

Class - VI

Mathematics
WORKBOOK



State Council of Educational Research and Training
Govt. of Tripura

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MATHEMATICS WORK BOOK
Class - VI

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রতন লাল নাথ
মন্ত্রী
শিক্ষা দপ্তর
ত্রিপুরা সরকার



শিক্ষার প্রকৃত বিকাশের জন্য, শিক্ষাকে যুগোপযোগী করে তোলার জন্য প্রয়োজন শিক্ষাসংক্রান্ত নিরন্তর গবেষণা। প্রয়োজন শিক্ষা সংশ্লিষ্ট সকলকে সময়ের সঙ্গে সঙ্গে প্রশিক্ষিত করা এবং প্রয়োজনীয় শিখন সামগ্রী, পাঠ্যক্রম ও পাঠ্যপুস্তকের বিকাশ সাধন করা। এস সি ই আর টি ত্রিপুরা রাজ্যের শিক্ষার বিকাশে এসব কাজ সূনামের সঙ্গে করে আসছে। শিক্ষার্থীর মানসিক, বৌদ্ধিক ও সামাজিক বিকাশের জন্য এস সি ই আর টি পাঠ্যক্রমকে আরো বিজ্ঞানসম্মত, নান্দনিক এবং কার্যকর করবার কাজ করে চলেছে। করা হচ্ছে সুনির্দিষ্ট পরিকল্পনার অধীনে।

এই পরিকল্পনার আওতায় পাঠ্যক্রম ও পাঠ্যপুস্তকের পাশাপাশি শিশুদের শিখন সক্ষমতা বৃদ্ধির জন্য তৈরি করা হয়েছে ওয়ার্ক বুক বা অনুশীলন পুস্তক। প্রসঙ্গত উল্লেখ্য, ছাত্র-ছাত্রীদের সমস্যার সমাধানকে সহজতর করার লক্ষ্যে এবং তাদের শিখনকে আরো সহজ ও সাবলীল করার জন্য রাজ্য সরকার একটি উদ্যোগ গ্রহণ করেছে, যার নাম 'প্রয়াস'। এই প্রকল্পের অধীনে এস সি ই আর টি এবং জেলা শিক্ষা আধিকারিকরা বিশিষ্ট শিক্ষকদের সহায়তা গ্রহণের মাধ্যমে প্রথম থেকে দ্বাদশ শ্রেণির ছাত্র-ছাত্রীদের জন্য ওয়ার্ক বুকগুলো সুচারুভাবে তৈরি করেছেন। ষষ্ঠ থেকে অষ্টম শ্রেণি পর্যন্ত বিজ্ঞান, গণিত, ইংরেজি, বাংলা ও সমাজবিদ্যার ওয়ার্ক বুক তৈরি হয়েছে। নবম দশম শ্রেণির জন্য হয়েছে গণিত, বিজ্ঞান, সমাজবিদ্যা, ইংরেজি ও বাংলা। একাদশ দ্বাদশ শ্রেণির ছাত্র-ছাত্রীদের জন্য ইংরেজি, বাংলা, হিসাবশাস্ত্র, পদার্থবিদ্যা, রসায়নবিদ্যা, অর্থনীতি এবং গণিত ইত্যাদি বিষয়ের জন্য তৈরি হয়েছে ওয়ার্ক বুক। এইসব ওয়ার্ক বুকের সাহায্যে ছাত্র-ছাত্রীরা জ্ঞানমূলক বিভিন্ন কার্য সম্পাদন করতে পারবে এবং তাদের চিন্তা প্রক্রিয়ার যে স্বাভাবিক ছন্দ রয়েছে, তাকে ব্যবহার করে বিভিন্ন সমস্যার সমাধান করতে পারবে। বাংলা ও ইংরেজি উভয় ভাষায় লিখিত এইসব অনুশীলন পুস্তক ছাত্র-ছাত্রীদের মধ্যে বিনামূল্যে বিতরণ করা হবে।

এই উদ্যোগে সকল শিক্ষার্থী অতিশয় উপকৃত হবে। আমার বিশ্বাস, আমাদের সকলের সক্রিয় এবং নিরলস অংশগ্রহণের মাধ্যমে ত্রিপুরার শিক্ষাজগতে একটি নতুন দিগন্তের উন্মেষ ঘটবে। ব্যক্তিগত ভাবে আমি চাই যথাযথ জ্ঞানের সঙ্গে সঙ্গে শিক্ষার্থীর সামগ্রিক বিকাশ ঘটুক এবং তার আলো রাজ্যের প্রতিটি কোণে ছড়িয়ে পড়ুক।


(রতন লাল নাথ)

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Chapter - 1



Knowing our Numbers

INTRODUCTION

Many thousands year ago, people knew only small numbers. Gradually, they learnt how to handle large numbers. They also learnt how to express large numbers in symbols. Numbers help us count concrete objects. We have added, subtracted, multiplied and divided them. We also looked for patterns in number sequences and done many other interesting things with numbers.

Gives two numbers, one with more digits is the greater number. If the number of digits in two given numbers is the same, that number is large, which has a greater left most digit. If this digit also happens to be the same we look at the next digit and so on. The smallest four digit number is 1000 (one thousand). It follows the largest three digit number 999. Similarly, the smallest five digit number is 10,000. It is ten thousand and follows the largest four digit number 9999. We observe that greatest 3-digit number + 1 = smallest 4-digit number.

Remember kilo shows 1000 times larger, Centi shows 100 times smaller and milli shows 1000 times smaller,

thus, 1 kilometre = 1000 metres,
1 metre = 100 centimetres or 1000 millimetres,
1 litre = 1000 millilitres,
1 gram = 1000 miligram.

Ascending order means arrangement from the smallest to the greatest.
Descending order means arrangement from the greatest to the smallest.



REVISITING PLACE VALUE

Number	Number Name	Expansion
65,740	Sixty five thousand seven hundred forty	$6 \times 10000 + 5 \times 1000 + 7 \times 100 + 4 \times 10$
3,53,500	Three lakh fifty three thousand five hundred	$3 \times 100000 + 5 \times 10000 + 3 \times 1000 + 5 \times 100$
89,324	Eighty nine thousand three hundred twenty four	$8 \times 10000 + 9 \times 1000 + 3 \times 100 + 2 \times 10 + 4 \times 1$

Large Number

If we add one more to the greatest 6-digit number we get the smallest 7-digit number. It is called ten lakh. The smallest 8-digit number is called one crore.

$$1 \text{ lakh} = 100 \text{ thousands} = 1000 \text{ hundreds}$$

$$1 \text{ crore} = 100 \text{ lakhs} = 10000 \text{ thousands}$$

INDIAN SYSTEM OF NUMERATION AND INTERNATIONAL SYSTEM OF NUMERATION

Commas help us in reading and writing large number. In our Indian system of numeration we use ones, tens, hundreds, thousands and then lakhs and crores. Commas are used to mark thousands, lakhs and crores.

In the International system of numeration, as it is being used we have ones, tens, hundreds, thousands and then millions. One million is a thousand thousands. Commas are used to mark thousands and millions.

For example, the number 50,801,592 is read in the International system as fifty million eight hundred one thousand five hundred ninety two. In the Indian system, it is five crore eight lakh one thousand five hundred ninety two. 1 billion = 1000 million.



Estimation

Estimation involves approximating a quantity to an accuracy required. Thus 4117 may be approximated to 4100 or to 4000 i.e. the nearest hundred or to the nearest thousand depending on our need. Estimating the outcome of number operations is useful in checking answers.

Roman Numerals

We have been using the Hindu - Arabic numeral system so far. This is not the only system available. One of the early system of writing numerals is the system of Roman numerals. This system is still used in many places. For example, the use of Roman numerals in clocks. It is also used for classes in the school time table etc.

I, II, III, IV, V, VI, VII, VIII, IX, X

denote 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 respectively

Some more Roman numerals

I	V	X	L	C	D	M
1	5	10	50	100	500	1000

Also

X	XX	XXX	XL	L	LX	LXX	LXXX	XC	C
10	20	30	40	50	60	70	80	90	100

Using Brackets and Expanding Brackets

Rina bought 9 note books from the book market and the cost was Rs.10 per note book. Her sister Tina also bought 6 note books from the same type. We have to find the total money they paid.

Rina calculated the amount

$$\begin{aligned} &9 \times 10 + 6 \times 10 \\ &= 90 + 60 \\ &= 150 \end{aligned}$$

Tina calculated the amount

$$\begin{aligned} &9 + 6 = 15 \\ &\text{and } 15 \times 10 = 150 \end{aligned}$$

This clearly tells that, first, turn everything inside the bracket () into a single number and then do the operation outside which in this case is to multiplied by 10.



$$\begin{aligned}17 \times 109 &= (10 + 7) \times 109 \\ &= 10 \times 109 + 7 \times 109 \\ &= 10 \times (100 + 9) + 7 \times (100 + 9) \\ &= 1000 + 90 + 700 + 63 = 1790 + 63 = 1853\end{aligned}$$

Exercise - 1

Very Short Answer Type Questions : (1 Mark)

- Find the greatest and smallest numbers
 - 16234, 16324, 16432, 16423
Ans- Greatest number 16432, Smallest number 16234
 - 26286, 26245, 26270, 26210, 26682
Ans-
- Use the given digits without repetition make the greatest and smallest 4-digit numbers.
 - 2, 8, 9, 4
 - 1, 6, 2, 8
 - 3, 5, 7, 0
- How many centimetres make 1 kilometre?
- How many milligrams make one kilogram?
- How many lakhs make 2 million?
- How many millions make five crore?
- Write the following expressions for each of the following using brackets.
 - Six multiplied by the sum of seven and three.
 - Divide five by the difference of nine and two.
- What is $1,00,00,000 - 1 = ?$
- What is $99,99,999 + 1 = ?$
- Estimate each of the following using general rule.
 - $715 + 999$,
 - $28,191 - 21,356$



Fill in the blanks (1 Mark)

1. 3 lakh = ten thousand.
2. 10 crore = ten lakh.
3. 1 billion = million.
4. 1 kilometre = metres.
5. $98 = \dots \times 10 + \dots \times 1$
6. 999 is the greatest digit number.
7. Greatest 3 digit number + 1 = Smallest digit number.
8. Roman numeral XX is
9. 1 litre = milliliters.
10. The greatest 5 digit number =

Which of the following statements are True (T) and which are False (F) (1 Mark)

1. Ascending order means arrangement from the smallest to the greatest.
Ans -
2. Descending order means arrangement from the smallest to the greatest.
Ans -
3. 999 is the greatest 3 digit number.
Ans -
4. Smallest 5 digit number is 99999.
Ans -
5. Greatest 2 digit number + 1 = smallest 3 digit number.
6. 1 billion = 10000 million.
7. 1 gram = 1000 miligrams.
8. The smallest 8 digit number is called one crore.
9. The greatest 7 digit number is called ten lakh.
10. The Roman numeral C denote 100.



Multiple Choice Questions (Chose the correct answers) (1 Mark)

1. 1 billion =
a) 10 million, b) 1000 million,
c) 100 million, d) 10000 million.

2. 1 crore =
a) 10000 thousands, b) 100 thousands,
c) 1000 thousands, d) 10 thousands.

3. 1 lakh =
a) 10 ten thousand, b) 1000 ten thousand
c) 100 ten thousand d) 10000 ten thousand

4. 1 metre =
a) 10 milimetres, b) 100 milimetres,
c) 1000 milimetres, d) 10000 milimetres.

5. 1 milion =
a) 10 lakh, b) 100 lakh,
c) 1000 lakh, d) 10000 lakh.

6. The numerals of 'Nine crore five lakh forty one' is
a) 9,50,00,041 b) 9,05,00,041
c) 9,05,00,41 d) 9,50,00,41

7. Greatest 4 digit number is
a) 1000, b) 1010,
c) 1999, d) 9999.

8. Lowest 3 digit number is
a) 101, b) 100,
c) 999, d) 199.

9. The expression of Forty five-divided by three times the sum of three and two
a) $45 \div (3+2)3$, b) $(3+2)3 \div 45$,
c) $(3+2)45 \div 3$, d) $3 \div 45(2+3)$.

10. The smallest 8 digit number is called
a) 1 lakh, b) 10 lakh,
c) 1 crore, d) 10 crore.



Short Answer Type Question : (2 Marks)

1. Arrange the following numbers in ascending order
 - a) 847, 983, 975, 796
Ans- 796, 847, 975, 983
 - b) 9801, 8910, 9870, 7809
Ans-
2. Arrange the following number in descending order
 - a) 5000, 5005, 5500, 5055
 - b) 81971, 45321, 88715, 92547
3. Insert commas suitably and write the names according to Indian system of numerations
 - a) 87595762
 - b) 99900046
 - c) 98432701
4. Insert commas suitably and write the names according to International system of numerations
 - a) 78921092
 - b) 48049831
 - c) 99985102
5. Write in Roman numerals
 - a) 65 b) 97 c) 77 d) 93
6. Evaluate by expanding brackets
 - a) 17×103 b) 105×103

Long Answer Type Question : (3/4 Marks)

1. Amit is a famous cricket player. He has so far scored 6890 runs in test matches. He wishes to complete 10100 runs. How many more runs does he need?
Ans : Amit has so far scored 6890 runs in test matches. He wishes to complete 10,100 runs. \therefore
$$\begin{array}{r} 10,100 \\ - 6,890 \\ \hline 3,210 \end{array}$$
So, 3,210 more runs need.
2. Find the difference between the greatest and the smallest 5 digit number that can be written using the digits 6, 2, 7, 4, 3 each only ones.



3. In an election, the successful candidate got 5,77,600 votes and his nearest rival candidate got 2,84,800 votes. By what margin did the successful candidate win the election?

Ans-

4. The distance between the school and a student house is 2 km 750 m. Everyday she walks both ways. Find the total distance covered by her in six days.

Ans-

5. In a container there are 4 litres 600 ml of curd. In how many glasses, each of 25 ml capacity, can be filled with curd?
6. A student multiplied 6325 by 62 instead of by 52. By how much was his answer greater than the correct answer?
7. To stitch a shirt, 2 m 25 cm cloth is needed. Out of 45 m cloth, how many shirts can be stitched and how much cloth will remain?
8. Find the difference between the greatest 6 digit number and smallest 5 digit number.
9. A machine, can make an average, 2,275 screws per day. How many screws will the machine be able to make in January 2009?
10. Population of Bilaspur was 2,47,486 in the year 1990. In the year 2018 it was found to be increased by 67,963. What was the population of the city in 2018?



Chapter - 2



Whole Numbers

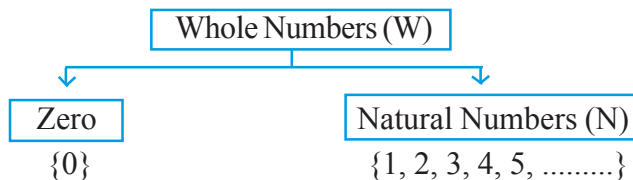
The collection of the counting numbers 1, 2, 3, 4, 5, 6, etc. are called natural numbers. We denote set of natural numbers as “N”.

$$\therefore N = \{1, 2, 3, 4, 5, \dots\}$$

Whole Numbers

The collection of natural numbers together with “0” (zero) are called whole numbers. We denote set of whole numbers as “W”.

$$\therefore W = \{0, 1, 2, 3, 4, 5, \dots\}$$

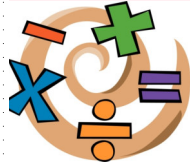


Even Numbers

A whole number divisible by 2 is called an even number.
e.g. 0, 2, 4, 6, etc. are all even numbers.

Odd Numbers

A whole number which is not divisible by 2 is called an odd number. e.g. 1, 3, 5, 7, 9, etc. are all odd numbers.



Successor of a Whole Number

If we add 1 to a whole number, we get the next whole number, it is called the successor of that whole number.

∴ The successor of 0 is $0 + 1 = 1$

The successor of 1 is $1 + 1 = 2$, and so on.

The successor of a whole number “a” is $(a + 1)$

Hence, every whole number has its successor.

Predecessor of a Whole Number

The predecessor of a whole number (other than 0) is one less than the given number.

∴ The predecessor of 1 is $1 - 1 = 0$, the predecessor of 2 is $2 - 1 = 1$

The whole number 0 (zero) does not have its predecessor.

∴ The predecessor of a whole number $a(\neq 0)$ is $(a - 1)$

Hence, every whole number (except 0) has its predecessor.

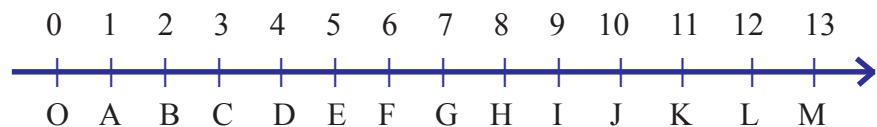
Representation of Whole Numbers on a Number Line

Whole numbers on a line is called the representation of whole numbers on number line.

The number line also helps us to compare two whole numbers. i.e. to decide which of the two given numbers is greater or smaller.

In order to represent whole numbers on a number line, we draw a straight line and mark a point “O” on it.

Starting from “O”, mark point A, B, C, D, E, F, etc. on the line at equal distances to the right of “O”.



Label the point O as 0, A as 1, B as 2 and so on.



PROPERTIES OF WHOLE NUMBER

Name of Properties	Operations			
	Addition	Subtraction	Multiplication	Division
Clousure Property : If a and b any two whole numbers.	$(a + b)$ is also a whole number	If $a > b$ then $(a - b)$ is a whole number	$(a \times b)$ is a whole number	$(a \div b)$ $(b \neq 0)$ may not be a whole number
Commutative Law: If a and b any two whole numbers	$(a + b) = (b + a)$	$(a - b) \neq (b - a)$	$a \times b = a \times b$	$a \div b \neq b \div a$ $(a, b \neq 0)$
Associative Property : If a, b and c any three whole numbers	$(a+b)+c = a+(b+c)$	$(a - b) - c \neq a-(b - c)$	$(a \times b) \times c = a \times (b \times c)$	$(a \div b) \div c \neq a \div (b \div c)$ $(b, c \neq 0)$
Distributive Property : If a, b and c any three whole numbers	Multiplication over addition $a \times (b+c) = a \times b + a \times c$	Multiplication over subtraction $a \times (b - c) = a \times b - a \times c$	Not Applicable	Not Applicable

Additive Property of 0 (Zero)

If a is a whole number then $a + 0 = 0 + a = a$
“0” is called additive identity of whole numbers.

Multiplication Property of 0 (Zero)

If a is a whole number, then $a \times 0 = 0 \times a = 0$

Division By 0 (Zero)

If a is a whole number, then $a \div 0$ is undefined.



Multiplicative Property of 1 (One)

If a is a whole number, then $a \times 1 = 1 \times a = a$.

“1” is called multiplicative identity of whole numbers.

EXERCISE - 2

1. Fill in the blanks : (1 mark)

- Smallest whole number is
- The multiplicative identity of whole numbers is
- Division by is undefined.
- The predecessor of the smallest 3-digit number is
- $22 + \dots = 100 + 22$
- $294 + \dots = 294$
- $0 \times 76 = \dots$
- $\dots \times 13 = 13 \times 18$
- If is added to a number, the sum will remain the same.
- Whole numbers are closed under addition and operation.

2. Which of the following statements are true (T) and which are false (F)?

- Smallest whole number is 1.
- 1 is the additive identity of whole numbers.
- The predecessor of the smallest 4-digit number is 999.
- The difference of predecessor and successor of a number is 2.
- Smallest odd whole number is 1.
- Product of two whole numbers is always whole number.
- All natural numbers are whole numbers.
- Every whole number has a predecessor.
- Multiplication is distributive over addition for whole numbers.
- All whole numbers are natural numbers.
- 7000 is the predecessor of 6999.



3. Very short answer type questions : (1 mark)

a) Write the smallest natural number.

Ans :

b) How many whole numbers are there between 13 and 97?

Ans :

c) Find the predecessor of 7063900.

Ans :

d) Write the successor of the greatest five digit number.

Ans :

e) Multiply 199 by 51.

Ans :

f) Subtract 99 from 632.

g) Find the sum by suitable rearrangement :

$$736 + 108 + 264$$

h) Find the product using suitable properties :

$$837 \times 102$$

i) Find the value of $(91 \times 16 + 87 \times 84)$.

j) Simplify : $(162 \times 129 - 162 \times 29)$

4. Multiple Choice Questions : (1 Mark)

Choose the correct answer :

i) The sum of two even number is -

- | | |
|-------------------|-------------------|
| a) an odd number | b) an even number |
| c) a prime number | d) none of these |

Ans-

ii) The predecessor of 20000 is -

- | | | | |
|----------|----------|----------|------------------|
| a) 20001 | b) 29999 | c) 19999 | d) none of these |
|----------|----------|----------|------------------|

Ans-

iii) $9857 - ? = 4343$

- | | | | |
|---------|---------|---------|------------------|
| a) 5541 | b) 6541 | c) 6514 | d) none of these |
|---------|---------|---------|------------------|

Ans-

iv) The smallest even whole number is -

- | | | | |
|------|------|------|------------------|
| a) 2 | b) 0 | c) 1 | d) none of these |
|------|------|------|------------------|

Ans-



- v) How many whole numbers are there between 2019 and 2303?
a) 284 b) 283 c) 285 d) none of these
- vi) The sum of the successor and the predecessor of 100 is -
a) 200 b) 201 c) 199 d) 198
- vii) The number of digits in the successor of the greatest 5-digit number is-
a) 3 b) 4 c) 5 d) 6

5. Short answer type questions : (2 marks)

- a) Multiply using number line : 3×2 .

Ans -

- b) Add using number line : $4 + 7$

Ans -

- c) Find the successor and predecessor of 2431011.

Ans-

- d) Simplify : $10000 - 7894$

- e) Multiply : 2056 by 78

- f) Find the product : $(15237 \times 40 \times 25)$

- g) Find the product of the largest 3-digit number and the largest 4-digit number.

- h) A bus moves at a uniform speed of 55 Km per hour. How much distance will it cover in 19 hours?

- i) The product of two numbers is 1729. If one of the numbers is 19, find the other.

- j) Simplify : $1647 \times 13 + 1647 \times 7$



6. Long answer type questions : (3/4 Mark)

- a) The cost of a chair is ₹ 995. Find the cost of such 25 chairs.

Ans - Cost of a chair = ₹ 995

$$\begin{aligned} \therefore \text{Cost of 25 chairs} &= ₹ (995 \times 25) = ₹ \{(1000-5) \times 25\} \\ &= ₹ (25000 - 125) \\ &= ₹ 24875. \end{aligned}$$

Therefore, cost of 25 chairs is ₹ 24,875

- b) A tyre factory produces 5675 tyres a day. How many tyres will the factory produce in 270 days?

Ans -

- c) The cost of 27 train tickets was ₹ 3267. Find the cost of one ticket.

Ans -

- d) 1767 trees have been equally planted in 57 rows. Find the number of trees in each row.

- e) A dealer purchased 135 colour television sets. If the cost of each set is Rs. 17650, determine the cost of all sets together.

- f) Match the following :

Column - A

- i) $2 \times 3 = 3 \times 2$
- ii) $(2 + 3) + 7 = 2 + (3 + 7)$
- iii) $2 \times (3 + 5) = 2 \times 3 + 2 \times 5$
- iv) If x and y any two whole numbers then $(x + y)$ is also a whole number.

Column - B

- a) Closure property on addition
- b) Distributive property on multiplication over addition.
- c) Associative property on addition.
- d) Commutative property on multiplication.

- g) A milkman supplies 24 litres of milk to a sweet shop in the morning and 36 litres of milk in the evening. If the milk costs ₹ 54 per litre, how much money will get the milkman every day from sweet shop?



Chapter - 3



Playing with Numbers

8 can be written as a product of two numbers in different ways as

$$8 = 1 \times 8 ; \quad 8 = 2 \times 4 ; \quad 8 = 4 \times 2 ; \quad 8 = 8 \times 1$$

From $8 = 2 \times 4$; it can be said that 2 and 4 exactly divide 8. So 2 and 4 are exact divisors of 8. From the other product $8 = 1 \times 8$, the exact divisors of 8 are found to be 1, 8. These 1, 2, 4 and 8 are exact divisors of 8. They are called the factors of 8.

Things to remember

- A.**
- a) A factor of a number is an exact divisor of the that number.
 - b) Every number is a factor of itself. 1 is a factor of every number.
 - c) Every factor of a number is less than or equal to the given number.
 - d) Every number is a multiple of each of its factors.
 - e) Every multiple of a given number is greater than or equal to that number.
 - f) Every number is a multiple of itself.
 - g) Number of factors of a given number are finite.
 - h) The number of multiples of a given number is infinite.

B. Perfect Number

A number for which sum of all its factors is equal to twice the number is called a perfect number.

- e.g.**
- i) The factors of 6 are 1, 2, 3 and 6
- $$\therefore 1 + 2 + 3 + 6 = 12 = 2 \times 6$$



ii) The factors of 28 are 1, 2, 4, 7, 14 and 28

$$\therefore 1 + 2 + 4 + 7 + 14 + 28 = 56 = 2 \times 28$$

So, the numbers 6 and 28 are perfect numbers.

C. Prime and Composite numbers

Numbers	Factors	Number of Factors	Name of the Numbers
1	1	1	Neither Prime nor Composite
2	1, 2	2	Prime
3	1, 3	2	Prime
4	1, 2, 4	3	Composite
5	1, 5	2	Prime
6	1, 2, 3, 6	4	Composite
7	1, 7	2	Prime
8	1, 2, 4, 8	4	Composite
9	1, 3, 9	3	Composite
10	1, 2, 5, 10	4	Composite
11	1, 11	2	Prime
12	1, 2, 3, 4, 6, 12	6	Composite

a) The numbers other than 1 whose only factors are 1 and the number itself are called Prime Numbers.

b) Numbers having more than two factors are called Composite Numbers. Number 1 is neither Prime nor Composite.

c) 2 is the smallest Prime Number which is even. Every Prime Number except 2 is odd.

d) Two numbers having only 1 as common factor are called Co-prime Numbers.
e.g. 4 and 15 are Co-prime Numbers.

e) Two Prime Numbers whose difference is 2 are called Twin Primes.
e.g. 3, 5.



D. Tests for divisibility of numbers :

a) **Devisibility by 10** : If a number has '0' in the ones place then it is divisible by 10.

b) **Devisibility by 5** : A number which has '0' or '5' in its ones place is divisible by 5.

c) **Devisibility by 2** : A number is divisible by 2 if it has any of the digits 0, 2, 4, 6 or 8 in its ones place.

d) **Devisibility by 3** : If the sum of the digits is a multiple of 3, then the number is divisible by 3.

e) **Devisibility by 6** : If a number is divisible by 2 and 3 both then it is divisible by 6 also.

f) **Devisibility y 4** : A number with 3 or more digits is divisible by 4 if the number formed by its last two digits (i.e., ones and tens) is divisible by 4.

g) **Devisibility by 8** : A number with 4 or more digits is divisible by 8, if the number formed by the last three digits is divisible by 8.

h) **Devisibility by 9** : If the sum of the digits of a number is divisible by 9, then the number itself is divisible by 9.

i) **Devisibility by 11** : Find the difference between the sum of the digits at odd places (from the right) and the sum of the digits at even places (from the right) of the number. If the difference is either 0 or divisible by 11, then the number is divisible by 11.

Exercise- 3

1. Fill in the blanks : (1 mark)

- i) HCF of two consecutive natural number is _____.
- ii) The number of multiples of any number is _____.
- iii) 2 is only _____ number.
- iv) LCM of 4 and 6 is _____.
- v) If a number is divisible by both 2 and 3, then it is also divisible by _____.



2. State Whether the following statements true (T) or False (F) : (1 Mark)

- a) 6 is a perfect number.
- b) 1 is a prime number.
- c) If a number is divisible by 9, then it is also divisible by 3.
- d) The number 1478 is not divisible by 4.
- e) If a number is divisible by 8, then it is divisible by 6 also.

3. Very short answer type questions : (1 mark)

- a) Write all the factors of 40.
Ans -

- b) Write first five multiples of 6.
Ans -

- c) What is the greatest prime number between 1 and 10?
Ans -

- d) Express 36 as the sum of two odd primes.
Ans -

- e) Give one pair of prime numbers whose difference is 2.
Ans -

- f) Express 31 as the sum of three odd primes.
Ans -



g) What are the common factors of 7 and 16?

Ans -

h) Find the common factors of 20 and 25.

i) Which factors are not included in the prime factorisation of a composite number?

j) Which is smallest number having first four prime numbers?

k) What is the full form of HCF?

l) Write the full form of LCM.

4. Short answer type question (2 Marks) :

a) Find the common factors of 4, 8 and 12.

Ans - Factors of 4 are 1, 2, 4

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

Factors of 8 are 1, 2, 4, 8

\therefore Common factors of 4, 8 and 12 are 1, 2, 4

b) Find first three common multiples of 4 and 6.

Ans -

c) Find the common factors of 9, 15 and 21.

Ans -



d) Write the greatest four digit number and express it in terms of its prime factors.

Ans -

e) Find the HCF of 54 and 63.

Ans -

f) Find the HCF of 140, 105 and 175.

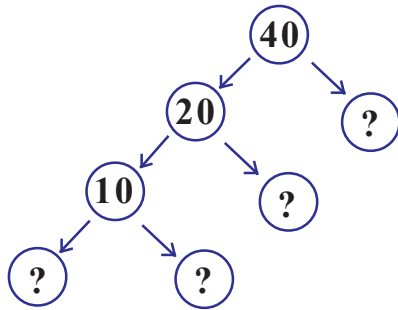
g) Find the LCM of 24 and 90.

h) Find the LCM of 20, 48 and 45.

i) What is the relation between LCM and HCF of two numbers?

j) Find the least number which when divided by 6, 15 and 18 leave remainder 5 in each case.

k) Write the missing numbers in the factor tree of 40.



5. Long answer type questions (3/4 Marks) :

a) Find all the prime factor of 1729. What is the name of this number? Arrange the prime factors of this number in ascending order. What is the relation between two consecutive prime factors?

Solution :

$$\begin{array}{r}
 13 \overline{) 1729} \\
 \underline{133} \\
 19
 \end{array}$$



The prime factorisation of 1729 is $13 \times 7 \times 19$.

The name of this number is Ramanujan's Number.

Arranging the prime factors in ascending order we get 7, 13, 19.

We have $13 - 7 = 6$, $19 - 13 = 6$

∴ The relation is the difference between two consecutive prime factors is equal to 6.

- b) What is the HCF of two consecutive
(i) numbers? (ii) even numbers? (iii) odd numbers?

Ans -

- c) The length, breadth and height of a room are 925 cm, 650 cm and 325 cm respectively. Find the longest tape which can measure the three dimensions of the room exactly.

Ans -

- d) The traffic lights at three different road crossings change after every 48 seconds, 72 seconds and 108 seconds respectively. If they change simultaneously at 7 a.m. at what time will they change simultaneously again?

- e) Three tankers contain 403 litres, 434 litres and 465 litres of diesel respectively. Find the maximum capacity of a container that can measure the diesel of the three containers exact number of times.



Chapter - 4



Basic Geometrical Ideas

The term Geometry is derived from the Greek word Geometron. This has two equivalent “GEO” means Earth and “METRON” means Measurement.

Geometrical ideas shaped up incient times, due to the needs art, architecture and measurments.

Things to Remember

1) Point

A point determines a location, which is denoted by a single capital letter. A point has no length, breadth, thickness.

• A • B
• C

2) Line Segment

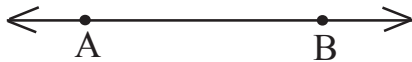
The shortest distance between two points is called line segment. In other words it is a part of line with the finite length and two end points.

A ————— B

The points A and B are called the end points of segment. It is named as \overline{AB}

3) Line

When a line segment is extended on both side infinitely then it is called a line.

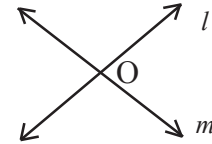


Here, \overleftrightarrow{AB} is a line.



4) Intersecting Line

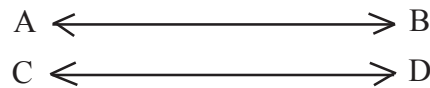
The two lines that share one common point are called intersecting line. The share point is called the point of intersection.



Here line l and m are intersect at point O .

5) Paralle Line

Two or more lines that never intersect, are called Parallel lines.



6) Ray

It is a part of a line with one starting point whereas extends endlessly in one direction. It is named as \overrightarrow{AB}



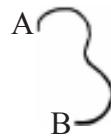
7) Curve

Any drawing (straight or non-straight) done without lifting the pencil may be called a curve. In this sence, a line is also a curve.

a) Simple Curve :- A curve that does not cross itself.



b) Open curve :- Curve in which its end points do not meet.



c) Closed curve :- A figure which begins and ends at the same point, is called a closed curve.



A closed curve has 3 parts which are as follows :

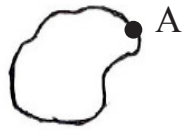
i) Interior of the curve :- It refers to the inside area of the curve.



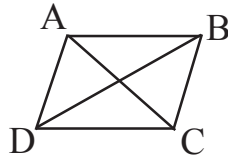
ii) Exterior of the curve :- It refer to the outside area of the curve.



iii) The boundary of the curve :- It refer to the dividing line thus it divides the interior and exterior of the curve.



8) Polygons :- It is a closed curve made of line segments or straight lines only.



i) Sides :- It refer to the line segments which form the polygon, as in the above figure AB, BC, CD, AD are the sides of the polygon ABCD.

ii) Vertex :- Point where two line segments meet as in the above figure, A, B, C and D are its Vertices.

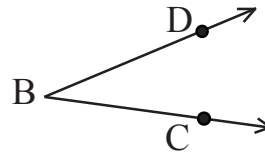
iii) Adjacent sides :- If any two sides share a common end point then they are said to be adjacent to each other. In the above figure \overline{AB} and \overline{BC} are adjacent sides.

iv) Adjacent vertices :- It refer to the endpoint of the same side of the polygon. As in the above figure A and B, B and C, C and D, D and A are adjacent vertices.



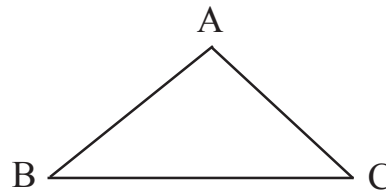
v) **Diagonals :-** It refers to the join of the vertices which are not adjacent to each other. As in the above figure, AC and BD are diagonals of the polygon.

9) **Angles :-** A figure formed from two rays which share a common endpoint is known as its vertex.

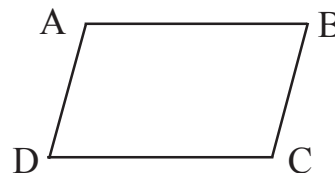


An angle is also associated with 3 parts i.e. Interior, Exterior, Angle Boundary.

10) **Triangle :-** It is a 3 sided polygon. It is also the polygon with the least number of the sides.

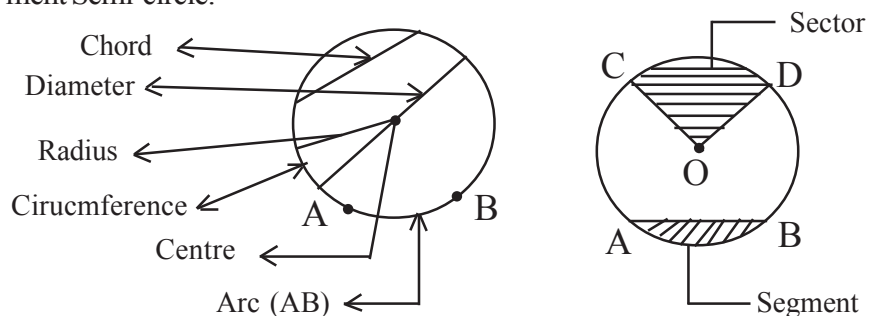


11) **Quadrilateral :-** A simple closed figure bounded by four line - segments is called a Quadrilateral.



12) **Circle :-** A circle is the path of a point moving at the same distance from a fixed point.

Parts of Circle :- Radius, Diameter, Circumference, Chord, Arc, Sector, Segment, Semi-circle.





Excercise - 4

1) Write “T” for true and “F” for false in case of each of the following statements : (1 Mark)

Example : Every point has a very small size.

Ans - F

a) A line is the collection of points.

Ans -

b) A line segment does not have any end points.

Ans -

c) A line segment has no length.

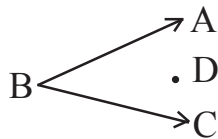
Ans -

d) A ray is a part of a line with only one point.

Ans -

e) Point “D” lies in the exterior of $\angle ABC$

Ans -



f) There are 8 triangles in the given figure.

Ans -



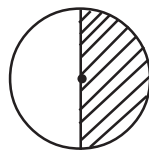
g) The given figure is a polygon.

Ans -



h) A semi-circle is both a segment and a sector.

Ans -



i) Any line segment in the interior of a circle is called a chord.

j) The ray \vec{AB} is the same as the \vec{BA} .



k) The line-segment \overline{AB} is the same as line-segment \overline{BA} .

Ans -

l) A polygon is a closed figure made up a number of line-segments.

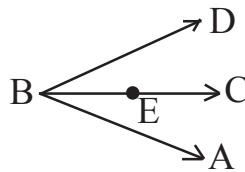
Ans -

m) Two interesecting lines interesect at a point.

Ans -

n) Point "E" is on the common arm of the both the angles $\angle ABC$ and $\angle CBD$.

Ans -



2) Fill in the blanks : (1 Mark)

a) The two edges of a straight road are example for line.

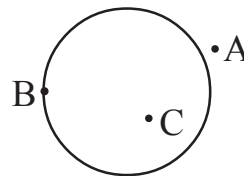
(Parallel / intersecting)

Ans - Parallel

b) In the figure given below points A, B, C respectively are,
..... and of the curve.

i) interior, exterior, boundary

ii) exterior, boundary, interior



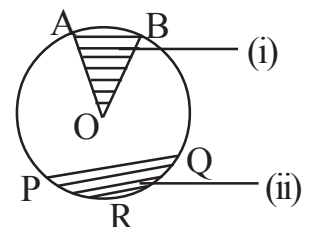
c) If two angles of quadrilateral have common arm, they are called
and if not, they are called (opposite angle / right angle / adja-
cent angle / acute angle)

d) The line-segment joining two non-adjacent vertices of a polygon, are called
..... (diagonal / chord / segment)

e) In the below figure, the shaded region :

i) AOB represents a

ii) PRQ represents a





- f) If radius of a circle is 7 cm, then its diameter is cm.
- g) A line-segment has end points.
- h) A line has end point.

3) Mark (✓) against the correct answer in each of the following (1 Mark):

- a) Which of the following has no end points?
 - i) A line-segment
 - ii) A ray
 - iii) A line
 - iv) None of these
- b) Which of the following has two end points?
 - i) A line-segment
 - ii) A ray
 - iii) A line
 - iv) None of these
- c) How many lines can be drawn passing through two given points?
 - i) Only one
 - ii) Two
 - iii) Three
 - iv) Unlimited number
- d) Where do any two diameters of a circle always intersect?
 - i) On the circle
 - ii) At the centre
 - iii) They never intersect
 - iv) At a point outside the circle
- e) The diameter of a circle is always twice its
 - i) Radius
 - ii) Chord
 - iii) Arc
 - iv) None of these

4) Draw a circle and mark the following : (3/4 Marks)

- a) Its centre
- b) Radius
- c) Diameter
- d) Sector
- e) Segment
- f) A point in its interior
- g) A point in its exterior
- h) An arc
- i) A chord



Chapter - 5



Understanding Elementary Shapes

In our surrounding, we see different corners, edges, planes, open curves, closed curves etc.

Examples :



Measurement of line segments

If we want to measure a line segment. We need ruler and divider



Ruler



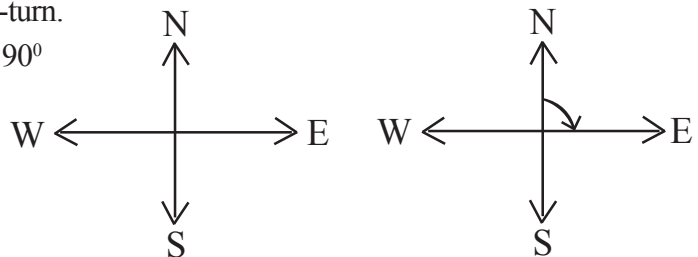
Divider

Right Angle

Stand facing north. By a turn face east. What is the angle that you turned?

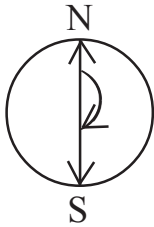
It is right-angle-turn.

1 right angle = 90°



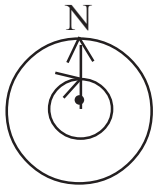


Similarly,



$\frac{1}{2}$ revolution = 2 right angles.

= N to S turn

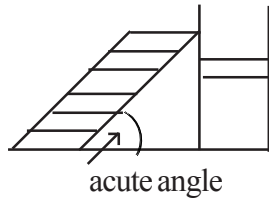


1 revolution = 4 right angles.

= N to N turn

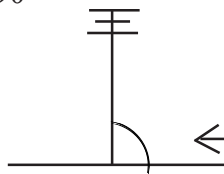
Types of Angles

i) **Acute angle** = 0° to below 90°



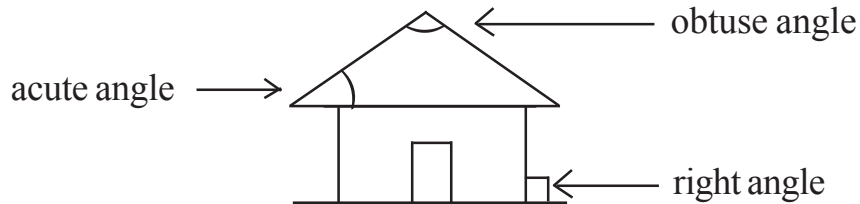
acute angle

ii) **Right angle** = 90°



90° right angle

iii) **Obtuse angle** = more than 90° and below 180°



acute angle

obtuse angle

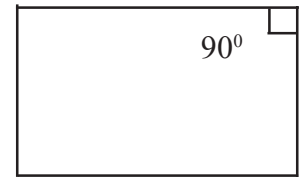
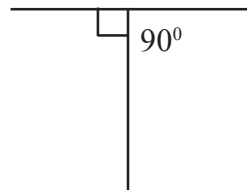
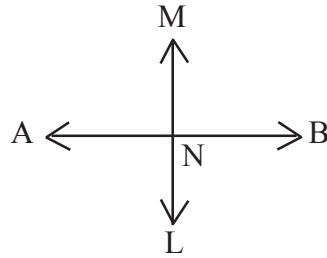
right angle

'Protractor' is used to measure angle.



Perpendicularity

The edges of post card, alphabet T shape etc. are examples of perpendicularity



We write $MN \perp AB$

i.e. MN is perpendicular to AB,

Classifications of Triangles

On the basis of angle

- i) Each angle is acute
→ Acute triangle
- ii) One angle is right angle
→ Right angled triangle
- iii) One angle is obtuse
→ Obtuse triangle

On the basis of sides

- i) All sides are equal
→ Equilateral Triangle
- ii) Three sides are unequal
→ Scalene Triangle
- iii) Any two sides are equal
→ Isosceles triangle

Try to draw the above triangles.

Some other 2-dimensional shapes



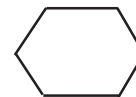
Triangle



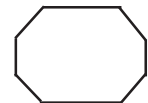
Quadrilateral



Pentagon

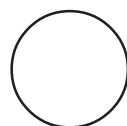


Hexagon



Octagon

Some 3 - dimensional shapes



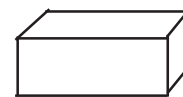
Sphere



Cone



Cylinder



Cuboid



Prism

Try to find out example of such shaped objects in our surrounding.



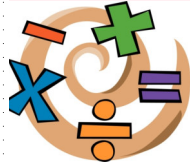
Exercise- 5

1. (A) Fill in the blanks : (1 Mark)

→	SN	Illustration	Name the type of triangle on the basis of side
Example			Scalene triangle
	i		_____
	ii		_____
	iii		_____
	iv		_____

1. (B)

→	SN	Figure of rotation	Angle of rotation
Example			90°
	v		_____
	vi		_____



SN	Figure of rotation	Angle of rotation
vii		-----
viii		-----
ix		-----
x		-----

2. Write True or False : (1 Mark)

Example : i) A right angle is $\frac{1}{4} \times$ revolution \rightarrow True

ii) A pentagon has 6 sides \rightarrow False

i) A reflex angle is larger than a straight angle.

ii) The playing die is a cone.

iii) The measure of an acute angle is 90°

iv) We use protractor to measure angle

v) The turn from North to South is 90°

vi) Each angle is acute in an acute angled triangle

vii) A trapezium has no parallel sides.

viii) A polygon having 8 sides is called an Octagon.

ix) A cuboid has 8 vertices.

x) A road-roller is an example of a cylinder.



3) Very short answer type questions : (1 Mark)

Example i) What is the shape of a brick?

Ans - A cuboid

ii) How many right angles make 360° ?

Ans - 4 right angles

i) What is the angle name of half a revolution?

Ans -

ii) Name the geometrical instrument used for measuring degree of angle.

Ans -

iii) From South direction, you made one full revolution, what is your direction now?

Ans -

iv) The hour hand moves from 12 to 9. What is degree of angle it moves?

Ans -

v) A triangle has 1 obtuse angle. What is the name of the triangle?

Ans -

vi) What is the name of the quadrilateral having four right angles?

vii) What is the measure of a reflex angle?

viii) How many edges does a cuboid have?

ix) How many acute angles are there in a right angled triangle?

x) What is the name of the triangle in which two sides are equal?

4) Short answer type questions (2 Marks)

i) Name the triangles based on angles.

Ans -

ii) Define square.

Ans -

iii) Give example of two 3 dimensional objects.

Ans -



iv) What is right angled triangle?

Ans -

v) How many faces, edges and vertices does a cuboid have?

vi) What is trapezium?

vii) Define equilateral triangle.

viii) What is perpendicularity?

ix) Define scalene triangle.

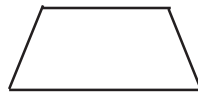
x) One of the angle of a right angled triangle is 30° . What are the measures of other two angles?

5) Long answer type questions (3 Marks)

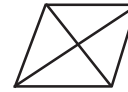
i) Define : a) Trapezium and b) Rhombus.

Ans - a) A quadrilateral in which two sides are parallel is called trapezium.

b) A quadrilateral in which all sides are equal but angles are not right angle is called rhombus. In rhombus diagonals intersect each other at right angle.



Trapezium



Rhombus

i) Draw an obtuse angled equilateral triangle.

ii) Name the type of triangle ΔXYZ , in which $\angle Y = 90^\circ$, $XY = YZ$, What are the measures of other two angles?

iii) Draw a prism and show its faces, edges and vertices.

iv) What is pyramid? Draw a square pyramid.

v) What is perpendicular bisector? Try to draw a perpendicular bisector of a line segment.



6) Match the column A and B (4 Marks)



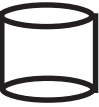




A

- i) All three sides are unequal
- ii) The distance between end points of a line segment
- iii) Your instrument box is
- iv) 1 complete revolution
- v) A sphere has

B

- a) length
- b) Scalene triangle
- c) No vertex
- d) A cuboid
- e) One full turn

7. Match the following : (4 Marks)

- a) 
- b) 
- c) 
- d) 
- e) 
- f) 
- g) 

- i) Prism
- ii) Quadrilateral
- iii) Cuboid
- iv) Sphere
- v) Cylinder
- vi) Hexagon
- vii) Cone
- viii) Die



Chapter - 6



Integers

Introduction :

Integers do not include fractions or decimals. If we call 5 bananas or 10 cows, all numbers expressed in this way are integers. We cannot express the number of students in a class in fraction. Integers include zero, positive and negative.

THINGS TO REMEMBER

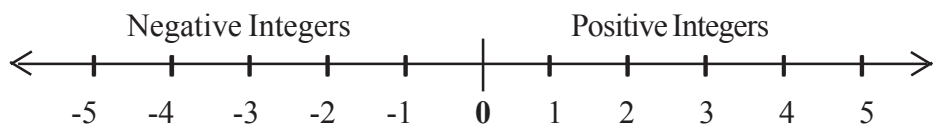
Integers :

Integers are those numbers which have no fractional or decimal part. Integers are of two types - (i) Positive integers : 1, 2, 3, etc. are positive integers and (ii) Negative integers : -1, -2, -3, etc. are negative integers. 0 (zero) is neither positive nor a negative integer.

Natural Numbers :

1, 2, 3, etc. are called natural numbers.

Representation of integers on a number line :



Numbers to the right of zero are positive integers and numbers to the left of zero are negative integers.



Rule of addition :

i) Sum of two positive integers is positive and sum of two negative integers is negative. **Example :** $(+7) + (+13) = +20 = 20$

$$(-12) + (-13) = - 25$$

ii) When a positive integer and a negative integer are added, smaller number with numerical value is subtracted from the greater number with numerical value and put the sign of number with greater numerical value before the result.

Example : $(-5) + (+7) = +2 = 2$

$$(-12) + (+3) = -9$$

Predecessor and successor :

If 1 is added to a number, the successor of the number is obtained. If 1 is subtracted from a number, the predecessor of the number is obtained.

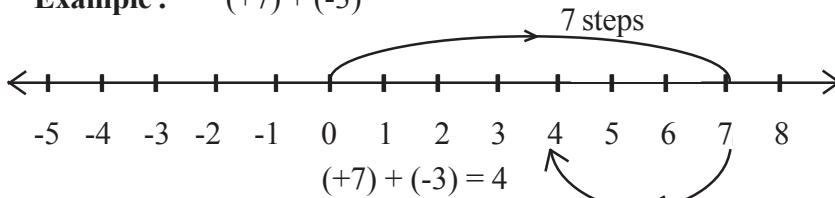
Example : Predecessor of 31 is $(31 - 1) = 30$

Successor of -19 is $-19 + 1 = -18$

Addition and subtraction of integers on a number line :

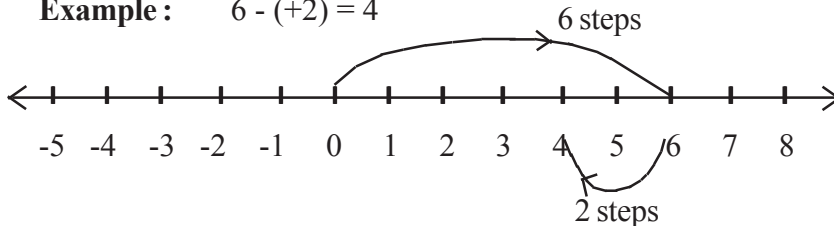
We can add two integers on a number line.

Example : $(+7) + (-3) = 4$



We can subtract two numbers on a number line.

Example : $6 - (+2) = 4$



Additive Inverse :

If sum of two integers is 0, two integers are called additive inverses to each other.



Exercise- 6

1. Fill in the blanks (1 mark) :

- i) The smallest positive integer is 1.
- ii) _____ is neither positive nor negative.
- iii) Sum of two positive number is _____
- iv) Predecessor of -37 is _____
- v) Successor of -48 is _____
- vi) Additive inverse of -5 is _____
- vii) The smallest integer among -1, 0, -5 is _____
- viii) The number of negative integers between -5 and 1 is _____
- ix) The opposite of a profit of ₹ 350 is _____

2. Write True (T) or False (F) (1 Mark) :

- i) Sum of a negative and a positive integer is always positive.
Ans - F
- ii) Negative integers are located to the left of 0 on a number line.
Ans -
- iii) The opposite of rise in temperature by 3°C is denoted by -3°C .
Ans -
- iv) $-37 > -13$. Ans -
- v) The integers between -5 and 0 are -4, -3, -2, -1. Ans -
- vi) Negative of a positive integer is positive. Ans -
- vii) Every negative integer is less than 0. Ans -
- viii) Positive integers $< 0 <$ negative integers. Ans -
- ix) $-10 + (+10) = 20$. Ans -
- x) The greatest integer lying between -3 and 3 is 2. Ans -

3. Choose the correct Answer (1 Mark) :

- i) Every integer greater than 0 has the sign.
a) - b) + c) x d) None of these.
Ans - b) +
- ii) 3 units to the right of 0 on the number line is
a) +3 b) -3 c) +1 d) 0
Ans -



- iii) The least integer lying between -8 and -1 is
a) -6 b) -4 c) -7 d) 0
Ans -
- iv) The successor of the successor of -10 is
a) -9 b) 9 c) -8 d) -11
Ans -
- v) The additive inverse of a positive integer is
a) Negative integer b) Positive integer
c) Zero d) The same integer
- vi) $0 - 3 - (-3) =$
a) 6 b) -6 c) 0 d) 9

4. Very short answer type questions (1 Mark) :

- i) Find the sum of the integers +6, -4
Ans- $(+6) + (-4)$
 $= 6 - 4 = 2$
- ii) Subtract 5 from -4
Ans-
- iii) Write the temperature with appropriate sign : 30°C below 0°C .
Ans-
- iv) Write the positive integer between -2 and 2.
- v) Which integer does not have an opposite?
- vi) What is the additive inverse of $-(-7)$?
- vii) Which is the greatest negative integer?

5. Short answer type questions (2 Marks) :

- i) Arrange in ascending order : -10, -11, 5, 0
Ans- The ascending order is -11, -10, 0, 5
- ii) Arrange in descending order : 0, -5, -11, 5
Ans-



iii) Which integer must be subtracted from -85 to get -5?

Ans-

iv) Which integer must be added to -19 to get -10?

Ans-

v) Write four negative integers greater than -12.

Ans-

vi) Add on the number line : +3 and -5.

vii) Write the sum of the integers between -5 and 1.

viii) Show -4, 1, -3, on the number line.

ix) Find $(-1) - 5 - (-1)$

x) Subtract (+8) from the sum of -1 and -3.

6. Long answer type questions (3/4 Marks) :

i) Find the sum : $(+28) + (-5) + (-15) + (-8)$

$$\begin{aligned}\text{Ans- } & (+28) + (-5) + (-15) + (-8) \\ & = 28 - 5 - 15 - 8 \\ & = 28 - 28 \\ & = 0\end{aligned}$$

ii) Match the following :

Column - I	Column - II
i) $30 + 1$	a) 5
ii) $-20 + (-5)$	b) 0
iii) $-3 - (-3)$	c) -25
iv) $0 - (-5)$	d) 31



- iii) Ramesh thinks of an integer. He subtracts 5 from the integer and gets the result 17. What was the integer he thought of?

Ans-

- iv) If $*$ is an operation such that for two integers a and b ,
 $a * b = a + b + 7$ find $(-7) * (-2)$.

Ans-

- v) Temperature of a place at 12.00 noon was $+22^{\circ}\text{C}$. Temperature increased by 6°C in the first hour and decreased by 2°C in the second hour. What was the temperature at 2.00 pm?

Ans-



Chapter - 7

Fractions



Fractions

A fraction is a number representing a part of a whole. The whole may be a single object or a group of objects.

In $\frac{5}{7}$, 5 is called the numerator and 7 is called the denominator. Fractions can be shown on a number line. Every fraction has a point associated with it on the number line.

Proper Fractions

In a proper fraction, the numerator is less than the denominator $\frac{3}{4}$, $\frac{5}{8}$ etc are proper fraction.

Improper Fractions

In a improper fraction, the numerator is greater than the denominator. $\frac{4}{3}$, $\frac{8}{5}$ are improper fraction.

Mixed fraction

An improper fraction can be written as a combination of a whole and a part, and such fraction is called mixed fraction. The mixed fraction will be written as Quotient $\frac{\text{Remainder}}{\text{Divisor}}$



$\frac{11}{3}$ will be written as $\frac{9+2}{3} = \frac{9}{3} + \frac{2}{3} = 3 + \frac{2}{3} = 3\frac{2}{3}$

Also we can express a mixed fraction as an improper fraction as

$$5\frac{3}{7} = \frac{(\text{Whole} \times \text{Denominator}) + \text{Numerator}}{\text{Denominator}} = \frac{(5 \times 7) + 3}{7} = \frac{38}{7}$$

Equivalent fractions

Each proper or improper fraction has many equivalent fractions. To find an equivalent fraction of a given fraction, we may multiply or divide both the numerator and the denominator of the given fraction by the same number,

$\frac{3}{7}, \frac{2}{4}, \frac{3}{6}, \dots, \frac{36}{72}, \dots$ are all equivalent fractions. They represent the same part of a whole.

$$\frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{2}{4}, \quad \frac{1}{2} = \frac{1 \times 36}{2 \times 36} = \frac{36}{72}$$

Simplest form of a fraction

A fraction is said to be in the simplest (or lowest) form if its numerator and denominator have no common factor except 1.

Consider $\frac{36}{24}$

The H.C.F. of 36 and 24 is 12

Therefore, $\frac{36}{24} = \frac{12 \div 4}{16 \div 4} = \frac{3}{2}$

The fraction $\frac{3}{2}$ is in the lowest form

Like fractions

Fractions with same denominators are called like fractions.

Thus $\frac{1}{17}, \frac{2}{17}, \frac{4}{17}, \frac{8}{17}$ are all like fractions.

Two fractions with the same denominator, the fraction with the greater numerator is greater. Between $\frac{4}{5}$ and $\frac{3}{5}$, $\frac{4}{5}$ is greater.

Thus $\frac{4}{5} > \frac{3}{5}$ or $\frac{3}{5} < \frac{4}{5}$



Unlike fractions

Two fractions are unlike if they have different denominators. For example $\frac{7}{27}$ and $\frac{7}{28}$ are unlike fractions.

If the numerator is the same in two fractions, the fraction with the smaller denominator is greater of the two.

Thus, $\frac{1}{8} > \frac{1}{10}$ and $\frac{4}{8} > \frac{4}{11}$

Adding and subtracting fractions

We have learnt to add and subtract like fractions. It is also not very difficult to add fractions that do not have the same denominator. When we have to add or subtract fractions we first find equivalent fractions with same denominator and then proceed.

Exercise- 7

Very short Answer Type Questions : (1 Marks)

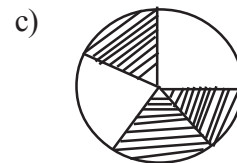
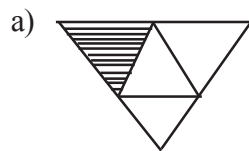
1) What fraction of a day is 6 hours?

Ans - $\frac{6}{24}$

2) What fraction of an hour is 20 minutes?

Ans -

3) Write the fraction representing the shaded portion.



Ans -

Ans -

Ans -

4) Show $\frac{2}{3}$ on a number line.

Ans -

5) Write a proper fraction whose numerator is 7 and denominator is 9

6) Find the equivalent fraction of $\frac{3}{5}$ having denominator 30.

7) Find the equivalent fraction of $\frac{42}{60}$ having numerator 7.



8) Which is the largest fraction?

a) $\frac{5}{18}$ or $\frac{10}{18}$ b) $\frac{5}{17}$ or $\frac{11}{17}$

9) Reduce the fraction $\frac{12}{52}$ to simplest form.

10) Express the fraction $\frac{27}{5}$ as mixed fraction.

11) Name the numerator and denominator of $\frac{5}{16}$.

12) Express the fraction $9\frac{3}{7}$ as improper fraction.

Fill in the blanks : (1 Mark)

1) $\frac{2}{9} = \frac{\dots\dots\dots}{63}$ 2) $\frac{45}{60} = \frac{15}{\dots\dots\dots}$

3) In a proper fraction, the numerator is less than the

4) In $\frac{9}{11}$, 9 is called the

5) In $\frac{13}{29}$, 29 is called the

6) The fractions, where the numerator is greater than the denominator are called

7) $\frac{3}{6} \square \frac{5}{6}$ 8) $\frac{2}{3} \square \frac{2}{4}$ 9) $\frac{7}{7} \square \frac{11}{11}$

10) $\frac{7}{9} \square \frac{3}{9}$ 11) $\frac{7}{8} \square 1$ 12) $\frac{7}{9} - \frac{5}{9} = \frac{\dots\dots\dots}{9}$

13) $\frac{5}{7} + \frac{\dots\dots\dots}{11} = \frac{12}{11}$ 14) $\frac{16}{5} - \frac{5}{7} =$

15) Fractions with same denominators are called

16) Two fractions are unlike if they have different

Which of the following statements are True (T) and which are False (F) (1 Mark) :

1) A fraction is said to be in the simplest (or lowest) form if its numerator and the denominator have no common factor except 1. Ans - T

2) In $\frac{17}{19}$, 19 is the numerator. Ans -

3) Two fractions are unlike if they have different denominators are called like fractions. Ans -

4) Fractions with same denominators are called like fractions. Ans -



5) The equivalent fraction of $\frac{3}{5}$ having denominator 40 is $\frac{40}{22}$

6) A mixed fraction has a combination of whole and a part.

7) $\frac{3}{6} < \frac{5}{6}$ 8) $\frac{3}{5} > \frac{6}{5}$ 9) $\frac{5}{7} < \frac{15}{21}$

10) A fraction is a number representing a part of a whole.

11) $\frac{2}{9}$ and $\frac{6}{27}$ are equivalent fractions.

12) Fraction can be shown on a number line.

Multiple choice questions (Choose the correct Answer) (1 Mark) :

1) The denominator of $\frac{5}{19}$ is -

- a) 5 b) 19 c) 24 d) 14

Ans - The denominator of $\frac{5}{19}$ is b) 19

2) The fractions, where the numerator is bigger than denominator are called-

- a) Proper fraction b) Improper fraction
c) Mixed fraction d) Equivalent fraction

Ans -

3) The equivalent fraction of $\frac{2}{9}$ is

- a) $\frac{14}{63}$ b) $\frac{63}{14}$ c) $\frac{7}{14}$ d) $\frac{14}{7}$

Ans -

4) The simplest form of $\frac{15}{50}$ is

- a) $\frac{3}{15}$ b) $\frac{5}{11}$ c) $\frac{3}{10}$ d) $\frac{5}{12}$

Ans -

5) The mixed fraction of $\frac{37}{5}$ is

- a) $5\frac{7}{5}$ b) $7\frac{2}{5}$ c) $8\frac{2}{5}$ d) $7\frac{4}{5}$

6) The improper fraction of $10\frac{3}{5}$ is

- a) $\frac{33}{5}$ b) $\frac{52}{5}$ c) $\frac{53}{5}$ d) $\frac{51}{5}$

7) Fractions with different denominators are called

- a) Unlike fraction b) Like fraction
c) Mixed fraction d) Improper fraction



- 8) $\frac{5}{6} - \frac{1}{3} =$
 a) $\frac{2}{3}$ b) $\frac{1}{3}$ c) $\frac{1}{6}$ d) $\frac{1}{2}$
- 9) Each proper or improper fraction has
 a) Only one equivalent fraction b) Only two equivalent fractions
 c) many equivalent fractions d) Only three equivalent fractions
- 10) $3 + \frac{12}{5} =$
 a) $\frac{27}{5}$ b) $\frac{21}{5}$ c) $\frac{23}{5}$ d) $\frac{19}{5}$

Short answer type question : (2 Marks)

- 1) Arrange the following in ascending order
 $\frac{1}{12}$, $\frac{1}{23}$, $\frac{1}{5}$, $\frac{1}{7}$, $\frac{1}{50}$, $\frac{1}{9}$, $\frac{1}{17}$
 Ans - Ascending Order $\frac{1}{50} < \frac{1}{23} < \frac{1}{17} < \frac{1}{12} < \frac{1}{9} < \frac{1}{7} < \frac{1}{5}$
- 2) Arrange the following in ascending order and descending order
 $\frac{1}{7}$, $\frac{3}{7}$, $\frac{13}{7}$, $\frac{11}{7}$, $\frac{7}{7}$

Ans -

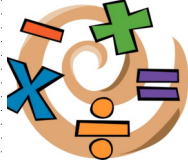
- 3) Compare $\frac{5}{6}$ and $\frac{13}{15}$

Ans -

- 4) Find the difference between $\frac{7}{9}$ and $\frac{1}{3}$

Ans -

- 5) Add : $2\frac{4}{5}$ and $3\frac{5}{6}$ 6) Simplify : $\frac{3}{5} - \frac{3}{20}$
 7) Solve : $3 - \frac{12}{5}$ 8) Solve : $1\frac{1}{3} + 3\frac{2}{3}$
 9) Solve : $\frac{1}{2} + \frac{1}{3} + \frac{1}{6}$ 10) Find : $4\frac{1}{2} - 2\frac{1}{5}$



11) Rinku reads 25 pages of a book containing 200 pages. Tinku reads $\frac{2}{5}$ of the same book. Who reads less?

12) Write the natural numbers from 102 to 113. What fraction of them are prime number?

Long answer type questions : (3/4 Marks)

1) Ajoy takes $4\frac{1}{5}$ minutes to walk across the school ground. Rakesh takes $\frac{7}{4}$ minutes to do the same. Who takes less time and by what fraction?

Ans -

2) Sarita bought $\frac{3}{5}$ metres of ribbon and Anamika $\frac{5}{7}$ metre of ribbon. What is the total length of the ribbon they bought?

Ans -

3) Laxmi's house is $\frac{7}{10}$ km from the market. She walked some distance and then took a bus for $\frac{1}{5}$ km, to reach the market. How far did she walk?

4) Nabarun was given $1\frac{1}{5}$ piece of Cake and Narayan was given $\frac{1}{6}$ piece of cake. Find the total amount of cake was given to both of them.

5) Solve: $\frac{1}{4} + \frac{1}{5} + \frac{1}{6}$

6) Solve: $1\frac{1}{4} + 2\frac{1}{4} + 3\frac{1}{4}$

7) In a class A of 35 students, 28 passed with 70% or more marks, in another class B of 45 students, 36 passed with 70% or more marks. In which class was the greater fraction of students getting with 70% or more marks.

8) Ram reads for $\frac{4}{5}$ of an hour. Laxman reads for $\frac{5}{6}$ of an hour. Who reads for a longer time and how much?



Chapter - 8



Decimals

A number of the form $\frac{a}{b}$, where a, b are whole numbers and $b \neq 0$, is a fraction; the number a is the numerator and b is a the denominator. In this chapter we will study about decimal fraction. The word decimal comes from Latin word “decimus” meaning tenth.

Decimal fraction

A fraction whose denominator is a power of ten i.e. 10, 100, 1000 etc. is called decimal fraction.

The numbers expressed in decimal form are called decimal number. A decimal number can be defined as a number whose whole number part and the fractional part are separated by a dot(.) which is known as decimal point.

e.g. In the number 13.49, 13 is the whole number part and .49 is the fractional part.

A decimal number can be expressed in the place value table as shown below :

Decimal numbers	Thousand (1000)	Hundreds (100)	Tens (10)	Ones (1)	Tenths $\frac{1}{10}$	Hundredths $\frac{1}{100}$	Thousandths $\frac{1}{1000}$
12.74			1	2	7	4	
0.456				0	4	5	6
123.478		1	2	3	4	7	8
4567.021	4	5	6	7	0	2	1

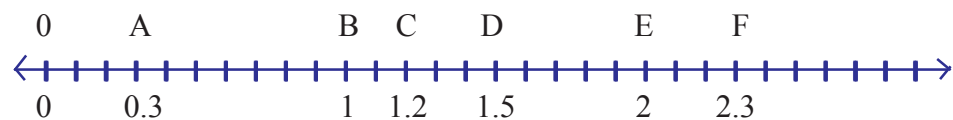


Now we will know how to read a decimal number -

Decimal Number	How to read
7.2	Seven point two
0.86	Zero point eight six
10.023	Ten point zero two three
123.405	One hundred twenty three point four zero five

Representing decimals on number line :

We know how to represent fractions on a number line. Let us now represent decimals on a number line. Now we will see how to represent 0.3 on a number line. 0.3 is more than zero and less than one. We divide each unit length into 10 equal parts and take 3 parts as shown below -



The point A represent 0.3, point C represent 1.2, point D represent 1.5 and point F represent 2.3

Comparing Decimals

Suppose we have to compare two decimals. At first compare the whole parts of the given numbers. The number with smaller whole part will be smaller and the number with greater whole part will be greater.

If the whole parts are equal then compare left digits of the decimal parts of the numbers. The number with smaller extreme left digit will be smaller and the number with greater extreme left digit will be greater.

If the extreme left digits of decimal parts are equal, then compare the next digits and so on.

e.g. $32.25 > 12.25$, $37.25 < 37.38$, $123.47 < 123.49$



Link and unlink decimals

The decimals having the same number of decimal places are called **like decimals**.

e.g. 12.35, 25.32, 10.79 are like decimals.

The decimals not having the same number of decimal places are called **unlike decimals**.

e.g. 14.5, 34.25, 143.1256 are unlike decimals.

For addition and subtraction of numbers with decimals, at first we have to convert the given decimals to like decimals.

Converting a decimal into a fraction

At first we will write the number without the decimal point as the numerator of the fraction. Then in the denominator, write 1 followed by as many zeroes (**e.g.** 10, 100 or 1000 etc.) as there are decimal places in the given decimal number.

e.g. $7.5 = \frac{75}{10} = \frac{15}{2}$

Converting a fraction into a decimal

If the denominator of a fraction is a power of 10 then we can convert into a decimal, as shown below.

e.g. $\frac{17}{10} = 1.7$, $\frac{1234}{100} = 12.34$, $\frac{3002}{1000} = 3.002$

If the denominator of the fractions are not power of 10, then we convert the fraction to an equivalent fraction with denominator 10 or 100 or 1000 etc.

e.g. $\frac{5}{2} = \frac{5 \times 5}{2 \times 5} = \frac{25}{10} = 2.5$
 $\frac{3}{8} = \frac{3 \times 125}{8 \times 125} = \frac{375}{1000} = 0.375$

Things to remember

1. All decimals can be represented on a number line.
2. Putting any number of zeros to the extreme right of the decimal part of a decimal does not change its value.
3. Every decimal can be written as a fraction.



4. Measurement of length

10 millimetres (mm) = 1 centimetre (cm)

10 centimetres (cm) = 1 decimetre (dm)

10 decimetres (dm) = 1 metre (m)

10 metres (m) = 1 decametre (dam)

10 decametres (dam) = 1 hactometre (hm)

10 hectometres (hm) = 1 kilometre (km)

1 m = 1000 mm, 1 mm = 0.001 m

1 m = 100 cm, 1 cm = 0.01 m

1 km = 1000 m, 1 m = 0.001 km

5. Measurement of weight

1 gram (g) = 1000 miligram (mg)

∴ 1 mg = 0.001 g

1 kilogram (kg) = 1000 gram (g)

1 g = 0.001 kg

6. Measurement of capacity

1 litre (l) = 1000 mililitre (ml)

1 ml = 0.001 l

1 kilolitre (kl) = 1000 litre (l)

1 l = 0.001 kl

7. Measurement of time

1 decade = 10 years

1 year = 365 days (non-leap year)

= 366 days (leap year)

1 year = 12 months

1 month = 30 days

1 day = 24 hours

1 hour = 60 minutes

1 minute = 60 seconds

1 week = 7 days

8. In money related problems we have to remember 100 paise = 1 rupee.

or, 1 paise = 0.01 rupee



EXERCISE - 8

1. Fill in the blanks : (1 Mark)

- a) 1 cm = metre
- b) 10.5 10.06
- c) 1 g = kg
- d) 1 year = decade
- e) 2 m 3 cm = m
- f) $0.004 = \frac{4}{\text{.....}}$
- g) Decimal form of $\frac{1235}{10000}$ is
- h) $20.45 + 13.7 = \dots\dots\dots$
- i) $123.5 - 82.05 = \dots\dots\dots$
- j) $412.3265 \times 100 = \dots\dots\dots$
- k) $147.367 \div 1000 = \dots\dots\dots$
- l) Every decimal can be written as a
- m) $143.69 + 25.38 + 2.1 = \dots\dots\dots$
- n) 1 ml = kl
- o) $29 + \frac{3}{10} + \frac{7}{1000} = \dots\dots\dots$
- p) $12.456 + \dots\dots\dots = 23.172$
- q) $23.02 - \dots\dots\dots = 9.45$
- r) $12 + \frac{1}{10} + \dots\dots\dots + \frac{3}{1000} = 12.153$
- s) 8 kg 37 g = kg
- t) ₹ 25 and 5 paise = ₹

2. Which of the following statements are True (T) and which are False (F) ?

(1 Mark)

- a) All decimals can be represented on a number line.

Ans -



b) 1 paise = ₹ 0.1

Ans -

c) $50 + \frac{3}{10} + \frac{5}{100} = 50.35$

Ans -

d) $0.0002 = \frac{1}{500}$

Ans -

e) $2.5 < 2.25$

Ans -

f) $5 \text{ km } 245 \text{ m} = 5.245 \text{ km}$

g) $2 \text{ kg } 358 \text{ g} = 23.58 \text{ g}$

h) $23.6 = 23.600$

i) $12 - 0.7 = 0.5$

j) $5.01 + 3.6 = 8.71$

k) Fourteen point six = 14.6

l) Two tenths = 0.02

m) 2.32 and 20.75 are like decimals.

n) $27.47 \times 10 = 2.747$

o) $\frac{24}{25} \neq 0.96$

3. Very Short Answer Type Questions : (1 Mark)

a) Write the place value of 2 in 34.725

Ans -

b) Write $21 + \frac{1}{100} + \frac{2}{1000}$ as decimal.

Ans -

c) Express 5 cm 3 mm in cm.

Ans -

d) Write 209.75 in words.

Ans -

e) Write 0.65 as a proper fraction.

Ans -

f) Which is greater 0.6 or 0.06?

Ans -



- g) Express 60 rupees 95 paise as rupees.
- h) Find the sum of 38.5 and 80.03
- i) Subtract 2.05 g from 18 g 5 mg.
- j) Find the value of $12.7 - 9.324$

4. Multiple Choice Questions (Choose the correct answer) : (1 Mark)

- i) $4 \frac{17}{100} = ?$
a) 41.7 b) 4.17 c) 0.417 d) 4.017

Ans -

- ii) $7.75 = ?$
a) $7 \frac{1}{4}$ b) $7 \frac{1}{2}$ c) $73 \frac{1}{4}$ d) $7 \frac{3}{4}$

Ans -

- iii) $3 + \frac{4}{10} + \frac{7}{1000} = ?$
a) 3.407 b) 3.47 c) 34.7 d) 34.07

Ans -

- iv) Among 3.6, 3.006, 3.66 and 3.06 the smallest number is
a) 3.6 b) 3.006 c) 3.66 d) 3.06

Ans -

- v) The place value of 3 in 15.638 is
a) $\frac{3}{10}$ b) $\frac{3}{100}$ c) $\frac{3}{1000}$ d) 3

Ans -

- vi) $0.5 + 0.005 + 5.5 = ?$
a) 5.005 b) 6.005 c) 50.05 d) 60.05

- vii) $6.02 - 2.7 = ?$
a) 3.32 b) 2.32 c) 9.72 d) 2.032

- viii) 10 cm = ?
a) 0.01 m b) 0.1 m c) 0.001 m d) None of these

- ix) $39.23 \div 10 = ?$
a) 392.3 b) 3.923 c) 39.23 d) 0.3923

- x) $1.608 \div 16.08 = ?$
a) 10 b) 0.01 c) 0.001 d) 0.1



5. Short Answer Type Questions : (2 Marks)

a) Represent 2.7 on the number line.

Ans -

b) The length of a room is 3 m 5 cm. What will be its length in metre?

Ans -

c) Write $720 + 25 + 7 + \frac{9}{1000}$ as decimal.

Ans -

d) Weight of an apple is 135 g 25 mg. What will be its weight in gram?

Ans -

e) Find the sum of 270.29, 205.25 and 75.1

f) Subtract 3 km 12 m from 7 km 903 m.

g) Sabita had ₹ 28. She bought one pen for ₹ 12.25. How much money does she have now?

h) Arrange the following decimals in ascending order :

2.007, 2.07, 7.02, 7.002

i) Simplify : $56.3 - 5.633 - 4.77$

6. Long Answer Type Questions : (3/4 Marks)

a) Show 0.4 and 1.8 on the number line.

Ans -



b) Debartha bought 7 kg 465 g of mangoes, 5 kg 125 g of apples and 0.775 g of dates. Find the total weight of all the fruits he bought.

Ans -

c) Shriyan purchased a book worth ₹ 245.25 from a book seller and gave him a 500 rupee note. How much balance did he get back?

Ans -

d) Aakash and Ankit bought 8.5 litres and 15.75 litres milk respectively from a milkman. How much milk did they buy in all? If there was 30 litres of milk with the milkman, find the quantity of milk left with him?

e) Anamika had 25 m 20 cm long cloth. She gives 5 m 75 cm length of cloth to Paramita and 12 m 50 cm length of cloth to Sharmila. How much cloth is left with her?

f) Srijita bought a watermelon weighing 4 kg 285 g. Out of this she gave 3 kg 50 g to her grandmother. What is the weight of the watermelon left with Srijita?

g) What should be added to 25.5 to get 50?

h) Match Column - A with Column-B.

Column - A

a) 0.456×0.3

b) 0.734×0.2

c) 0.0739×2

d) 0.0689×2

Column - B

i) 0.1468

ii) 0.1368

iii) 0.1478

iv) 0.1378

i) Simplify: $128.364 + 9.8 - 132.16 + 10.08$

j) Alok purchased 1 kg 200g potatoes, 250g dhania, 5 kg 300g onion, 500g cumin and 2 kg 600g tomatoes. Find the total weight of his purchases in kilogram.



Chapter - 9



Data Handling

Statistics may be defined as the science of collection, presentation, analysis and interpretation of numerical data. Information is collected, presented and organized in the form of tables, graphs etc.

Data

A data is a collection of numbers gathered to give some information.

Raw Data

The set of data obtained in the original form is called a set of raw data.

Array

Arranging the numerical figures of a set of data in ascending or descending order is called an array.

Observation

Each numerical figure in the set of data is called an observation.

Frequency of an observation

The number of times a particular observation occurs is called its frequency.

Statistics

It is the science which deals with the collection, presentation, analysis and interpretation of numerical data.

Example-1 :

The number of children in 25 families of a colony are given below :

2, 0, 2, 4, 2, 1, 3, 3, 1, 0, 2, 3, 4, 3, 1, 1, 1, 2, 2, 3, 2, 4, 1, 2, 2.

Represent the above data in the form of a frequency distribution table.



Solution : Frequency Distribution Table

Observation	Tally Marks	No. of families (Frequency)
0	//	2
1	||||/	6
2	||||/ ||||	9
3	||||	5
4	///	3
Total		25

Pictograph

The representation of an information through picture is called a pictograph.


Example-2 :





In a class test, the number of students passed in various subjects are given below :

Subject	English	Bengali	Mathematics	Science
Number of students passed	15	25	10	20

Taking the scale  = 5 successful students, draw the pictograph.

Solution :

Scale :  = 5 successful students

Subject	Number of students passed
English	
Bengali	
Mathematics	
Science	



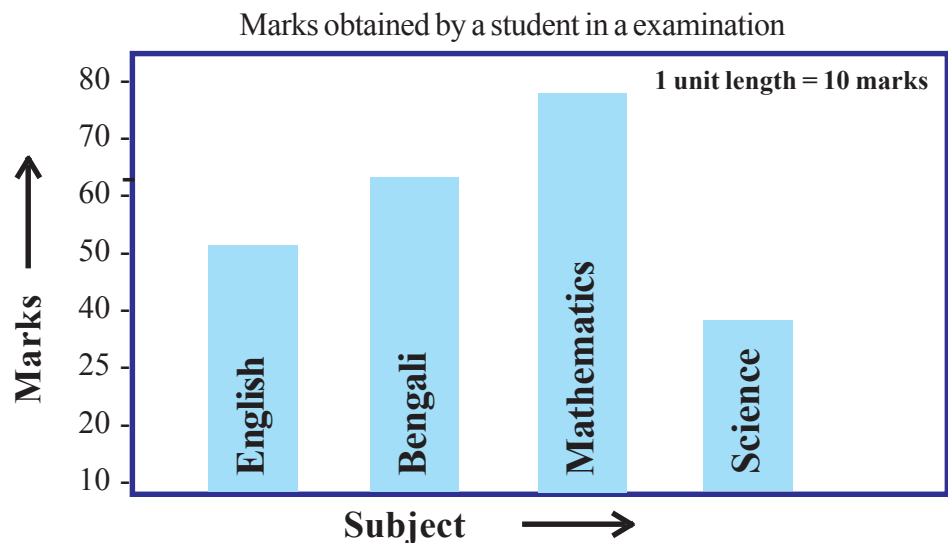
- i) How many mango trees are there?
- ii) How many banyan trees are there?
- iii) How many neem trees are there?
- iv) How many trees are there in all?

Bar Graph

A bar graph is a pictorial representation of numerical data in the form of rectangles (or bars) of equal width and varying heights. Bars of uniform width can be drawn horizontally or vertically.

Example-3 :

Look at the bar graph given below :



Read it carefully and answer the questions given below :

- i) What information does the bar graph give?
- ii) In which subject is the student poorest?
- iii) In which subject is the student best?
- iv) In which subjects did he get more than 40 marks?

Solution :

- i) The given bar graph shows the marks obtained by a student in an examination.
- ii) In Science subject, the student is poorest.
- iii) In Mathematics subject, the student is best.
- iv) In the subjects Bengali and Mathematics he got more than 40 marks.



Exercise- 9

Choose the correct options of the followings : (1 Mark)

- 1) Using tally marks which one of the following represent the number five?

a) ||||| (b) ✓✓✓✓✓ c) ~~||||~~ (d) ~~|||||~~
- 2) The marks (out of 10) obtained by 28 students in a mathematics test are listed below :

8, 1, 2, 6, 5, 5, 5, 0, 1, 9, 7, 8, 0, 5, 8, 3, 0, 8, 10, 10, 3, 4, 8, 7, 8, 9, 2, 0.

The number of students who obtained marks more than or equal to 5 is-

a) 13 (b) 15 c) 16 (d) 17
- 3) In question 2 above, the number of students who scored marks less than 4 is-

a) 15 (b) 13 c) 12 (d) 10
- 4) Using tally marks which of the following represents the number eight-

a) (||||) || (b) ~~||||~~ ~~||||~~ c) ~~||||~~ ||| (d) ~~||||~~ ||||
- 5) On the scale 1 unit length = 10 crore, in a bargraph. Then 75 crore represents-

a) 8 units (b) $7\frac{1}{2}$ units c) 6 units (d) $8\frac{1}{2}$ units

Fill in the blanks : (1 Mark)

- 6) Data means information in the form of _____.
- 7) Data obtained in the _____ form is called raw data.
- 8) Arranging the numerical figures in an ascending or a descending order is called an _____.
- 9) The number of times a particular observation occurs is called its _____.
- 10) Arranging the data in the form of a table is called _____.



State whether the statements are true or false : (1 Mark)

- 11). In a bar graph, the width may be unequal.
- 12). In a bar graph, the bars of uniform width are drawn vertically only.
- 13). Pictograph and bar graphs are pictorial represent of the numeral data.
- 14). An observation, occurring five times in a data is recorded as ||||| using tally marks.
- 15). In a bar graph, each bar (rectangle) represents only one value of the numerical data.

Long answer type questions : (3/4 Mark)

- 16). A die was thrown 20 times and the following outcomes were recorded :

5, 2, 1, 3, 4, 4, 5, 6, 2, 2, 4, 5, 5, 6, 2, 2, 4, 5, 5, 1

Arrange the above data in ascending order and prepare the frequency table.

- 17). Construct a frequency table for the following:

7, 8, 6, 5, 6, 7, 7, 9, 8, 10, 7, 6, 7, 8, 8, 9, 10, 5, 7, 8, 7, 6




- 18). The number of electric bulb purchased for a hostel in various years is as follows :

Year	Number of bulbs
2017	35
2018	20
2019	30
2020	45
2021	25

Represent the details by a pictograph.



19). The following pictograph shows different kinds of trees planted in a park. Each symbol represents 8 trees. Look at the pictograph & answer the questions given below :

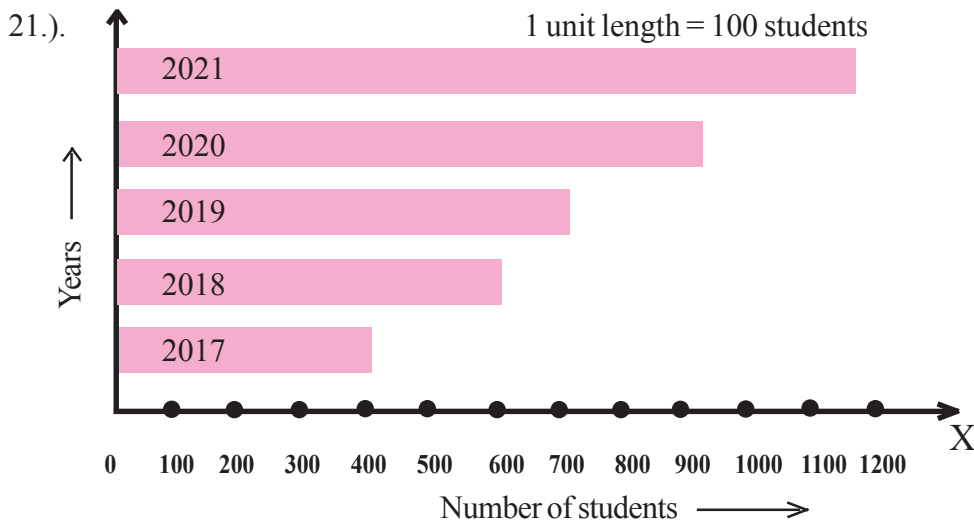
Banyan tree	
Neem tree	
Mango tree	

- i) How many mango trees are there?
- ii) How many banyan trees are there?
- iii) How many neem trees are there?
- iv) How many trees are there in all?

20). The number of Mathematics books sold by a shopkeeper on six consecutive days is shown below :

Days	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Numbers of books sold	70	45	35	50	60	75

Draw a bar graph to represent the above information choosing the scale of your choice.





Read the above bar graph showing the number of students in a particular school in different years :

Answer the following questions :

- i) What information does the above bar graph give?
- ii) What is the scale of this graph?
- iii) What is the number of students in the year 2021?
- iv) What is the difference of the number of students in the year 2021 & 2020?



Chapter - 10



Mensuration

Mensuration is a branch of mathematics that deals with measurement of various parameters of geometrical figures and many more.

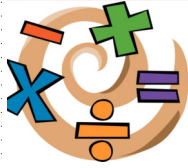
Things to remember

1. Perimeter :

- i) The sum of the lengths of all sides of a plane figure, or the length of its boundary, is called the perimeter of the figure.
- ii) Perimeter of a rectangle = $2(l + b)$ units, where l is its length and b is its breadth.
- iii) Perimeter of a square = $(4a)$ units, where a is one of its four sides.
- iv) Perimeter of a circle is called its circumference.

2. Area :

- i) The measurement of the region enclosed by a plane figure, is called the area of the figure.
- ii) Area of a rectangle = (length \times breadth) sq. units.
- iii) Area of a square = (sides)² sq. units.



**** Example :** Find the perimeter of a rectangle whose length and breadth are 15.4 cm and 11.6 cm respectively.

Solution : Length of the rectangle = 15.4 cm

Breadth of the rectangle = 11.6 cm

$$\begin{aligned}\text{Perimeter of the rectangle} &= 2(l + b) \text{ units} \\ &= 2(15.4 + 11.6) \text{ cm} \\ &= (2 \times 27) \text{ cm} \\ &= 54 \text{ cm}\end{aligned}$$

Hence, the perimeter of the rectangle is 54 cm.

**** Example :** The cost of fencing a square field at ₹ 125 per meter is ₹ 8000. Find the length of each side of the field.

Solution : Total cost of fencing = ₹ 8000

Rate of fencing = ₹ 125 per meter

$$\begin{aligned}\text{Length of boundary of the field} &= \frac{\text{Total cost}}{\text{Rate}} \\ &= \frac{8000}{125} = 64 \text{ m}\end{aligned}$$

Let the length of each side of the field be x meters.

Then, its perimeter = $(4x)$ meters.

$$\therefore 4x = 64 \quad \therefore x = \frac{64}{4} \quad \therefore x = 16$$

Hence, the length of each side of the field is 16 m.

Exercise- 10

Choose the correct options of the followings : (1 Mark)

- The area of a rectangle is 650 cm^2 and its breadth is 13 cm. The perimeter of the rectangle is -
a) 63 cm (b) 130 cm c) 100 cm (b) 126 cm
- The area of a square is 256 cm^2 . The perimeter of the square is -
a) 16 cm (b) 32 cm c) 48 cm (b) 64 cm



3. How many envelopes can be made out of a sheet of paper $72\text{ cm} \times 48\text{ cm}$, if each envelopes requires a paper of size $18\text{ cm} \times 12\text{ cm}$?
- a) 4 (b) 8 c) 12 (b) 16
4. The cost of putting a fence around a square field a ₹ 25 per metre is ₹ 2000. The length of each side of the field is-
- a) 80 m (b) 40 m c) 20 m (b) None of these.

Fill in the blanks : (1 Mark)

5. A polygon having all sides are equal and all angles are equal, is called a _____ polygon.
6. Perimeter of a square _____ \times side.
7. Area of a rectangle = _____ \times _____ .
8. The perimeter of a circle is called its _____ .
9. Match the following : (1 Mark)
- | | |
|------------------------------|---------------------------|
| a). Area of a rectangle | i) $4 \times \text{side}$ |
| b). Area of a square | ii) $l \times b$. |
| c). Perimeter of a rectangle | iii) $(\text{Side})^2$ |
| d). Perimeter of a square | iv) $2(l \times b)$. |

Long answer type questions : (3/4 Marks)

10. Find the perimeter of-
- i) A triangle of sides 7.8 cm, 6.5 cm and 5.9 cm.
- ii) A regular pentagon of side 8 cm.
- iii) An equilateral triangle of side 9.4 cm.



11. Fill in the blanks:

Rectangle	Length	Breadth	Area
I	4cm	3 cm	_____
II	_____	5 cm	60 sq. cm
III	16 cm	_____	80 sq. cm
IV	15 cm	7 cm	_____

12. Find the perimeter of a square, each of whose sides measures :

- a) 3.9 cm (b) 4.3 cm c) 2 m

13. The length and breadth of three rectangles are as given below :

- a) 30 cm and 20 cm
b) 17 cm and 5 cm
c) 25 cm and 15 cm.

Which one has the largest area and which one has the smallest area?

14. Find the area of a rectangle whose

- i). length = 46 cm and breadth = 25 cm
ii). length = 3.5 m and breadth = 2 m.

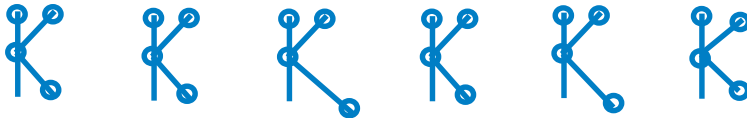


Chapter - 11

Algebra



Make Patterns by match sticks.




Nos. of K Pattern (s)	1	2	3	4
Nos. of match sticks required	4	8	12	16

Here, number of match sticks required = $4n$

Where, $n = 1, 2, 3, 4, \dots$

The value of n changes. So, n is a variable. We can make letters, shapes etc. by using match sticks to show some other examples of variables. A variable is a number which does not have a fixed value. Different rules of arithmetic can be expressed by variables.

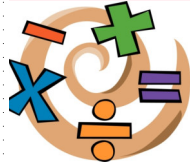
Rule	Example	Figure
Commutativity of addition	$3 + 2 = 2 + 3$	

Distributive rule :

Obviously, we do not know the table of 43. So, we can do the following -

$$7 \times 43 = 7(40 + 3) = 7 \times 40 + 7 \times 3 = 280 + 21 = 301$$

$$\text{Similarly } a(b + c) = ab + ac$$



Commutative rule of multiplication :

For multiplication of two numbers, the order of two numbers being multiplied does not matter.

For example, $5 \times 7 = 7 \times 5$

so, $11 \times 17 = 17 \times 11$

Similarly $a \times b = b \times a$

Expressions with variables :

We know, multiplying 9 by 2, we get, $9 \times 2 = 18$

Similarly, multiplying 9 by p, we get $9 \times p = 9p$

So, $9p$ is an expression.

Similarly,

Formation of expression	Algebraic Expression
y multiplied 5	$5y$
y added to 5	$y + 5$
P divided by 7	$\frac{P}{7}$
7 subtracted from -m	$-m - 7$

Using Expressions practically :

Problem	Variable	Expression
Sumi has 10 more pens than Sita,	Let, Sita has = x pens	\therefore Sumi has $(x + 10)$ pens.

Equation :

Example

SN	Value	$x - 5$	True or False
1	$x = 6$	0	False
2	$x = 6$	1	True
3	$x = 6$	2	False
4	$x = 5$	0	True
5	$x = 20$	15	True

We see that, $x - 5 = 1$ is true when $x = 6$ so, $x - 5 = 1$ is an equation.

Any equation like the above, is a condition on a variable. It is satisfied only for a definite value of the variable.



Exercise : 11

1. Fill in the blanks (1 Mark) :

SN	Shape	Variable (n = 1, 2 ...)
→ Example		n = 2
i	
ii	
iii	
iv	
v	

2) Write the names of the rules (1 Mark) :

SN	Example	Rule
→ Example	$3 + 5 = 5 + 3$	Commutativity of addition
i	$10 \times 9 = 9 \times 10$	.....
ii	$8 + 9 = 9 + 8$	.....
iii	$7 \times 23 = 7 \times (20+3)$	.....
iv	$37 \times 73 = 73 \times 37$	.....
v	$11 + 13 = 13 + 11$	.....



3) Give the expression of the following (1 Mark) :

SN	Statement / case	Rule
→ Example	8 added to p	$p + 8$
i	11 subtracted from a	.....
ii	x divided by 5	.....
iii	100 multiplied by y	.....
iv	11 added to product of 7 and q	.....
v	17 added to z	.....
vi	p multiplied by q	.....

4) Fill in the blanks (1 Mark) :

x	1	2	3	4	5	6	7
x-1	0	1	.....	3	.....	5	.....

5) Find the value of x (2 Marks) :

SN	Equation	Value of x
→ Example	$x + 2 = 3$	1
i)	$x + 5 = 7$	.....
ii)	$x - 3 = 0$	.....
iii)	$x + 9 = 10$	.....
iv)	$\frac{x}{5} = 2$	.....
v)	$7x = 21$	.....

6) Long Answer type questions (3 Marks) :

i) What is variable? Give example.

Ans - The term 'Variable' means something that can vary i.e. changes. The value of variable is not fixed. It can take any value 1, 2, 3, 4.....

Example - The length of side of a square is a variable. But number of sides in a square is 4. It is a fixed number. So, it is not a variable.



ii) What is an expression. Give example.

iii) What is an equation? Give example.

iv) Solve : $5x + 15 = 20$

v) Sita has some flowers, Soma has 5 flowers more than Sita. Together, they have 15 flowers. Make the equation.

vi) Ram has some marbles. Rabi has 20 marbles more than Ram. They have 100 marbles together. Make the equation.

vii) Solve : $7x - 3 = 32$

viii) Solve : $\frac{1}{3}x - 7 = 5$

7. Match column A and Column B :

- | A | B |
|------------------------------|--|
| i) $a \times b = b \times a$ | a) Value of a is greater than b |
| ii) ab | b) Distributivity of multiplication
Over addition |
| iii) $(a+b)+c = a + (b + c)$ | c) a multiplied by b |
| iv) $a (b+c) = ab + ac$ | d) Associativity of addition |
| v) $a > b$ | e) Commutativity of multiplication. |



Chapter - 12



Ratio and Proportion

In our daily life, we compare two quantities of the same type. For this purpose we use ratio, proportion and unitary method.

Things to remember

- i) The comparison of two numbers or quantities of the same type is known as ratio. The symbol of ratio is :
- ii) Two equivalent ratios are obtained by multiplying the numerator and denominator by the same number.
- iii) Four quantities a, b, c, d are said to be in proportion if $a : b = c : d$ or $a : b :: c : d$.
- iv) The method in which first we find the value of one unit and then the value of the required number of units is called unitary method.

Exercises : 12

1) Fill in the blanks (1 Mark) :

- i) Two quantities can be compared only if they are in the Unit.
- ii) $\frac{12}{15} = \frac{\boxed{}}{5}$ (Fill in the box)
- iii) If a, b, c and d are in proportion, $a : b = \dots : d$.



- iv) The symbol used for Proportion is
- v) If two ratios are, then they are in proportion.

2. Write True (T) or False (F) : (1 Mark)

- i) $6 : 12 :: 1 : 2$ Ans : T
- ii) In unitary method first we find the value of one unit.
- iii) The equivalent ratio of $9 : 15$ is $3 : 4$.
- iv) The ratio of 50 paise to ₹ 5 is $10 : 1$.
- v) Ratio may be treated as a fraction.

3) Choose the correct answer : (1 Mark)

- i) The ratio of Rs. 15 and 30 paise is-
 - a) $1 : 2$
 - b) $3 : 5$
 - c) $2 : 1$
 - d) $50 : 1$

Ans : (d)

- ii) The length and breadth of a rectangle are 21 cm and 14 cm respectively.

The ratio of the length to the breadth is

- a) $3 : 2$
- b) $2 : 3$
- c) $7 : 2$
- d) $4 : 3$

- iii) The missing number in the box in the following proportion is

$$\square : 4 :: 2 : 8$$

- a) 3
- b) 4
- c) 1
- d) 7

Ans :

- iv) The ratio of the shaded portion to unshaded portion

- a) $1 : 2$
- b) $2 : 1$
- c) $3 : 4$
- d) $5 : 6$



Ans :



v) The cost of 6 pens is ₹ 42. Then the cost of 5 pens is

- 1) ₹ 25 2) ₹ 35 3) ₹ 40 4) ₹ 52

4. Short answer type questions : (2 Marks)

i) 30 litres of petrol costs ₹ 2700. Find the cost of 15 litres of petrol.

Ans - 30 litres of petrol costs = ₹ 27000

$$1 \text{ litre of petrol costs} = ₹ \frac{27000}{30}$$

$$15 \text{ litres of petrol costs} = ₹ \frac{27000 \times 15}{30} \\ = ₹ 13500$$

ii) Find the ratio of the number of sides to the number of vertices of a cuboid.

Ans:

iii) Find the two equivalent ratios of 5 : 7.

Ans:

iv) Find the ratio of 15 minutes to 1 hour.

v) Present age of father is 55 years and that of his son is 25 years. Find the ratio of the present age of father to the present age of son.

vi) Which ratio is larger 3 : 5 or 2 : 7 ?

vii) Find two numbers whose difference is 10 and ratio is 3 : 2.

viii) Find the ratio of the number of vertices of a triangle to the number of vertices of a cube.



5) Long answer type questions : (3/4 Marks)

i) In a box, the ratio of the number of 5 rupee coins to the number of 1 rupee coins is 7 : 4. If number of 1 rupee coins is 20, find the number of 5 rupee coins.

Ans - Hints : Find $\frac{20}{4}$, then $7 \times \frac{20}{4} = 35$ five rupee coins
 $4 \times \frac{20}{4} = 20$ one rupee coins

ii) Divide ₹ 1500 between Manika and Konika in the ratio 3 : 7.

Ans -

iii) Divide ₹ 2500 among A, B and C in the ratio 2 : 3 : 5.

iv) The 1st, 3rd and 4th terms are 25, 75 and 105 respectively. Find the 2nd term, if four terms are in proportion.

v) If the cost of one dozen pencil is ₹ 120 what is the cost of 18 such pencils?

vi) 30 men can finish a piece of work in 6 days. How many men will be needed to finish it in 12 days?

vii) A car travels 210 km in 3 hours. a) How long will it take to travel 630 km?

b) How far will it travel in 5 hours with the same speed?



Chapter - 13

Symmetry



Introduction

A figure has line symmetry if a line can be drawn dividing the figure into two identical parts. The line is called a line of symmetry. When we see certain figures with evenly balanced proportions, we say, “They are symmetrical.

Number of lines of symmetry

A figure may have no line of symmetry, only one line of symmetry, two lines of symmetry or multiple lines of symmetry. Here some examples.

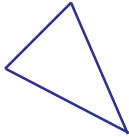
Number of lines of Symmetry	Examples
No line of symmetry only one line of symmetry	An scalene triangle.
Two lines of symmetry	A rectangle.
Three lines of symmetry	An equilateral triangle.
Four lines of symmetry	A square
Infinite number lines of Symmetry	Circle

The regular polygons are symmetrical figure and hence their lines of symmetry are quite interesting.



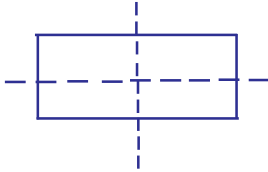
Each regular polygon has as many lines of symmetry as it has sides. We say, they have multiple lines of symmetry.

i) Scalene Triangle



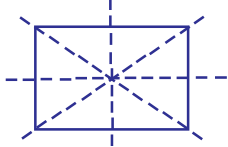
No line of symmetry

iii) A rectangle



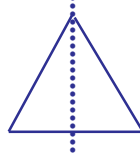
Two lines of symmetry

v) Square



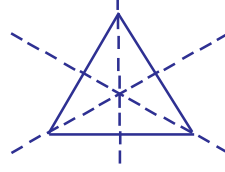
Four lines of symmetry

ii) An isosceles triangle



only one line of symmetry

iv) An equilateral triangle



Three lines of symmetry

vi) Regular polygon



Five lines of symmetry

vii) Regular hexagon



six lines of symmetry

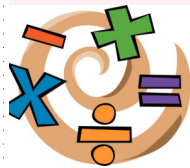
Reflection and symmetry

Line symmetry and mirror reflection are naturally related and linked to each other.

Here is a picture showing the reflection of the English letter M. You can imagine that the mirror is invisible and can just see the letter M and its image.



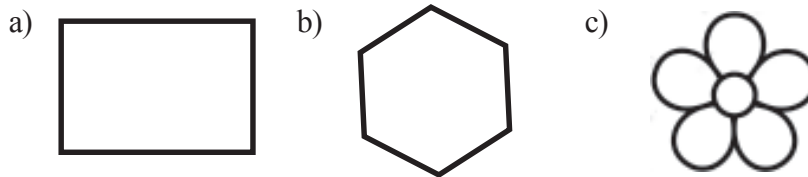
When dealing with mirror reflection, we have to take into account the left \longleftrightarrow right changes in orientation.



Exercise- 13

Very Short Answer Type Questions : (1 Mark)

- 1) List any four symmetrical objects from your home or school.
Ans- The blackboard, the table top, The computer disc, a pair of scissors etc.
- 2) Find the number of line of symmetry for each of the following shapes.



- 3) Write the number of lines of symmetry of
 - a) Isosceles triangle
 - b) Rhombus
 - c) Circle
- 4) State the number of lines of symmetry for the following figures
 - a) An equilateral triangle
 Ans -
 - b) A regular hexagon
 - c) A Square
 - d) A rectangle
- 5) Can you draw a triangle which has
 - a) Exactly two lines of symmetry
 - b) No lines of symmetry
 - c) Exactly three lines of symmetry
 - d) Exactly one lines of symmetry

Fill in the blanks (1 Mark)

Complete the following table

Shape	Figure	Number of lines of symmetry
Equilateral triangle		3
Square		



Shape	Figure	Number of lines of symmetry
Rectangle		
Isosceles triangle		
Rhombus		
Circle		
Regular hexagon		
Scalene triangle		

Which of the following statements are True (T) and which are False (F) : (1 Mark)

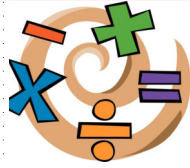
- The number of lines of symmetry of a scalene triangle is one. Ans - F
- The number of lines of symmetry of a circle is countless.
- The number of lines of symmetry of a regular hexagon is six.
- The number of lines of symmetry of an equilateral triangle is three.
- For the given figure, l is the mirror line.



- The number of lines of symmetry of a rhombus is three.
- The number of lines of symmetry of a regular pentagon is five.

Multiple choice questions (Choose the correct answer) : (1 Mark)

- The number of lines of symmetry of a circle
 A) Infinite B) One C) One D) Two
- The number of lines of symmetry of a regular hexagon is
 A) 2 B) 3 C) 4 D) 6



- 3) The number of lines of symmetry of a scalene triangle is
A) 1 B) 2 C) 0 D) 3

- 4) The number of lines of symmetry of the given shape is



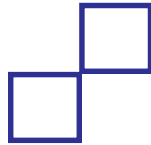
- A) 1 B) 2
C) 3 D) 4

- 5) The number of lines of symmetry of the given shape is



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

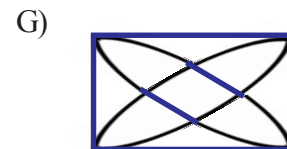
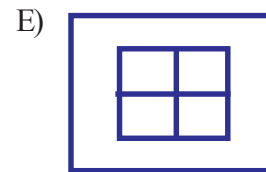
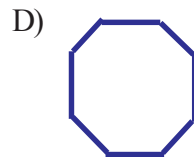
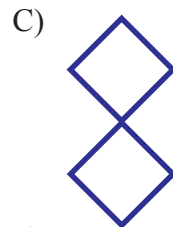
- 6) The number of lines of symmetry of the given shape is



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

Short answer type Questions (Marks - 2)

- 1) Find the number of lines of symmetry for each of the following shapes



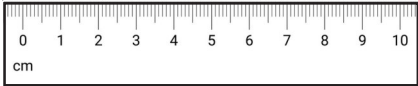



Chapter - 14

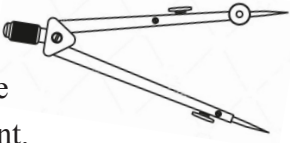
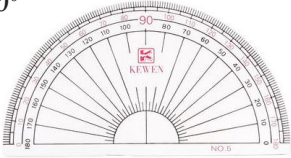
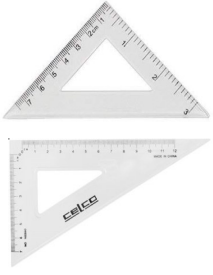


Practical Geometry

In drawing geometrical shapes we need to know about basic geometrical tools. In this chapter we will know their names and uses. These tools will be used on construction of line segments, angles etc.

Sl. No.	Geometrical Tools	Use
1	<p>Ruler : A ruler, sometimes called a rule or line gauge, is a device used in geometry and technical drawing, as well as engineering and construction industries to measure distance or draw straight lines.</p> 	To draw line, line segment, ray and to measure length of line segment
2	<p>Compasses : The instrument compasses has two arms, one of the arm has a metal end point. The other arm has screw arrangement which can ktightly hold a pencil.</p> 	It is used to trace, areas, circles and angles.



Sl. No.	Geometrical Tools	Use
3	<p>Divider : A pair of divider has two arms. Each arm has a sharp metal end point. The distance between two ends is adjustable as per requirement.</p> 	It is used to measure and compare lengths.
4	<p>Protractor : A protractor is a measuring instrument, typically made of transparent plastic for measuring angles. It has degree marks on the curved edge (semi-circular arc) and a $0^\circ - 180^\circ$ line. The mid point of $0^\circ - 180^\circ$ line is called the centre of the protractor.</p> 	To draw and measure angles.
5	<p>Set-Squares : There are two triangular shaped instruments called set squares are usually made of thin transparent plastic sheet. In one set square, the angles are $30^\circ, 60^\circ, 90^\circ$ is called 30° - Setsquare and in the other the angles are $90^\circ, 45^\circ, 45^\circ$ is called 45° - Setsquare</p> 	To draw parallel and perpendicular line. They can also used to construct $30^\circ, 45^\circ, 60^\circ, 90^\circ$.

Construction of circles

A circle is a two dimensional figure. Every circle have a fixed point called a centre. Distance between the centre and the boundary of a circle is known as its radius. The line segment through the centre of a circle with its end points touching the boundary of the circle is known as the diameter of the circle. The diameter is twice its radius.



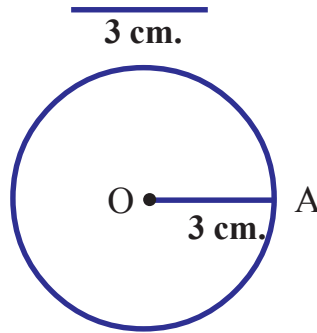
Construction of a circle of radius 3 cm

Let us draw a circle with 3 cm.

Step - 1 : Place the compass on a ruler and widen it to measure 3 cm.

Step - 2 : Mark the centre of the circle with the sharp end to the compass.

Step - 3 : Move the arm with the pencil around, keeping the other arm fixed at the centre of the circle.



All the points on the boundary of a circle are equidistant from its centre.

Here O is the centre of the circle and $OA = 3$ cm, is the radius of the circle.

Construction of a line segment of a given length

A line segment is a measurable part of a line with two definite end points.

Let us draw a line segment of length 5 cm.

Step - 1 : Draw a long line m.



Step - 2 : Mark a point X on it.

Step - 3 : Place the compass on a ruler and widen it to measure 5 cm.

Step - 4 : Place the sharp end of the compass on point X. Rotate the other arm with the pencil to make a mark at point Y on the line. \overline{XY} is the line segment of length 5 cm.

Construction of a copy of a given line segment

Suppose we want to draw a line segment whose length is equal to the length of the line segment \overline{XY} .

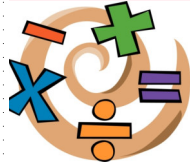
Step - 1 : Use the compass to measure \overline{XY} .

Step - 2 : Draw a long line m, mark a point P on it.

Step - 3 : Place the sharp end of the compass on the point P. Rotate the other arm with the pencil to mark point Q on the line.



\therefore We have $\overline{XY} = \overline{PQ}$.



Construction of perpendicular to a line

A perpendicular to a line cuts it at right angles.

A perpendicular to a line can be draw in two ways:

- Through a point on the line.
- Though a point outside the line.

(a) Perpendicular through a point on the line

Step - 1 : Draw a long line, m .

Step - 2 : Mark a point A on it.

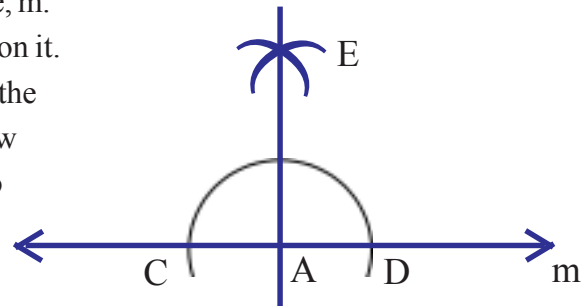
Step - 3 : With point A as the centre and any radius, draw an arc to cut line, m at two points C and D .

Step - 4 : With the radius greater than CA and C as the centre, draw an arc above the first arc.

Step - 5 : With the same radius and D as the centre, draw another arc above the first arc.

Step - 6 : Mark the point of intersection of the two arcs as E .

Step - 7 : Join point E to point A with the help of a ruler. $EA \perp m$.



(b) Perpendicular through a point outside the line

Step - 1 : Draw a long line m .

Step - 2 : Mark a point A above it.

Step - 3 : With point A as the centre and any radius draw an arc to cut line m at two points C and D .

Step - 4 : With the radius greater than half of CD and C as the centre, draw an arc below the first arc.

Step - 5 : With the same radius and D as the centre draw another arc below the first arc.

Step - 6 : Mark the point of intersection of the two arcs as E .

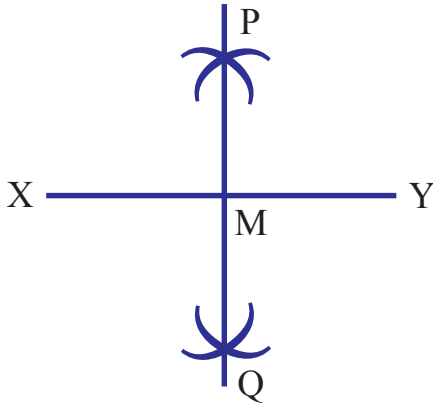
Step - 7 : Join point E to point A with the help of a ruler.

$$\therefore AE \perp m.$$



Construction of perpendicular bisector of line segment

A perpendicular bisector of a line segment intersects it at right angles and divides it into two equal halves.



Step - 1 : Draw a line segment XY of 6 cm.

Step - 2 : With X as centre and radius more than half XY, draw arcs, one on each side of XY.

Step - 3 : With Y as centre and the same radius as before, draw arcs, cutting the previously drawn arcs at P and Q respectively.

Step - 4 : Join PQ, meet XY at M.

Here $\angle PMX = \angle PMY = 90^\circ$ and $XM = MY = 3$ cm

\therefore PQ is the perpendicular bisector of XY.

Construction of an angle equal to a given angle

Let $\angle ABC$ be given.

Step - 1 : Draw a ray OX.

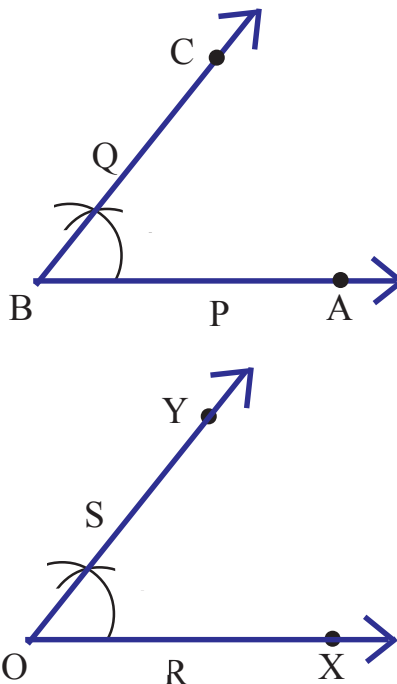
Step - 2 : With B as centre and any radius, draw an arc cutting BA and BC at P and Q respectively.

Step - 3 : With O as centre and the same radius, draw an arc, cutting OX at R.

Step - 4 : With R as centre and radius as PQ cut the arc through R at S.

Step - 5 : Join OS and produce it to Y.

\therefore Then, $\angle XOY = \angle ABC$.





Construction of Bisector of an angle

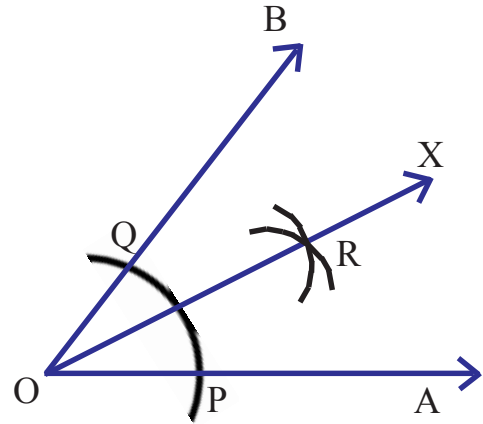
Let $\angle AOB$ be given.

Step - 1 : With O as centre and any convenient radius, draw an arc, cutting OA and OB at P and Q respectively.

Step - 2 : With centre P and radius more than half of PQ, draw an arc.

Step - 3 : With centre Q and the same radius as before, draw another arc, cutting the previously drawn arc at a point R.

Step - 4 : Join OR and produce it to any point X.



\therefore Ray OX bisects $\angle AOB$.

Exercise : 14

1. Fill in the blanks : (1 Mark)

- The diameter of a circle is 7 cm. The radius of the circle is
- Diameter = 2 x
- All the diameter of a circle passing through the
- A line hasend point.
- A ray hasend point.
- A part of a line with to points is called a
- A ray hasdefinite length.
- If two line segments do not intersect, they are



2. Long answer type questions : (3/4 Marks)

a) Draw a circle of radius 3.5 cm.

Ans -

b) With the same centre O, draw three circles of radii 3 cm, 4 cm and 5 cm.

Ans -

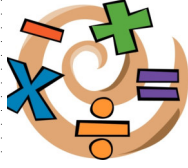
c) Draw any circle and mark points P, Q and R such that (i) P is in the interior of the circle (ii) Q is on the circle (iii) R is in the exterior of the circle.

d) Draw a line segment of length 6.5 cm using a ruler.

e) Draw a line segment of length 7.2 cm; bisect it; measure the length of each part.

f) Draw a line segment $AB = 6.4$ cm. Draw the perpendicular bisector of AB.

g) Draw an angle of 50° with the help of a protractor. Draw a ray bisecting this angle.



- h) Draw a line segment $AB = 5.6$ cm. Take a point P outside the line segment and draw a perpendicular line from P on AB .

Ans -

- i) Draw a line segment $PQ = 6.8$ cm. Take a point O on the line segment and draw a perpendicular line passing through O .

Ans -

- j) Using compasses construct the following angles.

i) 60° ii) 90° iii) 45°

- k) Draw an angle of 55° with the help of a protractor. Draw a copy of 55° angle with a ruler and compasses.

- l) Match the following statements -

Column - A

- i) Line segment is
ii) Two segments may intersect
iii) Line segment has
iv) A line has

Column - B

- a) no end point.
b) portion of a line.
c) at a point.
d) two end-points.



SAMPLE QUESTION

Class - VI

Time - 3 Hours

Subject - Mathematics

Full Marks - 100

Group - A (20 Marks)

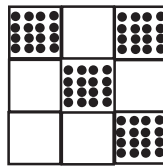
1. Answer the following questions :

2x5=10

a) Choose the correct answer :

The shaded region is

- i) $\frac{2}{9}$ ii) $\frac{4}{9}$ iii) $\frac{5}{9}$



b) Write the numbers 'P' and 'Q' which are not given -

- (6) (12) (18) (P) (Q) (36)

- i) P = ii) Q =

c) Find the biggest number - $\frac{1}{2}$, $\frac{1}{3}$, 1, $\frac{1}{4}$, $\frac{1}{5}$

d) Subtract :
$$\begin{array}{r} 321 \\ - 168 \\ \hline \end{array}$$

e) Multiply : $43 \times 0.6 =$

2. Answer the following questions :

2x3=6

Find Dividend, Divisor and Quotient. $161 \div 7 =$

- i) Dividend = ii) Divisor = iii) Quotient =

3. Match the columns :

1x4=4



a) Triangle



b) Quadrilateral

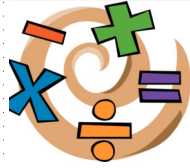


c) Pentagon



d) Hexagon

e) Heptagon



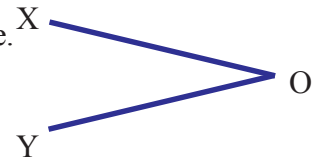
Group - B (40 Marks)

4. Answer the following questions :

1x10=10

- i) Which one is smaller : 0.09 and 0.009
- ii) Express the following in fraction. : 3.17
- iii) \overline{AB} and \overline{PQ} are parallel, then we write -
 - a) $\overline{AB} = \overline{PQ}$, b) $\overline{AB} \parallel \overline{PQ}$,
- iv) Area of rectangle = (..... x breadth) unit²
- v) Length of each side of a equilateral triangle = a cm,
then perimeter =
- vi) When x and y are two variables, then $x + y = y + \dots\dots\dots$
- vii) $\frac{2}{5} = \frac{8}{\square}$
- viii) Write true or false. $36 : 24 :: 5 : 2$
- ix) Write the names of the line segments from the figure.

c) $\overline{AB} \sim \overline{CD}$



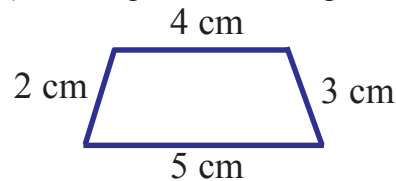
- x) The sum of three angles of a triangle is -
 - a) 360° b) 150°

c) 180°

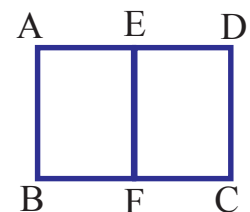
2x9=18

5. Answer the following questions :

- i) Write in word : 23.701
- ii) Find the perimeter of the given figure :



- iii) How many rectangles are in the figure? Name them.



- iv) Fill in the blanks : $a \times (b + c) = a \times b + \dots\dots\dots$
- v) In a college, out of 4320 students, 2300 are girls. Find the ratio of number of girls to the total numbers of students.
- vi) Find the sum : $0.65 + 1.155 + 2$

Sample Question



- vii) Draw a line segment of length 7.9 cm using a ruler only.
 viii) Complete the left blank boxes.

P	7	9	11	13
P-6	1		5	

- ix) Give the expression : 11 subtracted from twice y.

6. Answer the following questions :

3x4=12

- i) Find the ratio : 80 paise and ₹ 4.
 ii) Ram earns ₹ 1500 in 10 days. How much will he earn in 30 days?
 iii) Find the area of the square whose length of each side is 15 cm.
 iv) Draw circle of diameter 6.4 cm.

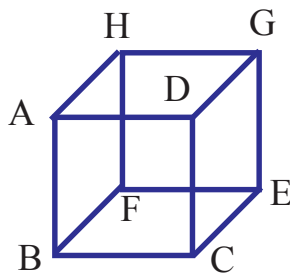
Group - C (40 Marks)

7. Answer the following questions :

1x6=6

- i) 5, 2, 7, 9, 8, 7, 9, 6 : How many numbers are equal to or more than 7?
 ii) Express as decimal form : $\frac{3}{5}$
 iii) 30 paise = ₹
 iv) What is the number of line of symmetry of an equilateral triangle?
 v) How many radii can have a circle?

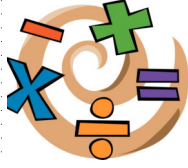
- vi) Name the vertices of the figure.



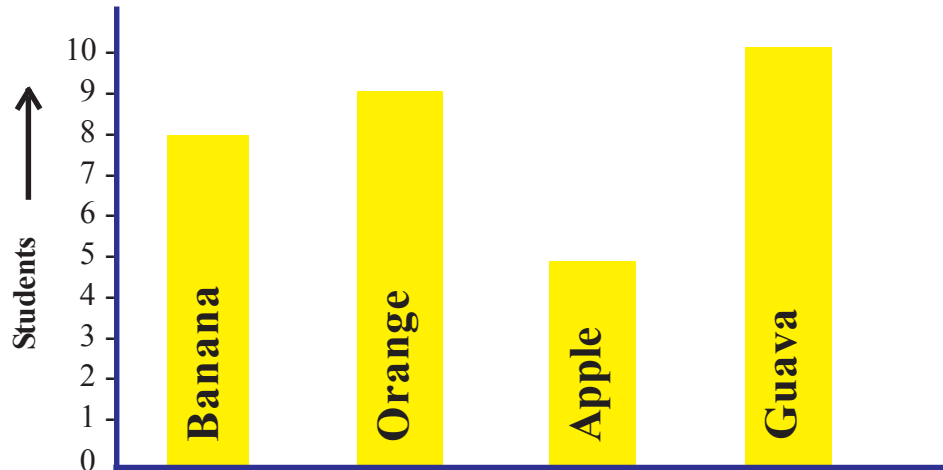
8. Answer the following questions :

2x5=10

- i) Each angle of a rectangle is a right angle. (yes/ no)
 ii) Write two equivalent ratios of 8 : 6
 iii) Present age of Rabi is 4 years. Rabi's father's age is 7 years more than 4 times of Rabi's age. What is Rabi's father's present age?
 iv) The area of a rectangle is 1200 sq.m. It's breadth is 30 m. Find its length.



v) From the bar graph write the number of students like banana, orange, apple and guava.



9. Answer the following questions :

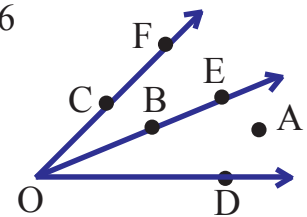
3x4=12

i) The following marks were obtained by 40 students in Mathematics. Arrange them in a table using tally marks.

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

ii) In the given diagram, name the point(s) –

- In the exterior of $\angle EOF$.
- On $\angle EOF$
- In the interior of $\angle DOE$.



iii) Find the cost of fencing a square park of side 250 m at the rate of ₹ 20 per metre.

iv) Naresh walked 2 km 35 m in the morning and 1 km 7 m in the evening. How much distance did he walk in all?

10. Answer the following questions :

4x3=12

i) Amal made 42 runs in 6 overs and Anup made 63 runs in 7 overs. Who made more runs per over?

ii) Cost of a dozen pencil is ₹ 180 and cost of 8 ballpens is ₹ 56. Find the ratio of the cost of a pencil to the cost of a ballpen.

iii) Draw a line segment AB of length 12 cm. Draw a perpendicular bisector PQ of the line segment AB.



Answer Sheet



Exercise - 1 (Knowing our Numbers)

Very short answer type questions :

- b) Greatest number 26682, Smallest number 26210
- a) Greatest number 9842, Smallest number 2489
b) Greatest number 8621, Smallest number 1268
c) Greatest number 7530, Smallest number 3057
- 1,00,000 cm, 4. 10,00,000 miligram, 5. 20 Lakh = 2 Million.
- 5 Crore = 50 Million, 7. a) $(7+3) \times 6$, b) $5 \div (9-2)$, 8. 9999999, 9. 10000000
- a) 1,700 b) 7,000

Fill in the blanks :

- Three hundred, 2. One hundred, 3. 1000 million, 4. 1000 metres, 5. $9 \times 10 + 8 \times 1$,
6. 3 digit, 7. Smallest 4 digit, 8. 20, 9. 1000 mililitres, 10. 99999

Say True or False :

- T, 2. F, 3. T, 4. F, 5. T, 6. F, 7. T, 8. T, 9. F, 10. T

Multiple Choice Question :

- B, 2. A, 3. A, 4. C, 5. A, 6. B, 7. D, 8. B, 9. C, 10. C

Short answer type questions :

- b) 7809, 8910, 9801, 9870
- a) 5500, 5055, 5005, 5000; b) 92547, 88715, 81971, 45321
- a) Eight crore seventy-five lakh ninety-five thousand seven hundred sixty two,
b) Nine crore ninety-nine lakh forty six, c) Nine crore eighty-four lakh thirty-two thousand seven hundred one.



4. a) Seventy-eight million, nine hundred twenty-one thousand, ninety two, b) Forty-eight million forty-nine thousand eight hundred thirty one, c) Ninety-nine million nine hundred eighty-five thousand, one hundred two.

5. a) LXV b) XCVII c) LXXVII d) XCIII

6. a) 1,751 b) 10,815

Long answer type questions :

1. 3,210 2. 52,965 3. 292,800 4. 33 km 5. 182 6. 63,250

7. 20 sheet, nil, 8. 989,999 9. 67425 10. 315,449

Exercise - 2 (Whole Number)

1. a) 0, b) 1, c) 0, d) 99, e) 100, f) 0, g) 0, h) 18, i) 0, j) multiplication.

2. a) F, b) F, c) T, d) T, e) T, f) T, g) T, h) F, i) T, j) F, k) F

3. a) 1, b) 84, c) 7063899, d) 100000, e) 10149, f) 533, g) 1108, h) 85374, i) 9700, j) 16200

4. (i)(b), (ii)(c), (iii)(d), (iv)(b), (v)(a), (vi)(a), (vii)(d)

5. a) 10, b) 11, c) 2431012, 2431010; d) 2106, e) 160368, f) 15237000; g) 9,989,001; h) 1045 km, i) 91, j) 32,940

6. a) ₹ 24875, b) 1,532,250; c) ₹ 121, d) 31, e) 2,382,750; f) (i)-(d), (ii)-(c), (iii)-(b), (iv)-(a); g) ₹ 3240

Exercise - 3 (Playing with Numbers)

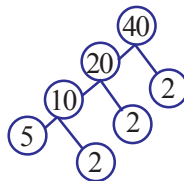
1. i) 1, ii) Infinite, iii) Even prime, iv) 12, v) 6.

2. a) T, b) F, c) T, d) T, e) F.

3. a) 1, 2, 4, 5, 8, 10, 20, 40; b) 6, 12, 18, 24, 30; c) 7, d) $36=17+19$, e) 3, 5; f) 7, 11, 13; g) 1, h) 1, 5; i) 1 and the number itself, j) $210=2 \times 3 \times 5 \times 7$, k) Highest Common Factor, l) Lowest Common Multiple.

4. a) 1, 2, 4; b) 12, 24, 36; c) 1, 3; d) $9999 = 3 \times 3 \times 11 \times 101$; e) 9, f) 35, g) 360, h) 720, i) Product of the HCF and LCM of the numbers = Product of the numbers, j) 95,

k)





5. a) $1729 = 7 \times 13 \times 19$, Difference between two consecutive prime nos. = 6
b) - (i) 1, (ii) 2, (iii) 1
c) 25 cm, d) 7 minutes 12 seconds post 7 a.m., e) 31 litres.

Exercise - 4 (Basic Geometrical Ideas)

1. a) T, b) F, c) F, d) T, e) F, f) T, g) F, h) T, i) F, j) F, k) T, l) T, m) T, n) T.
2. b) ii, c) adjacent, opposite; d) diagonal, e) sector, segment;
f) 14, g) 2, h) no.
3. a (iii), b (i), c (i), d (ii) e (i)

Exercise - 5 (Understanding Elementary Shapes)

1. (A) i) Equilateral triangle, ii) Isosceles triangle,
iii) Scalene triangle, iv) Isosceles triangle.
(B) v) 270° , vi) 180° , vii) 360° , viii) 180° , ix) 270° , x) 270°
2. i) T, ii) F, iii) F, iv) T, v) F, vi) T, vii) F, viii) T, ix) T, x) T
3. i) Straight angle, ii) Protractor, iii) South, iv) 270° , v) Obtuse triangle.
vi) Rectangle, vii) $180^\circ < \text{Reflex angle} < 360^\circ$, viii) 12,
ix) 2, x) Isosceles triangle.
6. (i)-b, (ii)-a, (iii)-d, (iv)-e, (v)-c,
7. a)-(vii), b)-(iii), c)-(v), d)-(iv), e)-(i), f)-(ii), g)-(vi)

Exercise - 6 (Integer)

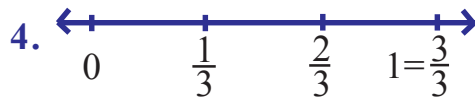
1. ii) 0, iii) Positive, iv) -38, v) -47, vi) 5, vii) -5,
viii) -4, ix) A loss of ₹ 350.
2. ii) T, iii) T, iv) F, v) T, vi) F, vii) F, viii) T, ix) F, x) T
3. (ii)-(a), (iii)-(c), (iv)-(c), (v)-(a), (vi)-(c)
4. ii) -9, iii) -30°C , iv) 1, v) 0, vi) -7, vii) -1
5. ii) 5, 0, -5, -11; iii) -80, iv) 9, v) -11, -10, -9, -8;
vii) -10, ix) -5, x) -12
6. ii) (i)-(d), (ii)-(c), (iii)-(b), (iv)-(a); iii) 22, iv) -2, v) 26°C



Exercise- 7 (Fractions)

Very short answer type questions :

1. $\frac{6}{24}$ 2. $\frac{20}{60}$ 3. a) $\frac{1}{4}$ b) $\frac{2}{6}$ c) $\frac{3}{5}$



5. $\frac{7}{9}$ 6. $\frac{18}{30}$ 7. $\frac{7}{10}$ 8. i) $\frac{7}{18}$ ii) $\frac{11}{17}$ 9. $\frac{3}{13}$ 10. $5\frac{2}{5}$

11. Numerator 5, Denominator 16; 12. $\frac{66}{7}$

Fill in the blanks :

1. $\frac{2}{9} = \frac{14}{63}$ 2. $\frac{45}{60} = \frac{15}{20}$ 3. denominator, 4. numerator,
5. denominator, 6. Improper fraction. 7. <, 8. >, 9. =, 10. >, 11. <,
12. $\frac{2}{9}$ 13. $\frac{7}{11}$ 14. $\frac{9}{5}$ 15. like fraction, 16. denominators.

True or False :

1. T, 2. T, 3. F, 4. F, 5. F, 6. T, 7. T, 8. F, 9. F, 10. T, 11. T, 12. T

- MCQ : 2. b, 3. a, 4. c, 5. b, 6. c, 7. a, 8. D, 9. C, 10. a.

Short answer type questions :

2. Ascending order $\frac{1}{7} < \frac{3}{7} < \frac{7}{7} < \frac{11}{7} < \frac{13}{7}$

Descending order $\frac{13}{7} > \frac{11}{7} > \frac{7}{7} > \frac{3}{7} > \frac{1}{7}$

3. $\frac{13}{15} > \frac{5}{6}$ 4. $\frac{4}{9}$ 5. $6\frac{19}{30}$ 6. $\frac{9}{20}$ 7. $\frac{3}{5}$ 8. 5, 9. 1, 10. 2

11. Rinku has read less,

12. 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, $\frac{4}{12}$ i.e. $\frac{1}{3}$ part

Long answer type questions :

1. Rakesh takes less time : by $2\frac{8}{15}$ minutes, 2. $\frac{46}{35}$ metres, 3. $\frac{1}{2}$ km,

4. $2\frac{11}{30}$ 5. $\frac{37}{60}$ 6. $6\frac{3}{4}$ 7. Same to the both class room, $\frac{4}{5}$

8. Laxman, 2 minutes.



Exercise - 8 (Decimals)

- a) 0.01, b) $>$, c) 0.001, d) 0.1, e) 2.03, f) 1000, g) 0.1235, h) 34.15, i) 41.45, j) 41232.65, k) 0.147367, l) Fraction, m) 171.17, n) 0.000001, o) 29.307, p) 10.716, q) 13.57, r) $\frac{5}{100}$, s) 8.037, t) 25.05
- a) T, b) F, c) T, d) F, e) F, f) T, g) F, h) T, i) F, j) F, k) T, l) f, m) T, n) F, o) F.
- a) $\frac{2}{100}$, b) 21.012, c) 5.3, d) 5, e) $\frac{13}{20}$, f) 0.6, g) 60.95, h) 118.53, i) 15.955 g., j) 3.376
- i)-b), ii)-d), iii)-a), iv)-b), v)-b), vi)-b), vii)-a), viii)-b), ix)-b), x)-d)
- b) 3.05 m., c) 752.009, d) 135.025 g., e) 550.64, f) 4 km 891 m., g) ₹ 15.75, h) $0.33 < 3.003 < 3.033 < 3.3$, i) $7.02 > 7.002 > 2.07 > 2.007$, j) 45.897
- b) 13 kg 365 g., c) ₹ 254.75, d) 5.75 l, e) 6 m. 95 cm, f) 1 kg 235 g., g) 24.5 cm, h) a)-ii), b)-i), c)-iii), d)-iv); i) 16.084, j) 9.850 kg

Exercise - 9 (Data Handling)

- (d) 2. (d) 3. (d) 4. (d) 5. (b)
- numerical figures 7. original 8. array 9. frequency 10. tabulation
- F, 12. F, 13. T, 14. F, 15. T.
- (i) 24 (ii) 32 (iii) 40 (iv) 96.
- (i) The above bar graph shows the number of students in a particular school in different years.
(ii) 1 unit length = 100 students.
(iii) In the year 2021, the number of students in this school is 1100.
(iv) In the year 2020, the number of students in this school = 900.
 \therefore Required difference in the year 2021 and 2020 = $1100 - 900 = 200$.



Exercise - 10 (Mensuration)

- (d) 126 cm
- (d) 64 cm
- (d) 16
- (c) 20 m.
- square
- 4
- Length \times Breadth
- Circumference
- a) (ii), b) (iii) c) (iv) d) (i)
- (i) 20.2 cm (ii) 40 cm (iii) 28.2 cm
- Rectangle I : Area 12 sq.cm
Rectangle II : Length 12 cm
Rectangle III: Breadth 5 cm
Rectangle IV: Area 105 sq.cm
- (i) 15.6 cm (ii) 17.2 cm (iii) 8 cm
- Largest (a), Smallest (b)
- (i) 1150 cm (ii) 7 sq.cm.

Exercise - 11 (Algebra)

- i) 3, ii) 4, iii) 5, iv) 2, v) 4. 2. i) Commutativity of multiplication, ii) Commutativity of addition, iii) Distributivity of multiplication over addition, iv) Commutativity of multiplication, v) Commutativity of addition.
- i) $a - 11$, ii) $\frac{x}{5}$, iii) $100y$, iv) $7q + 11$, v) $z + 17$, vi) pq
- 2, 4, 6 ;
- i) 2, ii) 3, iii) 1, iv) 10, v) 3 ;
- iv) 1, v) $x + (x+5) = 15$, vi) $x + (x+20) = 100$, vii) 5, viii) 36 ;
- i)-e), ii)-c), iii)-d), iv)-b), v)-a)

Exercise- 12 (Ratio and Proportion)

- ii) 4, iii) c) iv) ::, v) equal ;
- ii) T, iii) F, iv) F, v) T ;
- (ii)-(a), (iii)-(c), (iv)-(a), (v)-(b);
- ii) 3 : 2, 2. iii) 10 : 14, 15 : 21 iv) 1 : 4, v) 11 : 5
vi) 3 : 5, vii) 30, 20 viii) 3 : 8 ;
- ii) Rs.450, Rs.1050; iii) Rs.500, Rs.750, Rs.1250;
iv) 35, v) Rs.180, vi) 15 men, vii) (a) 9 hours, (b) 350 km.



Exercise - 13 (Symmetry)

Very short answer type questions :

2. a) 2, b) 6, c) 5 ; 3. a) 1, b) 2, c) Countless ; 4. a) 3, b) 6, c) 4, d) 2
 5. a) No, b) Yes, a scalene triangle ; c) Yes, an equilateral triangle;
 d) Yes, an isosceles triangle

Fill in the blanks : Square - 4, Rectangle - 2, Isosceles triangle - 1, Rhombus - 2,
 Circle - Infinite, Regular hexagon - 6, Scalene triangle - No.

Say True or False : 1. F, 2. T, 3. T, 4. F, 5. T, 6. F, 7. T, 8. F

MCQ : 1. A, 2. D, 3. C, 4. D, 5. B, 6. D

Short answer type questions : 1. A) 2, B) 0, C) 2, D) 8, E) 2, F) 2, G) 2.

Exercise - 14 (Practical Geometry)

1. a) 3.5 cm, b) Radius, c) Centre, d) No,
 e) One, f) Line segment, g) No, h) Parallel.
 2. i) (i)-(b), (ii)-(c), (iii)-(d), (iv)-(a)

Sample Question

1. (a)(ii), (b)(i) 24, (ii) 30, (c) 1, (d) 153, (e) 25.8;
 2. i) 161, ii) 7, iii) 23
 3. (i)-(b), (ii)-(d), (iii)-(a), (iv)-(c);
 4. i) 0.009, ii) $\frac{317}{100}$, iii) (b), iv) Length, v) 4a cm, vi) x,
 vii) 20, viii) False, ix) OX, OY; x) (c)
 5. i) Twenty three point seven zero one, ii) 14 cm,
 iii) 3, ABCD, ABFE, CDEF; iv) axc,
 v) 115 : 216, vi) 3.805, viii) 3, 7
 6. i) 1 : 5, ii) ₹ 4500, iii) 225 sq. cm
 7. i) 5, ii) 0.6, iii) 0.30, iv) 3 Nos, v) Infinite, vi) A, B, C, D, E, F, G, H
 8. i) Yes, ii) 4 : 3, 16 : 12; iii) $(4xy+7)$ years, iv) 40 m.,
 v) Banana - 7, Orange - 9, Apple - 5, Guava - 10
 9. ii) (a) A, D, C ; b) B, c) A, iii) Rs.20,000; iv) 3 km 42 m.
 10. i) Anup, ii) 12 : 7

Note

Note

Note