) *mm* + 2 *mm* [∵ 1 *cm* = 10 *mm*]
= 90 *mm* + 2 *mm*
= 92 *mm*



Example 3 : Convert 2 *km* 3 *hm* 5 *dam* 4 *m* into *m*.

Solution : 2 *km* 3 *hm* 5 *dam* 4 *m*
= 2 *km* + 3 *hm* + 5 *dam* + 4 *m*
= (2 × 1000) *m* + (3 × 100) *m* + (5 × 10) *m* + 4 *m*
[∵ 1 *km* = 1000 *m*, 1 *hm* = 100 *m*, 1 *dam* = 10 *m*]
= 2000 *m* + 300 *m* + 50 *m* + 4 *m*
= 2354 *m*

Example 4 : Convert 5 *kg* 289 *g* into *g*.

Solution : 5 *kg* 289 *g* = 5 *kg* + 289 *g*
= (5 × 1000) *g* + 289 *g* [1 *kg* = 1000 *g*]
= 5000 *g* + 289 *g*
= 5289 *g*



Example 5 : Convert 3 g 29 cg into cg.

Solution :

$$\begin{aligned} 3 \text{ g } 29 \text{ cg} &= 3 \text{ g} + 29 \text{ cg} \\ &= (3 \times 100) \text{ cg} + 29 \text{ cg} [\because 1 \text{ g} = 100 \text{ cg}] \\ &= 300 \text{ cg} + 29 \text{ cg} \\ &= 329 \text{ cg} \end{aligned}$$

Example 6 : Convert 3 kg 8 hg 2 dag 5 g into g.

Solution :

$$\begin{aligned} 3 \text{ kg } 8 \text{ hg } 2 \text{ dag } 5 \text{ g} &= 3 \text{ kg} + 8 \text{ hg} + 2 \text{ dag} + 5 \text{ g} \\ &= (3 \times 1000) \text{ g} + (8 \times 100) \text{ g} + (2 \times 10) \text{ g} + 5 \text{ g} \\ &\quad [\because 1 \text{ kg} = 1000 \text{ g}, 1 \text{ hg} = 100 \text{ g} + 1 \text{ dag} = 10 \text{ g}] \\ &= 3000 \text{ g} + 800 \text{ g} + 20 \text{ g} + 5 \text{ g} \\ &= 3825 \text{ g} \end{aligned}$$



Example 7 : 7 l 25 ml into ml.

Solution :

$$\begin{aligned} 7 \text{ l } 25 \text{ ml} &= 7 \text{ l} + 25 \text{ ml} \\ &= (7 \times 1000) \text{ ml} + 25 \text{ ml} [\because 1 \text{ l} = 1000 \text{ ml}] \\ &= 7000 \text{ ml} + 25 \text{ ml} \\ &= 7025 \text{ ml} \end{aligned}$$

Example 8 : Convert 8 kl 6 hl 2 dal 7 l into l.

Solution :

$$\begin{aligned} 8 \text{ kl } 6 \text{ hl } 2 \text{ dal } 7 \text{ l} &= 8 \text{ kl} + 6 \text{ hl} + 2 \text{ dal} + 7 \text{ l} \\ &= (8 \times 1000) \text{ l} + (6 \times 100) \text{ l} + (2 \times 10) \text{ l} + 7 \text{ l} \\ &\quad [\because 1 \text{ kl} = 1000 \text{ l}, 1 \text{ hl} = 100 \text{ l}, 1 \text{ dal} = 10 \text{ l}] \\ &= 8000 \text{ l} + 600 \text{ l} + 20 \text{ l} + 7 \text{ l} \\ &= 8627 \text{ l} \end{aligned}$$



Exercise 13.3

1. Convert the following units of length:

- | | |
|--------------------------------|--------------------------------|
| (a) 2 m 6 cm into cm | (b) 5 cm 3 mm into mm |
| (c) 3 km 420 m into m | (d) 5 km 7 hm 3 dam 2 m into m |
| (e) 2 km 8 hm 5 dam 9 m into m | |



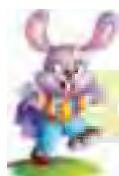


2. Convert the following units of mass:

- (a) 3 kg 250 into g (b) 2 g 14 mg into mg
(c) 5 cg 90 mg into mg (d) 4 kg 5 hg 3 dag 2 g into g
(e) 3 kg 2 hg 7 dag 9 g into g

3. Convert the following units of capacity:

- (a) 2 hl 20 l into l (b) 5 dal 9 l into l
(c) 6 l 25 dl into dl (d) 5 kl 7 hl 2 dal 5 l into l
(e) 2 kl 3 hl 7 dal 8 l into l



Conversion of Lower Units into Higher Units

Solved Examples

Example 1 : Convert 80 mm into cm.

Solution : 10 mm = 1 cm
80 mm = (80 ÷ 10) cm
= 8 cm

Example 2 : Convert 29 mm into cm and mm.

Solution : 29 mm = 20 mm + 9 mm
= (20 ÷ 10) cm + 9 mm (∵ 10 mm = 1 cm)
= 2 cm + 9 mm
= 2 cm 9 mm

Example 3 : Convert 426 cm into m and cm.

Solution : 426 cm = 400 cm + 26 cm
= (400 ÷ 100) m + 26 cm [∵ 100 cm = 1 m]
= 4 m + 26 cm
= 4 m 26 cm



Example 4 : Convert 764 *cm* into *m* and *cm*.

Solution : $764 \text{ mm} = 700 \text{ cm} + 64 \text{ cm}$
 $= (700 \div 100) \text{ m} + 64 \text{ cm} [\because 100 \text{ cm} = 1 \text{ m}]$
 $= 7 \text{ m} + 64 \text{ cm}$
 $= 7 \text{ m } 64 \text{ cm}$

Example 5 : Convert 6200 *hg* into *g*.

Solution : $6200 \text{ hg} = (6200 \div 100) \text{ g} [\because 100 \text{ g} = 1 \text{ hg}]$
 $= 62 \text{ g}$

Example 6 : Convert 272 *cg* into *g* and *cg*.

Solution : $272 \text{ cg} = 200 \text{ cg} + 72 \text{ cg}$
 $= (200 \div 100) \text{ g} + 72 \text{ cg} [\because 100 \text{ cg} = 1 \text{ g}]$
 $= 2 \text{ g} + 72 \text{ cg}$
 $= 2 \text{ g } 72 \text{ cg}$

Example 7 : Convert 7642 *l* into *kℓ* and *ℓ*.

Solution : $7642 \text{ l} = 7000 \text{ l} + 642 \text{ l}$
 $= (7000 \div 1000) \text{ kℓ} + 642 \text{ l} [\because 1000 \text{ l} = 1 \text{ kℓ}]$
 $= 7 \text{ kℓ} + 642 \text{ l}$
 $= 7 \text{ kℓ } 642 \text{ l}$

Example 8 : Convert 25 *dℓ* into *ℓ* and *dℓ*.

Solution : $25 \text{ dℓ} = 20 \text{ dℓ} + 5 \text{ dℓ}$
 $= (20 \div 10) \text{ ℓ} + 5 \text{ dℓ} [\because 10 \text{ dℓ} = 1 \text{ ℓ}]$
 $= 2 \text{ ℓ} + 5 \text{ dℓ}$
 $= 2 \text{ ℓ } 5 \text{ dℓ}$



Exercise 13.4

1. Convert the following units of length:

- (a) 32 mm into cm and mm
- (b) 900 cm into m
- (c) 586 cm into m and cm
- (d) 6000 m into km
- (e) 820 m into hm and m



2. Convert the following units of mass:

- (a) 2600 g into kg and g
- (b) 7340 g into kg and g
- (c) 50 g into dag
- (d) 3805 mg into g and mg
- (e) 29 dg into g and dg

3. Convert the following units of capacity:

- (a) 8000 l into kl
- (b) 876 l into hl and l
- (c) 25 l into dal and l
- (d) 2000 ml into l
- (e) 732 cl into l and cl



Think Wisely

Krishna has only 500g weight. How will he weigh 1kg 500g potatoes by using balance twice?





Mental Maths

Complete the following:-

1. $3\text{m} = \underline{\hspace{2cm}} \text{cm}$
2. $3000\text{g} = \underline{\hspace{2cm}} \text{kg}$
3. $1425 \text{ ml} = \underline{\hspace{2cm}} \text{l}$
4. The base unit of length is $\underline{\hspace{2cm}}$.
5. $\underline{\hspace{2cm}}$ litres make one kilolitre.



Maths Lab Activity

Materials required: Measuring flask, buckets of capacity 5l . empty water bottles.

Steps:

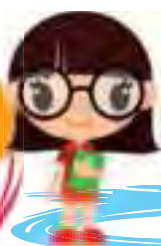
1. This activity will be done in groups of 6 to 8 students.
2. Each group will be given empty water bottles, measuring flask and bucket.
3. First, a student will fill empty water bottles with water using measuring flask.
4. Another student will record the capacity of each water bottle.
5. Other students will pour this water from bottles into the bucket.
6. They will record the number of bottles required to fill the 5l bucket.



Obsevation: Students will note down their result in a table.

Capacity of bucket	Capacity of water bottle	Number of water bottles required
5l	1l	5





Geometrical Concepts



Learning Objectives

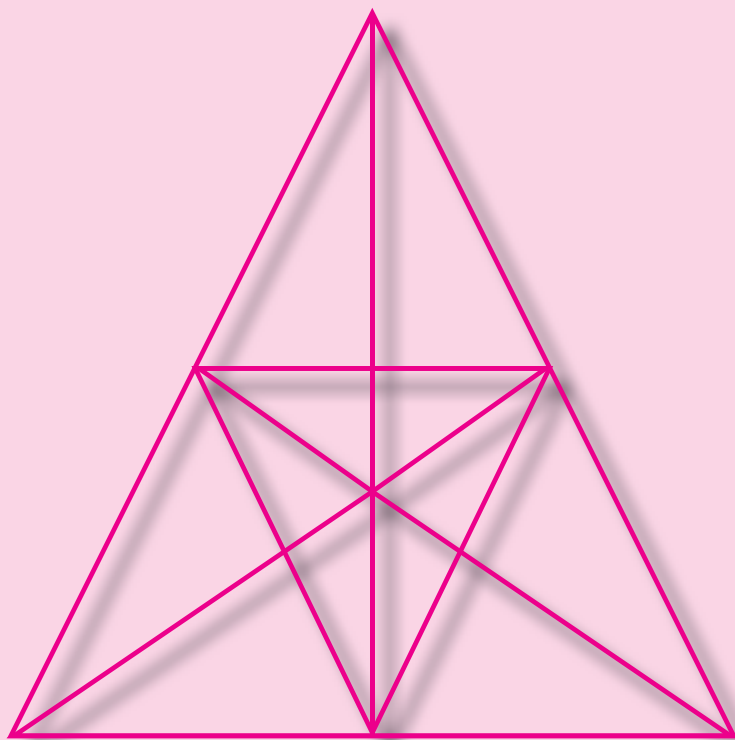
By the end of this lesson, students will be able to:

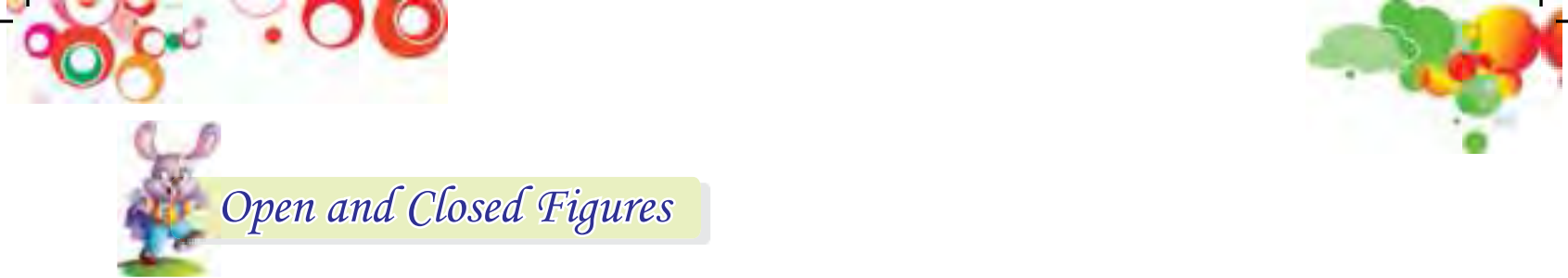
- Understand open and closed figures.
- Know the types of angles and compare them.
- Draw the different types of angles.



Warm-Up

How many triangles are there in the given figures?
Count and write in the box given.

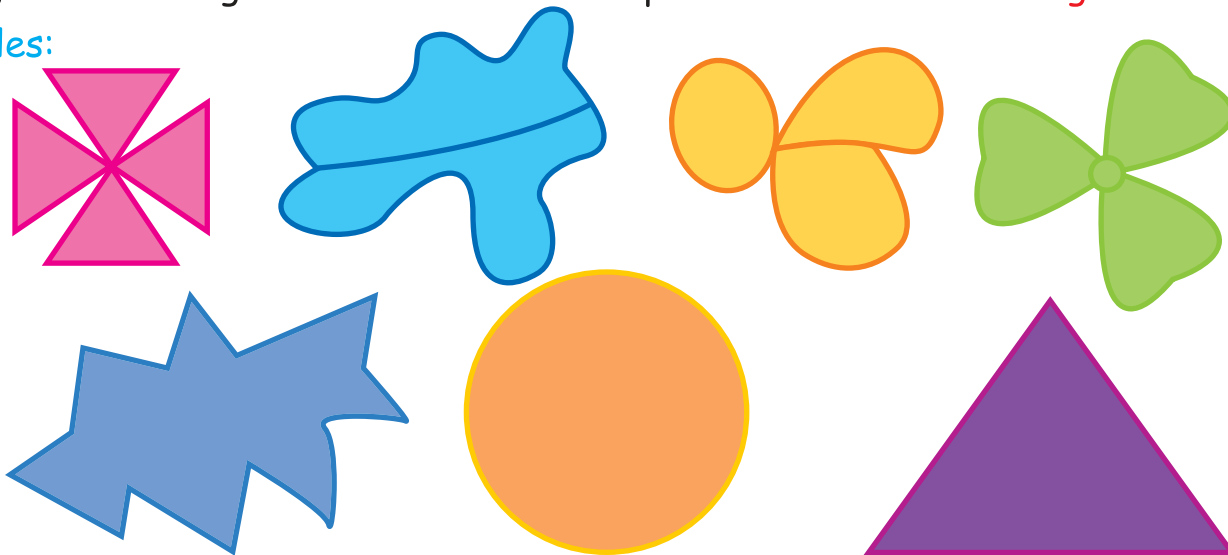




Open and Closed Figures

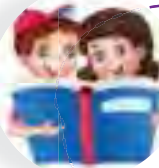
The figures that begin and end at the same point are called **closed figures**.

Examples:



The figures that do not begin and end at the same point are called **open figures**.

Examples:



Facts to Know

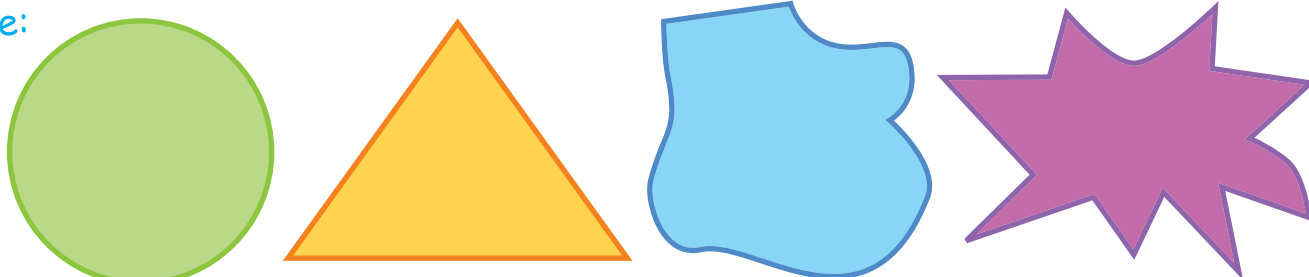
In geometry, a closed shape can be defined as an enclosed shape or figure whose line segments and/or curves are connected or meet. They start and end at the same point.



Simple Closed Figures

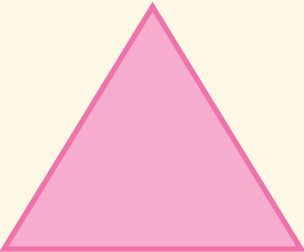
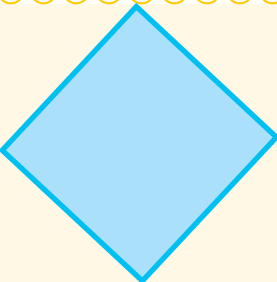
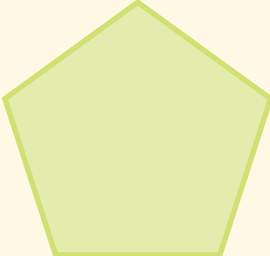
The closed curve that does not intersect itself is called a **simple closed curve**.

Example:

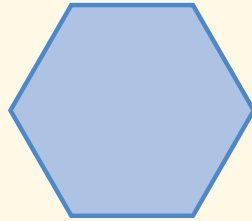


Polygon

Polygon is a simple closed figure formed by three or more line segments. Some of the different types of polygons are shown below:

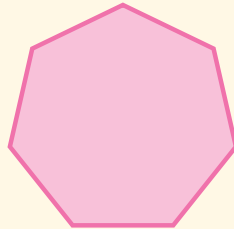
Name	Shape	Number of Sides
Triangle		3
Quadrilateral		4
Pentagon		5

Hexagon



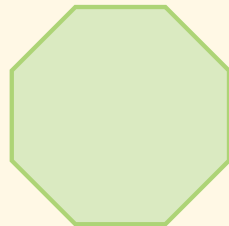
6

Heptagon



7

Octagon



8

Exercise 14.1

1. Which of the following are closed figures?

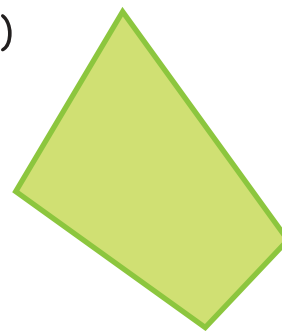
(a)



(b)



(c)



(d)



2. Which of the following are open figures?

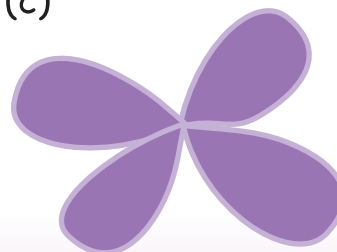
(a)



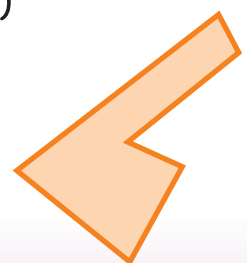
(b)



(c)

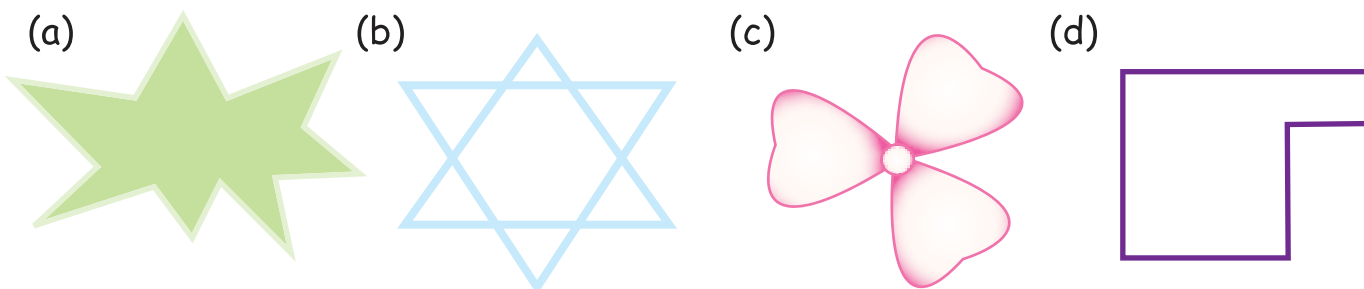


(d)

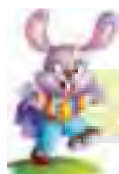
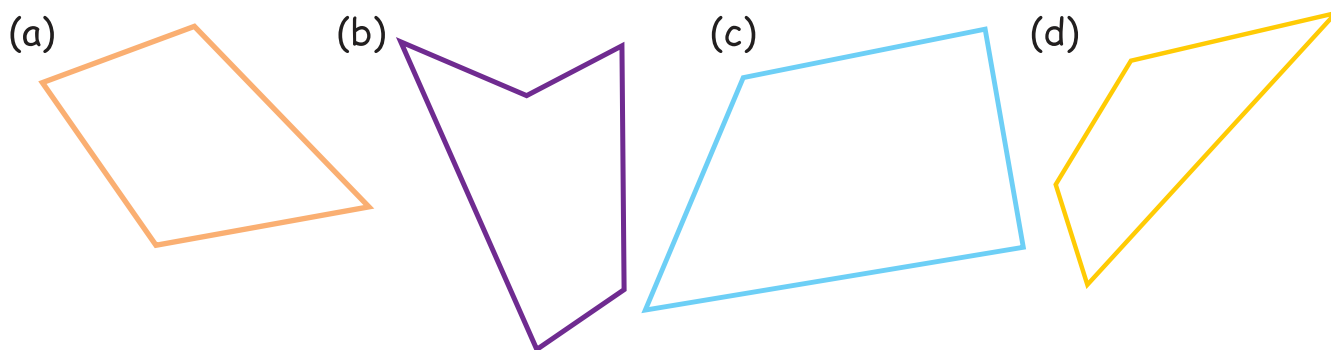




3. Which of the following are simple closed figures?

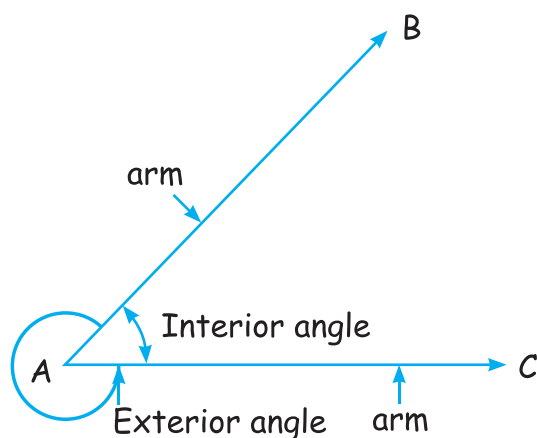


4. Which of the following polygons are quadrilateral?



Angles

When two rays originate from the same point, then they form an **angle**.



or, we can say that, two rays having a same end point, forms an **angle**.

In the above figure, AB and AC are the two arms of an angle.

The angle formed inside the two arms is known as **interior angle**.

The angle formed outside the two arms is known as **exterior angle**.



Many objects around us forms an angle.

Examples,

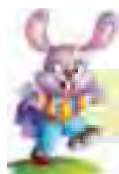
Two arms of a scissors.



Two hands in the clock.



Two legs of a trousers.



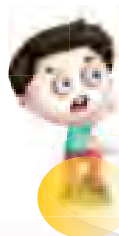
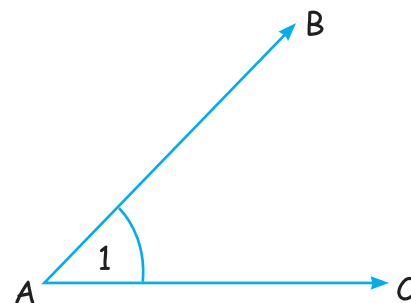
Naming An Angle

The symbol ' $\angle$ ' is used to denote an angle.

The angle can be named as $\angle BAC$ or $\angle CAB$ or $\angle A$.



Sometimes, the name of an angle can also be written as by putting a number inside the angle. So, $\angle BAC$ can also be written as, $\angle 1$

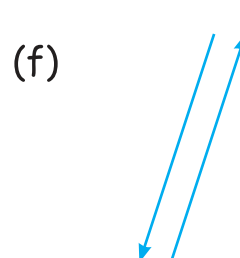
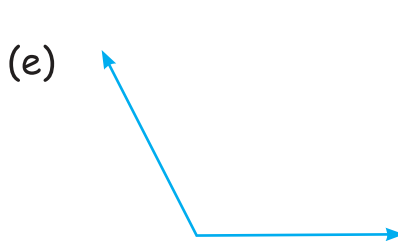
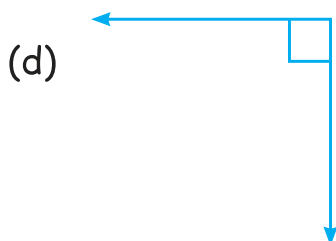
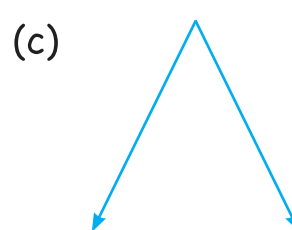
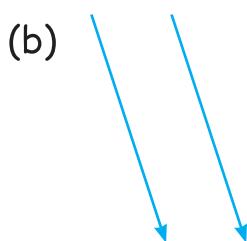
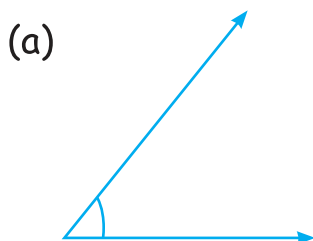


Quick Tip

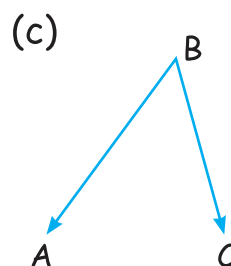
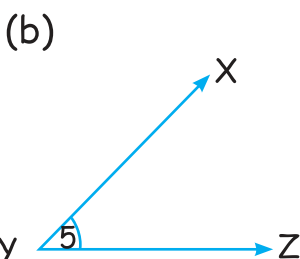
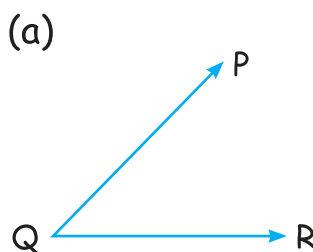
The vertex denoting the angle is always written in middle.

Exercise 14.2

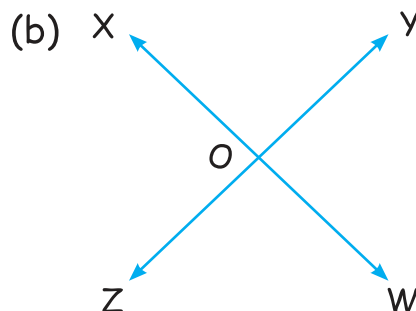
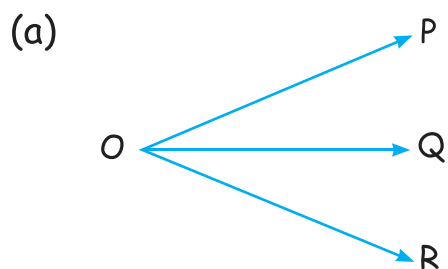
1. Which of the following figures represent an angle?



2. Name each of the following angles in any two ways:



3. Count the number of angles found in each of the following figures. Also write their names:



4. Draw the following angles:

(a) $\angle PQR$

(b) $\angle XYZ$

(c) $\angle 5$

(d) $\angle 2$

(e) $\angle 3$

(f) $\angle ABC$

(g) $\angle LMO$

(h) $\angle 6$



Types Of Angles



There are six types of angles.

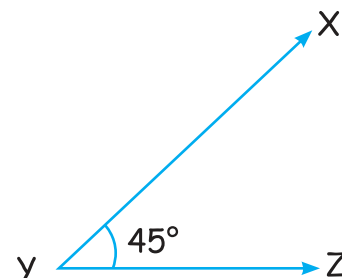
1. Acute Angle:

An angle whose measure is more than 0° but less than 90° , is known as acute angle.

For example,

$$\angle XYZ = 45^\circ$$

$\therefore \angle XYZ$ is an acute angle.



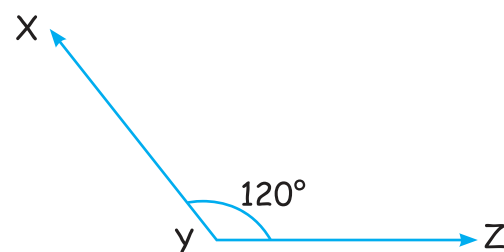
2. Obtuse Angle:

An angle whose measure is more than 90° but less than 180° , is known as obtuse angle.

For example,

$$\angle XYZ = 120^\circ$$

$\therefore \angle XYZ$ is an obtuse angle.



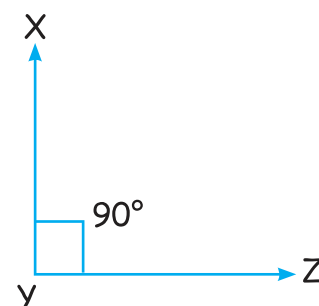
3. Right angle:

An angle whose measure is 90° , is known as right angle.

For example,

$$\angle XYZ = 90^\circ$$

$\therefore \angle XYZ$ is a right angle.



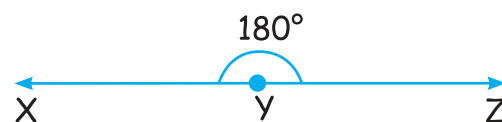
4. Straight Angle:

An angle whose measure is 180° , is known as straight angle.

For example,

$$\angle XYZ = 180^\circ$$

$\therefore \angle XYZ$ is a straight angle.



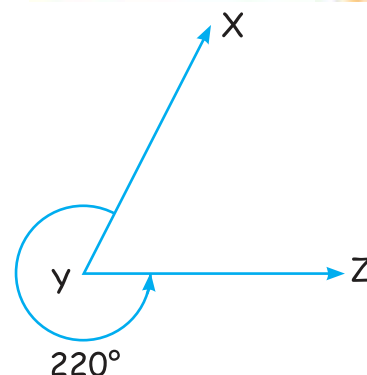
5. Reflex Angle:

An angle whose measure is more than 180° but less than 360° is known as reflex angle.

For example,

$$\angle XYZ = 220^\circ$$

$\therefore \angle XYZ$ is a reflex angle.



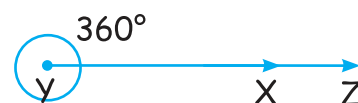
6. Whole Angle or Complete Angle:

An angle whose measure is 360° , is known as whole angle or complete angle.

For example,

$$\angle XYZ = 360^\circ$$

$\therefore \angle XYZ$ is a whole angle or complete angle.



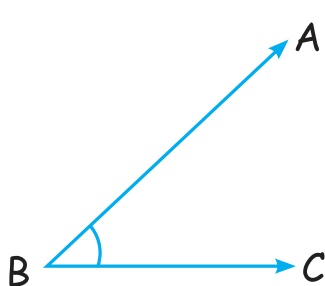
Teacher's Note:

Tell students that always use capital letters to denote angle names.

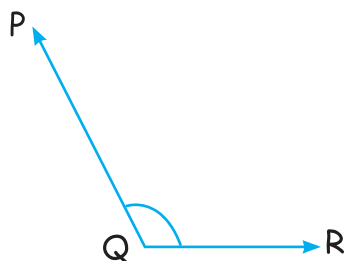
Exercise 14.3

1. Without measuring, identify the type of angle:

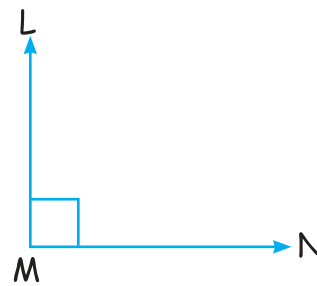
(a)



(b)



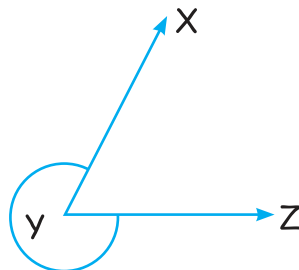
(c)



(d)



(e)



(f)



2. Identify and write the type of angle:

(a) 25°

(b) 100°

(c) 90°

(d) 280°

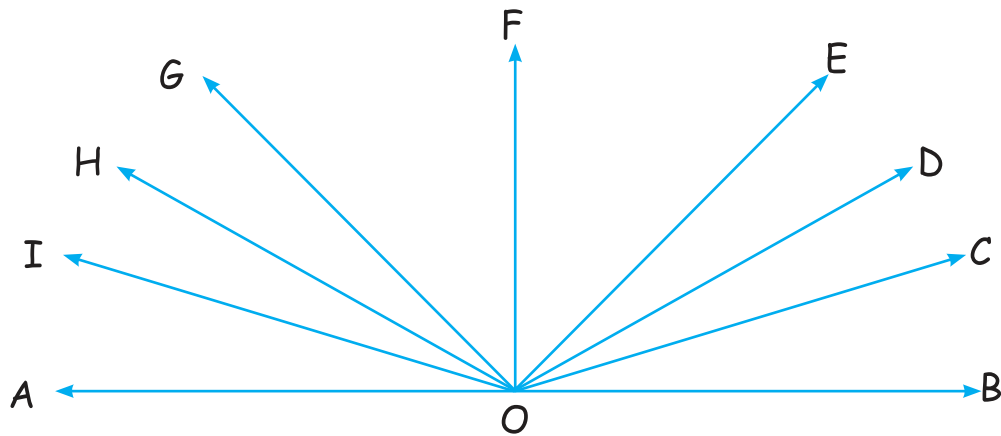
(e) 80°

(f) 160°

(g) 360°

(h) 180°

3. In the following figure, name any ten acute angles, six obtuse angles, one straight angle and two right angles:



Think Wisely

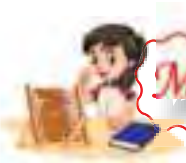
I have 4 sides and 4 right angles. My top and bottom are equal and my left and right are equal. What am I ?



Mental Maths

Write whether the statements are True or false.

1. Each face of a cube is a rectangle. ()
2. A polygon can have a minimum of 2 sides. ()
3. A triangle has 4 vertices. ()



Maths Lab Activity

Materials required: Paper, scissor and pencil.

Steps:

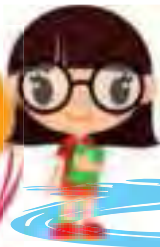
1. Draw a circle of any radius on the paper using a paper plate.
2. Cut-out the circle you have drawn on the paper.
3. Now fold it so that the two parts fit exactly over each other.
4. Open it. The crease will be along the diameter.
5. Now fold it along a different line and write down the names of angles it make.



Teacher's Note:

Teacher will provide the cut-out of the circle to the students.





Perimeter of Rectilinear Figures



Learning Objectives

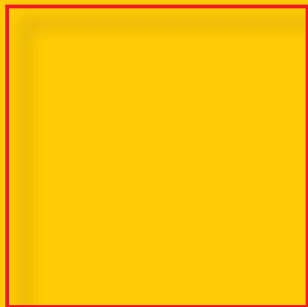
By the end of this lesson, students will be able to:

- Know about rectilinear figures.
- Find the perimeter of all the rectilinear figures.



Warm-Up

Measure the length of the shapes by using a ruler and add them up.



Rectangle: _____

Square: _____

Triangle: _____



Teacher's Note:

Apprise the students that real-life objects have perimeters as well. A football field, including the end zones, is 360 feet long and 160 feet wide. This means that the perimeter of the field is $360+160+360+160=1040$ feet.



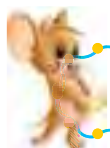
The word '**Perimeter**' is derived from the Greek word '**Peri**', which means '**around**' and '**Meter**' means '**measure**'.

Perimeter defines the length around a figure.

Perimeter can also be defined as a 'sum of all the sides'.

Rectilinear figures are the plane figures bounded by the line segments.

All the polygons are the rectilinear figures.



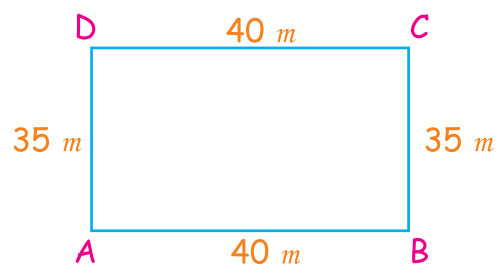
Remember

- ❖ Perimeter of a rectangle = $2 \times (\text{Length} + \text{Breadth})$
- ❖ Perimeter of a square = $4 \times (\text{Side of the square})$

Solved Examples

Example 1 : Find the perimeter of a rectangular field whose length is 40 m and breadth is 35 m.

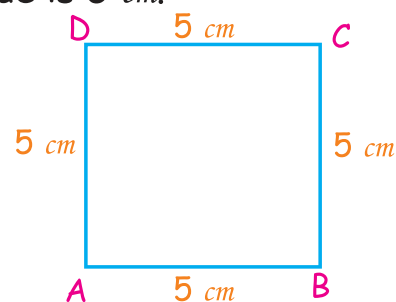
Solution : Perimeter = $2 \times (\text{Length} + \text{Breadth})$
= $2 \times (40 \text{ m} + 35 \text{ m})$
= $2 \times 75 \text{ m}$
= 150 m



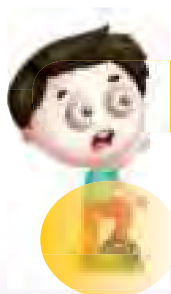
$\therefore$ The perimeter of a rectangular field is 150 m

Example 2 : Find the perimeter of a square whose each side is 5 cm.

Solution : Perimeter = $4 \times (\text{side})$
= $4 \times 5 \text{ cm}$
= 20 cm



$\therefore$ The perimeter of a square is 20 cm

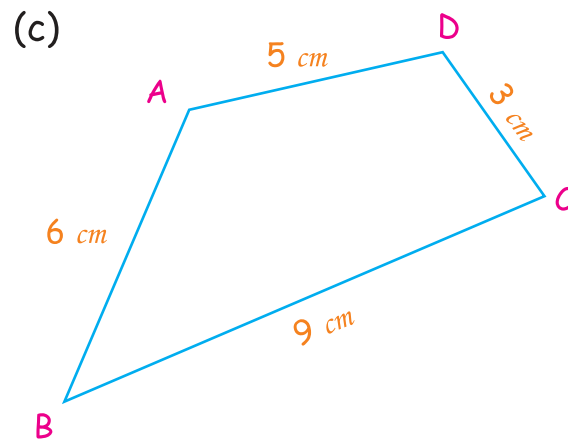
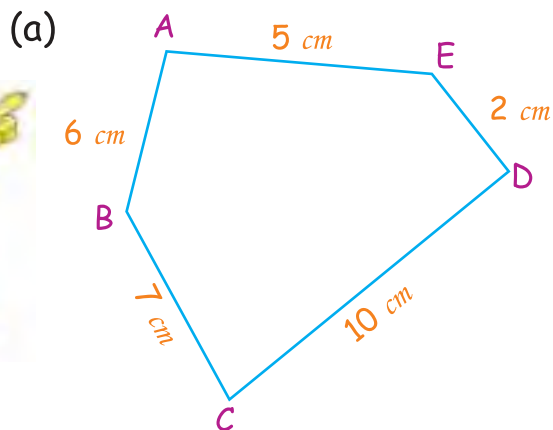


Quick Tip

The perimeter of any polygon is the sum of the lengths of its sides or line segments.



Example 3 : Find the perimeter of the following rectilinear figures:



Solution :

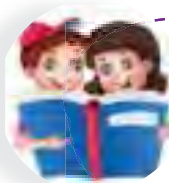
(a) Perimeter = $AB + BC + CD + DE + EA$
 $= 6 \text{ cm} + 7 \text{ cm} + 10 \text{ cm} + 2 \text{ cm} + 5 \text{ cm}$
 $= 30 \text{ cm}$
 $\therefore$ Perimeter = 30 cm

(b) Perimeter = $AB + BC + CD + DA$
 $= 6 \text{ cm} + 9 \text{ cm} + 3 \text{ cm} + 5 \text{ cm}$
 $= 23 \text{ cm}$
 $\therefore$ Perimeter = 23 cm



Example 4 : The perimeter of rectangle is 120 cm . If its length is 40 cm , find its breadth.

Solution :

$$\begin{aligned} \text{Length} + \text{Breadth} &= \frac{1}{2} \times \text{Perimeter} \\ &= \frac{1}{2} \times 120 \text{ cm} \\ &= 60 \text{ cm} \\ \text{Length} + \text{Breadth} &= 60 \text{ cm} \\ \text{Breadth} &= 60 \text{ cm} - \text{Length} \\ &= 60 \text{ cm} - 40 \text{ cm} = 20 \text{ cm} \end{aligned}$$


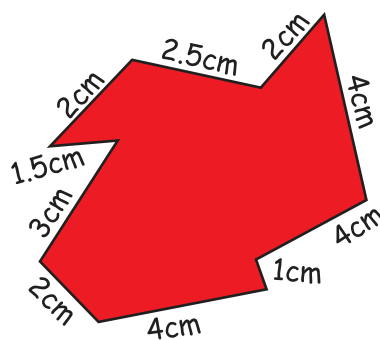
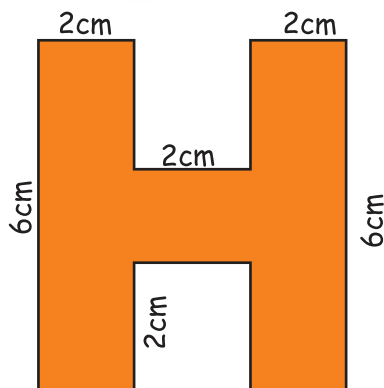
Facts to Know

Carl Friedrich Richard Foerster (1825-1902) is the inventor of perimeter.



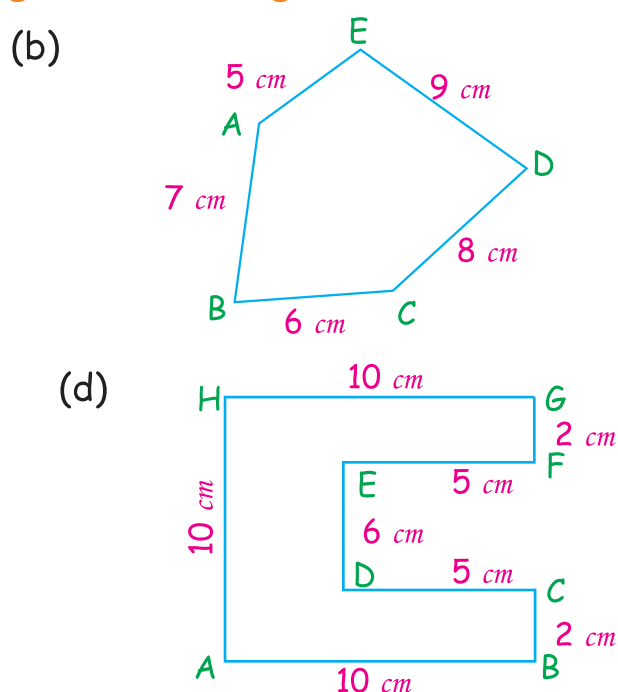
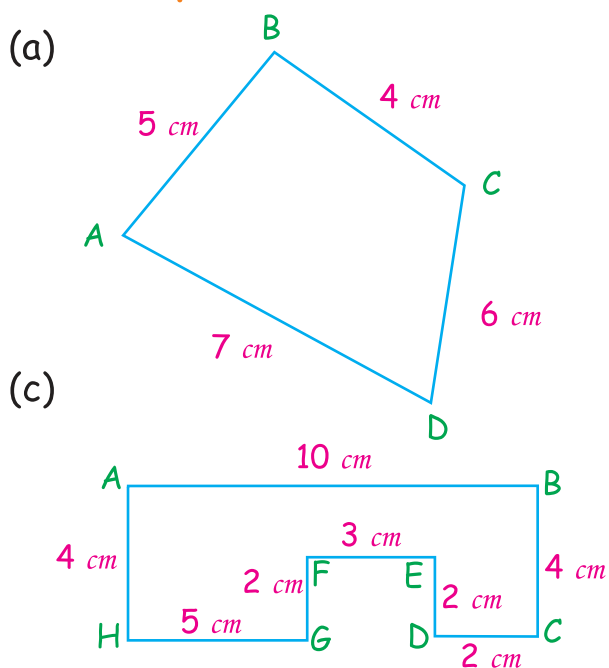
Think Wisely

Find the perimeter of the given figures.



Exercise 15.1

1. Find the perimeter of the following rectilinear figures:



2. Find the perimeter of a triangle whose sides are given below:

- (a) 15 cm, 14 cm and 20 cm
- (b) 5 m, 10 m and 8 m

3. Find the perimeter of a square whose side is 4 cm.

4. Find the perimeter of a rectangular field whose length is 15 m and breadth is 10 m.

5. The perimeter of a rectangular field is 160 m. If its length is 50 m, find its breadth.
6. If the perimeter of a square is 100 cm, find its side.



Mental Maths

Complete the given table:

(a)	Perimeter of square	Length of a side	(b)	Perimeter of rectangle	Length	Breadth
	(i) _____	40mm		(i) _____	25m	15cm
	(ii) _____	20mm		(ii) 86cm	19cm	_____
	(iii) 48cm	_____		(iii) 484cm	_____	58cm
	(iv) 72cm	_____		(iv) 250cm	75cm	_____



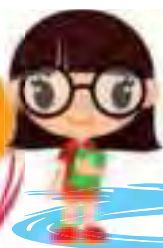
Maths Lab Activity

Materials required: A textbook and thread

Steps:

1. Place the thread on the boundary (i.e. of the four edges) of the top of the book.
2. Remove the thread from the book.
3. Using the scale, measure the length of the thread in cm.
4. This length gives the length of the boundary of the top of the book.
5. Calculate the perimeter of books using this method.





Pictorial Data Representation



Learning Objectives

By the end of this lesson, students will be able to:

- Analyse pictographs.
- Represent the data using pictograph and Bar graph.



Warm-Up

Ask each of your classmates about his/her favourite fruit and prepare a table.

Favourite fruit	Number of students
Apple	
Mango	
Litchi	
Strawberry	
Blueberry	
Banana	
Orange	





Data is a fact or an information collected for analysis.

Pictorial data representation means representation of numerical data through graphs or pictures.



Solved Examples

Example 1 : Mr. Raj went to the market to purchase cold drinks. He purchased following cold drinks:

6 - Fanta

12 - Pepsi

8 - Dew

5 - Maza

7 - Coke

Represent the above data using pictograph.

Solution :

Cold-Drinks Purchased by Mr. Raj



Pepsi



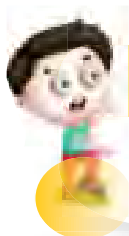
Dew



Maza

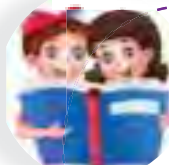


Coke



Quick Tip

Always make equal division to represent data.



Facts to Know

Advantages of using pictographs:

- They help in visually formatting statistics.
- They make data visually interesting and easy to understand.
- Representing data in a pictographic way can be useful for representing a large amount of data.



Exercise 16.1

In each of the following questions, represent the data using pictograph:

1. Number of different animals in the zoo:

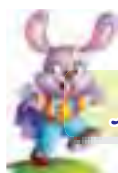
Monkey	Lions	Elephant	Tiger	Deer
20	5	15	25	10

2. Number of students who can play different games in the school:

Cricket	Badminton	Football	Basket Ball	Chess
80	70	40	50	60

3. Number of students of a school liking different T.V. channels:

Zee T.V.	Sony	Discovery	Food Food	Pogo	Sab T.V.
30	15	50	10	70	85



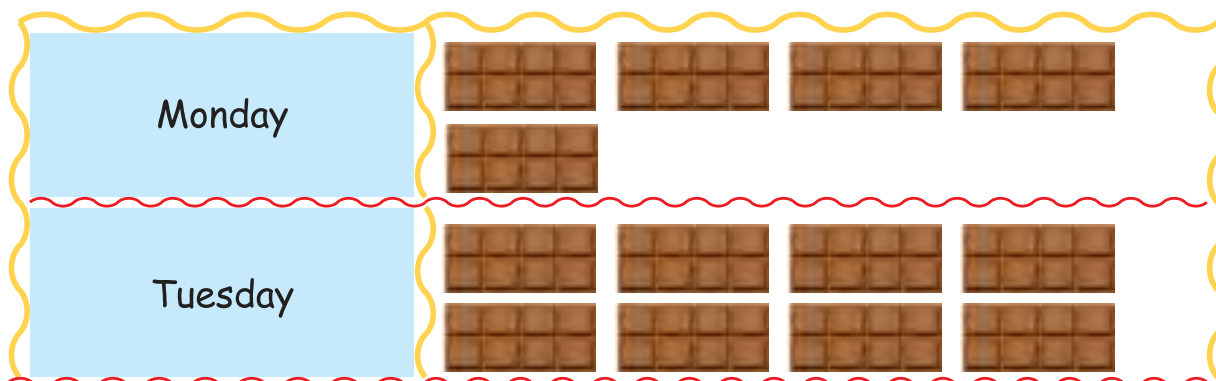
Analyzing Pictographs



Analyzing pictographs means to read the data represented in the pictographs.

Solved Examples

Example 1 : A pictograph is given below. It shows the number of chocolates sold on seven days of a certain week.





Note: 1  represents 10 chocolates.

From the above pictograph, answer the following questions:

- (a) On which day maximum number of chocolates sold?
- (b) On which day minimum number of chocolates sold?
- (c) How many chocolates are sold on thursday?
- (d) How many more chocolates were sold on saturday than friday?
- (e) What is the total number of chocolates sold in all these seven days?

Solution :

- (a) Sunday
- (b) Wednesday
- (c) It is given that 1 symbol of chocolates represents 10 chocolates
So, number of chocolates sold on thursday

$$= 4 \times 10$$

$$= 40$$



(d) Number of chocolates sold on saturday = 6×10
 $= 60$
 Number of chocolates sold on friday = 3×10
 $= 30$
 Number of more chocolates sold on saturday than friday = $60 - 30$
 $= 30$

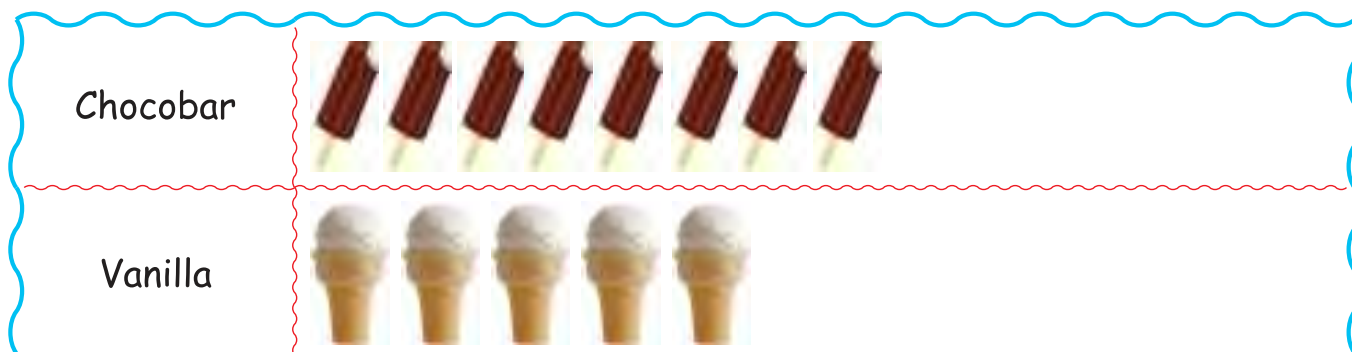
Hence, 30 more chocolates were sold on saturday than friday.

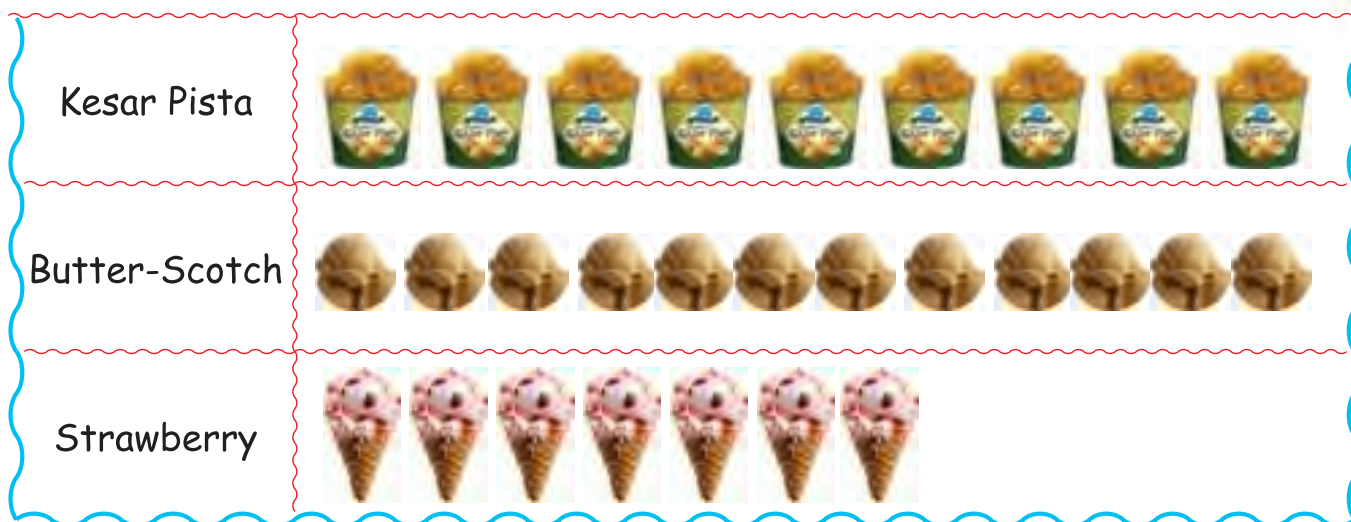
(e) Number of chocolates sold on monday = $5 \times 10 = 50$
 Number of chocolates sold on tuesday = $8 \times 10 = 80$
 Number of chocolates sold on wednesday = $2 \times 10 = 20$
 Number of chocolates sold on thursday = $4 \times 10 = 40$
 Number of chocolates sold on friday = $3 \times 10 = 30$
 Number of chocolates sold on saturday = $6 \times 10 = 60$
 Number of chocolates sold on sunday = $9 \times 10 = 90$
 $\therefore$ Total number of chocolates sold in these seven days
 $= 50 + 80 + 20 + 40 + 30 + 60 + 90$
 $= 370$ chocolates

Exercise 16.2

1. The following pictograph shows the number of different ice-creams sold by the ice-cream seller:

Number of Different Ice-Creams





Note: 1 ice-cream represents 5 ice-creams.

From the above pictograph answer the following questions:

- Which ice-cream is liked by the customers most?
- Which ice-cream is less liked by the customers?
- How many kesar pista were sold?
- How many less vanilla were sold than strawberry?
- What is the total number of ice-creams were sold?

2. The following pictograph shows the different types of flowers in a garden:
Different flowers In A Garden

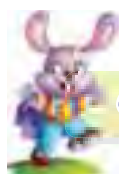
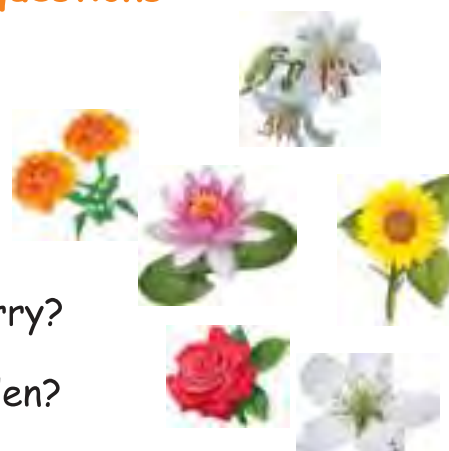




Note: 1 flower represents 8 flowers.

From the above pictograph, answer the following questions:

- Which flower is least in the garden?
- Which flower is most in the garden?
- How many roses are there in a garden?
- How many sunflowers are more than black berry?
- What is the total number of flowers in a garden?



Data Representation Using Bar Graphs

When the data is represented using bars, then such data representation is called bar graphs.

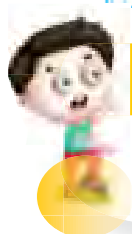
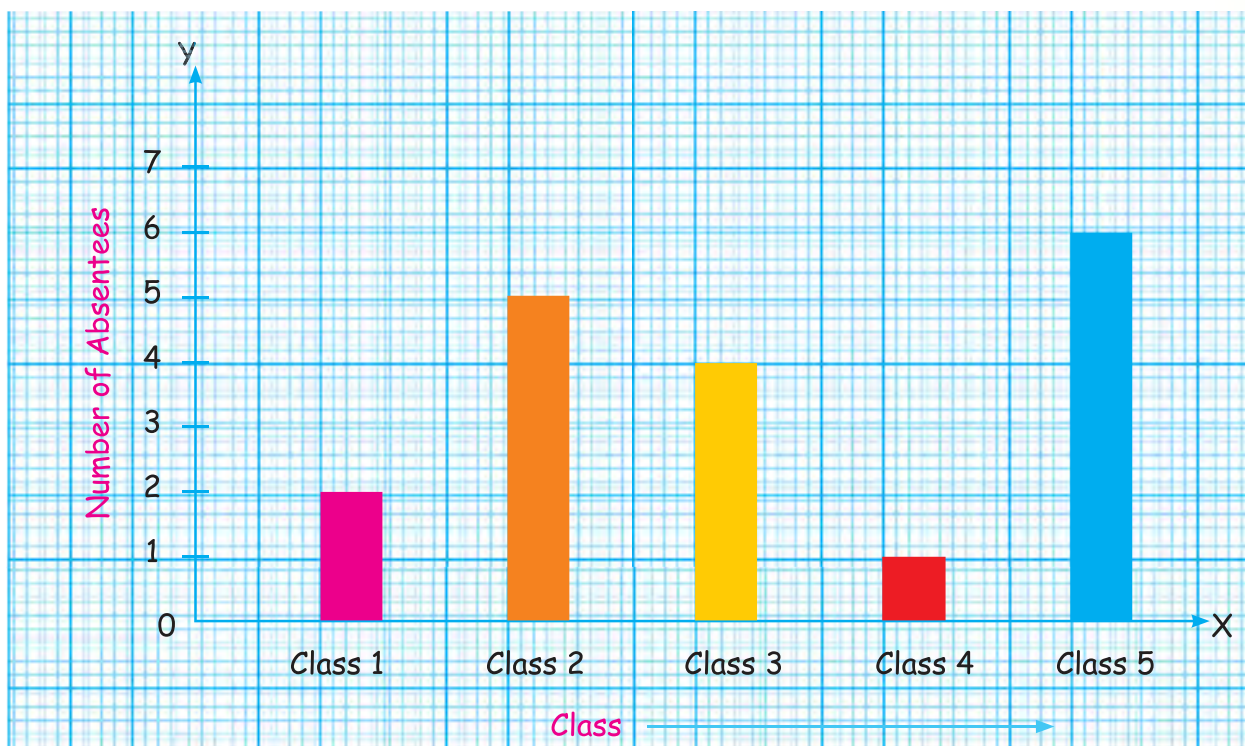
Solved Examples

Example 1 : Represent the following information about number of absentees in each class using bar graph:

Class	1	2	3	4	5
Number of Absentees	2	5	4	1	6



Solution :



Quick Tip

Make equal divisions to represent data.



Teacher's Note:

Apprise students that a horizontal line in a bar graph is 'x axis', and a vertical line in a bar graph is 'y axis'.

Exercise 16.3

1. Represent the following information about number of different fruits using bar graph:

Fruits	Mangoes	Apples	Bananas	Litches	Oranges
Number	10	8	12	9	6

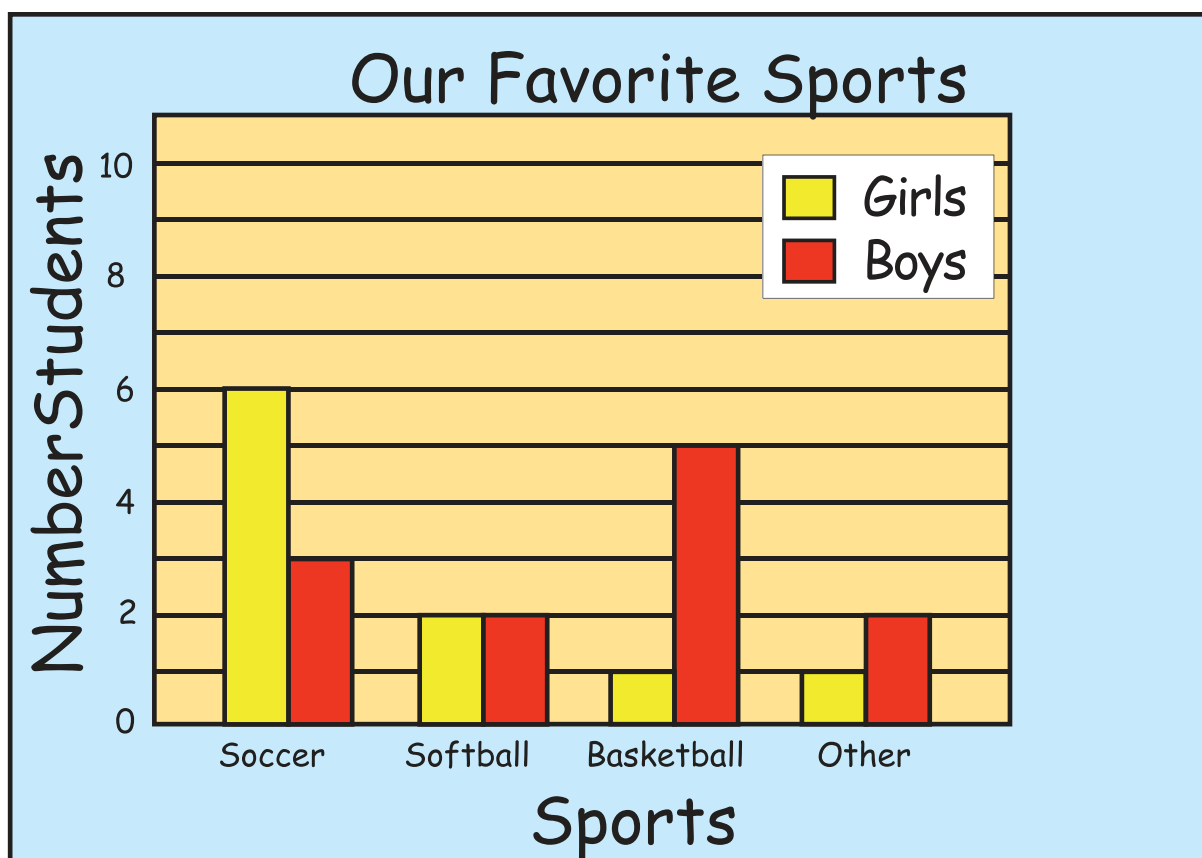
2. Represent the following information about favourite colour of children:

Colours	Red	Pink	Blue	Orange	Purple
Number	8	9	4	5	2



Think Wisely

Who likes Basketball the most?



Mental Maths

Fill in the blanks

1. Always make _____ division to represent data.
2. In a bar graph the vertical line is called _____.
3. In a bar graph the horizontal line is called _____.
4. _____ is a fact or an information collected for analysis.
5. _____ means representation of numerical data through graphs or pictures.



Materials required: Pencil and Pencil Colours.

Steps:

1. Half an hour was spent observing different vehicles passing through the road. The results are listed in the tally chart below:-

Vehicle	Tally marks	Total
Car		18
Bus		06
Bike		15
Truck		03.

2. Observe the data from the above tally chart to draw a pictograph.
3. Draw relevant pictures.
 - Each symbol stands for 3 vehicles

Car	
Bus	
Bike	
Truck	

