MENTAL MATHS

QUESTION BANK
CLASS 6

MENTAL MATHS

CLASS VI

2022-23

DIRECTORATE OF EDUCATION

GOVT. OF NCT OF DELHI

HIMANSHU GUPTA, IAS
Director, Education & Sports

Directorate of Education
Govt. of NCT of Delhi
Room No. 12, Civil Lines
Near Vidhan Sabha,
Delhi-110054
Ph.: 011-23890172
E-mail : diredu@nic.in

No. PS/DE/2022/194
Dt. 19/5/2022

MESSAGE

They say, 'Numbers are not just symbols on paper; numbers have life!'

It is not an exaggeration to place on record that numbers have played a pivotal role in the development and growth of human civilisation.

Numerical skills are very useful for students in their future life, especially when they appear in competitive exams.

Our Mental Maths Project aims at gradually developing and nurturing foundational numerical skills among our budding mathematicians. It started nearly two decades ago, and is striding, each passing year, on the path of progress.

Incidentally, I had an opportunity to witness the State Level Mental Maths Quiz Competition recently and I was spellbound by the speed, confidence and enthusiasm exhibited by the students. Indeed, it was to be seen to be believed!

I appreciate the dedication and hard work put in by the State Core Committee members and the Subject Experts under the able guidance of the Project Director (Mental Maths) in preparing the Question Banks and carrying this project forward with great zeal & fervour.

(HIMANSHU GUPTA)

विकास कालिया
परियोजना निदेशक (मेंटल मैथ्स)
क्षेत्रीय शिक्षा निदेशक (उत्तर & मध्य)

VIKAS KALIA
PROJECT DIRECTOR (MENTAL MATHS)
REGIONAL DIRECTOR OF EDUCATION
(NORTH & CENTRAL)

No. PD|MMP|609

सत्यमेव जयते

Dated 02|01|2023

'A Few Interesting Facts About Maths'

The word 'Mathematics' has its origin in the Greek word "Mathema' which means 'something that is learnt' or 'something that one gets to know'. In the same country (Greece), an ancient scholar Archimedes is considered to be the 'Father of Mathema' as he discovered methods to measures the areas of different shapes.

However, in our own country, we consider Aryabhatta as Father of Mathematics because of his original contributions made in Spherical Trigonometry. Some people believe that Aryabhatta invented Zero also, while some others credit another Vedic scholar Brahmgupta for this landmark discovery. The Western Scholars believe that Zero was first invented by the 'Mayans' (Mesopotamia) and a little later, by the Indians from which places, Zero travelled gradually to Cambodia, China and to the Arab world.

By the way, 'Arab' reminds me of an important branch of Maths named 'Algebra' which has its roots in the Arabian word 'Al-jabr' which means 'reunion of broken parts' (also used for reuniting broken bones)!

Algebra seeks to find out 'the missing values' and restoring them, just like restoring broken bones by providing missing links. In Algebra, we first 'imagine' values in the form of symbols like 'x' or 'y' and then, manipulate them to find out the 'actual' values. This is how even today, we find the 'missing' values or links through Algebra.

In short, we can conclude that unlike the 'inventions' of bulb, printing press or pen which were made by certain individuals, Mathematics is not an invention made by one person or by one civilisation. Its various branches were cultivated and nurtured by various individuals across various continents & civilizations and through different millennia.

As for Mental Maths, one can master Mental Maths through rigorous practice. Apart from learning Tables and Formulae by heart, one needs to learn various tricks for breaking longer calculations into smaller parts and making numbers 'round'. I am sure, our Maths Teachers will be able to identify students who have aptitude for numbers and groom them for Mental Maths Quiz Competitions.

I take this opportunity to thank all our Maths Teachers who devote so much of their extra time to prepare our students to sit for these competitions. I am also indebted to our Maths Teachers who have 'written' and 'reviewed' these question banks.

I thank my HoSs, Coordinators and the Core Team who, I think, are devoted much more than their Project Director to promoting Mental Maths among students!

Finally, I thank DBTB for the efforts they made for successful publication of these Question Banks.

Above all, I am indebted to my superior, the Director of Education, for his consistent support & guidance.

02/01/23

(VIKAS KALIA)
PROJECT DIRECTOR
(MENTAL MATHS)

ACKNOWLEDGEMENT
SUBJECT EXPERTS & CONTENT DEVELOPMENT TEAM (Class-VI)
SESSION 2022-2023

Dr. SUNIL AGGARWAL, LECTURER

STATE COORDINATOR, MENTAL MATHS PROJECT

Govt. S. Co-ed Sr. Sec. School, Possangipur, B-1 Janak Puri (School ID - 1618003)

Ms. SAMPDA GULATI, VICE PRINCIPAL

STATE CO-COORDINATOR, MENTAL MATHS PROJECT

GSKV, C-Block, No.1, Janak Puri (School ID - 1618017)

Mr. SANJAY KUMAR, VICE PRINCIPAL

Govt. S. Co-ed Sr. Sec. School, Bindapur, Delhi (School ID - 1618191)

Mr. NARAYAN DUTT MASIWAL, LECTURER

Govt. S. Co-ed Sr. Sec. School, Possangipur, B-1 Janak Puri (School ID - 1618003)

Mr. NAVEEN KUMAR NASSA, LECTURER

GBSSS, AP Block, Shalimar Bagh (School ID - 1309007)

Ms. ANJALI ARYA, TGT

GSKV, A- Block, Janak Puri (School ID -1618018)

Mr. TUSHAR SALUJA, LECTURER

Member, Academic Core Committee

Mr. DEEPAK SHARMA, TGT

RPVV, Gandhi Nagar (School ID - 1003261)

COVER PAGE DESIGN & TECHNICAL SUPPORT

Mr.PREM KUMAR SHARMA, LECTURER

GBSSS, No. 1, C-Block, Janak Puri (School ID - 1618006)

Mr. NARESH KUMAR, TGT

GSBV, No. 2, C-Block, Janak Puri (School ID - 1618005)

STATE LEVEL MENTAL MATHS QUIZ COMPETITION RESULT 2021-2022
LEVEL-1
REGION-EAST (1st POSITION)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	D.O.B.	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	DEVARSH	PAWAN KUMAR	20190210031	09.05.2010	SBV KIRAN VIHAR	1001109	DALIP KUMAR
2	VI	UJJAWAL KUMAR	AJEET	20160149218	07.10.2009	SBV KIRAN VIHAR	1001109	MADHU RANJAN
3	VI	KHUSHWANT BHARDWAJ	HITESH BHARDWAJ	20190206309	29.08.2010	GMSBV GT ROAD SHAHDARA	1105001	DHRMENDRA KUMAR

REGION -WEST (1ST RUNNER UP)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	D.O.B.	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	VANSHU GARG	ANKUR GUPTA	20200293047	26.02.2011	GGSSS NANGLOI	1617021	MONIKA
2	VI	LAKSHAY KUMAR	JASBIR	20160065332	26.09.2010	SARVODAYA CO-ED VIDYALAYA L BLOCK HARI NAGAR	1514022	MANVI GUPTA
3	VI	AKHILESH YADAV	DEVI PRASAD YADAV	20190339931	06.06.2010	SBV NO 1 MADIPUR	1515007	NAWAL KISHORE

REGION -NORTH (2ND RUNNER UP)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	D.O.B.	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	DAIWIK KABIR	SANDEEP KABIR	20190174011	11.05.2010	G CO-ED SV SEC 8 ROHINI	1413027	SUNITA CHAUDHARY
2	VI	SATYAM KUMAR JHA	BRAHMANAND JHA	20160181430	24.12.2010	GSBV K BLOCK MANGOLPURI	1412002	SANTOSH
3	VI	YASH GUPTA	GANSHYAM GARG	20160396886	22.07.2010	GBSSS BAWANA	1310019	SUDHIR ATRI

REGION -SOUTH (4TH POSITION)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	D.O.B.	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	ALIYA	SAGEERUDDIN	20170314953	10.06.2009	RRMR SKV HAUZRANI	1923041	ARUNA
2	VI	DIPANSHU	ISHWAR DAYAL	20150096963	28.09.2010	SBV VIJAY ENCLAVE	1821028	AMAR NATH TRIVEDY
3	VI	ARNAV SHARMA	SUBHASH SHARMA	20150072903	03.09.2010	G CO-ED SV DICHAON KALAN	1822262	PAWAN SHARMA

REGION -CENTRAL (5TH POSITION)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	D.O.B.	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	HARSHITA BISHT	FAKIR CHAND BISHT	20210175074	16.03.2011	SACSV SHAM NATH MARG	1207107	PRADEEP KUMAR MISHRA
2	VI	HIMANSHU	PRAMOD SAINI	20210177198	25.10.2008	GBSSS MUKUNDPUR	1207236	ASHA
3	VI	SAHIL SHEIKH	MILAN SHEIKH	20170182840	01.01.2009	SBV ROUSE AVENUE	2127001	SHASHI KANT SHARMA

SCHEDULE OF MENTAL MATHS QUIZ COMPETITIONS

FOR THE YEAR 2022-2023

DIRECTORATE OF EDUCATION

GOVT OF NCT OF DELHI

- **Practice to students from Question Bank**   **01.04.2022 to 15.10.2022**

- **School level Quiz Competition**   **17.10.2022 to 07.11.2022**

- **Cluster level Quiz Competition**   **08.11.2022 to 14.11.2022**

- **Zonal level Quiz Competition**   **21.11.2022 to 30.11.2022**

- **District level Quiz Competition**   **07.12.2022 to 14.12.2022**

- **Regional level Quiz Competition**   **26.12.2022 to 31.12.2022**

- **State level Quiz Competition**   **18.01.2023 to 31.01.2023**

INDEX

Chapter-1

Knowing Our Numbers

Points to Remember:

- **Natural Numbers:**

  Counting numbers are called natural numbers 1, 2, 3, …. are called natural numbers. 1 is the smallest natural number.

- **Place value:**

  The place value of a digit depends upon its position in the number.

  For e.g.:- The place value of 5 in 4567 is 500.

- **Face value:**

  Each digit has its fixed face value, independent of its place in the number.

  For e.g. :- The face value of 5 in 4567 is 5.

- **Rounding off the number to the nearest 10, 100, 1000 etc.**

  1, 2, 3, 4 are numbers nearer to 0 than 10, so they are rounded off to 0.

  6, 7, 8, 9 are numbers nearer to 10 than 0, so they are rounded off to 10.

  Number 5 is equidistant from 0 and 10, but it is rounded off to 10.
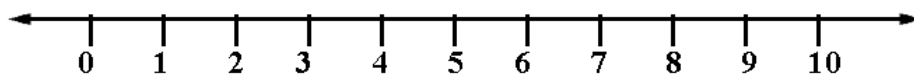
   For example: Round off 86512 to nearest:

  1. Tens   86510

  2. Hundreds   86500

  3. Thousands   87000

- **ROMAN NUMERALS:**

  Roman Numerals are expressed by letters of the English alphabet.

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

My Dear Cow, Loves Xtra Vegetables Immensely.

M(1,000), D(500), C(100), L(50), X(10), V(5), I(1)

- **USE OF BRACKETS:**

  Brackets are symbols used in pairs to group things together.

  Types of Brackets

  Parentheses or round brackets ( )

  Square brackets   **[ ]**

  Angled brackets   **< >**

  Braces or curly brackets   **{ }**

SEE THE DIFFERENCE	
$(3 + 2) \times (6 - 4)$ $=(5) \times (2)$ $=5 \times 2$ $=10$	$3 + (2 \times 6) - 4$ $= 3+12-4$ $= 11$

QUESTIONS:

1. **Make the greatest 5-digit number, using the digits 6, 2,5,8,4 only once.**

2. **Find the product of the place value of two 3's in 534370.**

3. **Make the smallest 5 -digit number, using the digits 7, 9,3,8,5 only once.**

4. **Find the sum of the place values of two 5's in 75450.**

5. **Find the value of: $45 \times (14 - 9)$**

6. **Write 24 in Roman numerals.**

7. **How many thousands are there in two lakhs?**

8. **Find the value of: $80 + (15 \times 4)$**

9. **A student Ajit's height is 1m 29 cm. Find his height in cm.**

10. Find the number: $7 \times 10000 + 5 \times 1000 + 4 \times 100 + 8 \times 10.$

11. Find the difference between smallest 4 -digit number and largest 4 -digit number.

12. How many seconds make 7 minutes?

13. Simplify: $48 + 5 \times 4 - (24 + 6) - 7$

14. How many metres should be added to 24 km 450m to make 30 km 550m?

15. Ravi had ₹ 75500. He gave ₹ 5350 to Garima and ₹ 15,150 to Ramesh. How much money is left with Ravi?

16. Prakash buys 10 notebooks and 20 pens. If the cost of one notebook is ₹ 35 and cost of one pen be ₹ 10, how much money did he spend?

17. Find the sum of smallest 3 - digit number and largest 4 -digit number.

18. How many milliliters make a liter?

19. How many centimetres make 18 metres?

20. A box contains 40000 toffees, each toffee weighs 5gm .What is the total weight of the box in kg?

21. There are 48 pages in a notebook. How many pages are there in 20 such notebooks?

22. Arrange in ascending order:-
    4379, 4739, 4397, 4793

23. Arrange in descending order:-
    43251, 43521, 43125, 43152

24. Arrange in ascending order :-
    27643, 26743, 27634, 24736

25. Arrange in descending order :-
    1548, 1584, 1854, 1845

26. Make the largest 4-digit number using the digits 3,5,7,0.

27. Take two digits 0 and 1. Make the greatest 4 -digit number using both the digits equal number of times.

28. Take two digits 0 and 1. Make the smallest 4 -digit number using both the digits equal number of times.

29. Write in Roman numerals :80

30. The monthly salary of Rohit is ₹ 20975 and that of Reena is ₹ 15875. What is the difference between their monthly salaries?

31. Manish multiplied 100 by 89 instead of multiplying by 79 .How much was his answer greater than the correct answer?

32. Sangeeta types 25 pages per day. How many pages will she type in the month of November?

33. How many times the digit 0 comes in 10 crores?

34. Anita's age is 48 years. How is her age represented in Roman system?

35. How many numbers are there containing 3 – digits?

36. The estimated value of 5784 - 437 is?

37. Write the number for the expanded form :-
    $2 \times 10000 + 8 \times 10 + 5 \times 1$

38. The distance between Delhi and Agra is 233 km. What is the distance in metres?

39. Keeping the place of 5 unchanged in the number 537068, find the smallest number obtained by rearranging other digits.

40. Estimate the quotient to the nearest tens: 74 divided by 8.

Answers:

1.	86542	21.	960 pages
2.	9000000	22.	4379<4397<4739<4793
3.	35789	23.	43521>43251>43152>43125
4.	5050	24.	24736<26743<27634<27643
5.	225	25.	1854>1845>1584>1548
6.	XXIV	26.	7530
7.	200	27.	1100
8.	140	28.	1001
9.	129cm	29.	LXXX
10.	75480	30.	₹ 5100
11.	8999	31.	1000
12.	420 seconds	32.	750
13.	31	33.	8 times
14.	6100 m	34.	XLVIII
15.	₹ 55000	35.	900
16.	₹ 550	36.	5400
17.	10099	37.	20085
18.	1000 ml	38.	233000 m
19.	1800 cm	39.	503678
20.	200 kg	40.	10

Chapter -2

Whole Numbers

Points to Remember:

- **Whole Number: The natural number along with zero 0, form the collection of whole numbers.**
  0 is the smallest whole number.
- **Predecessor of number: Predecessor is that number which comes Immediately before the given natural number. It's obtained by subtracting 1 from the given number.**
  for e.g. Predecessor of 45 is 45-1=44
  0 has no predecessor in whole number.
- **Successor of a number: The successor of a whole number is the number obtained by adding 1 to it.**
  For e.g. Successor of 45 is 45+1 = 46.
  Every whole number has it's successor.
- **Representation of whole number on the number line**
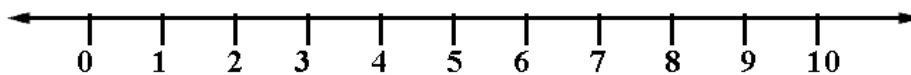
- **Division of a whole numbers by zero is not defined.**
- **0 is called the ADDITIVE IDENTITY (because adding 0 to any number, does not change the number).**
- **1 is called the MULTIPLICATIVE IDENTITY (because multiplying any number with 1, does not change the number).**

- **Dot patterns :** We shall review some types of dot patterns of numbers:

(1) LINE: Every number can be arranged as a line.

E.g. The number 5 is shown as   • • • • •

(2) SQUARE :

E.g. The number 4 is shown as   • •

                                                           • •

(3) RECTANGLE :

E.g. The number 8 is shown as   • • • •

                                                           • • • •

(4) TRIANGLE :

E.g. The number 6 can be shown as   •

                                                          • •

                                                         • • •

Questions:

1. Determine the three consecutive whole numbers which come immediately before 17999.
2. How many whole numbers are there between 25 and 65?
3. Find the predecessor of the smallest 3-digit number.
4. Find the sum of predecessor of smallest 3-digit number and successor of greatest 3-digit number.
5. Find the product of successor and predecessor of 99.
6. Find the value of: $65 \times 95 + 65 \times 5$.
7. Simplify: $169 \times 20 + 169 \times 40 + 169 \times 30$.
8. Find the product of: $824 \times 4 \times 25$.
9. What is the sum of the original number and the new number if the digits 2 and 7 are interchanged in the number 2997?
10. Find the value of $1+2-3-4+5-6+7+8-9$.

11. What should be added to (70×20) so that the sum is $(14750 \div 10)$?

12. Find the successor of the largest number formed by using the digit 7,3,5,4,1 only once.

13. Ravi spends ₹450 on lunch and dinner. How much money he has to spend on lunch and dinner for a week?

14. Find the value of: 735+ $(150 \div 10)$.

15. Find the product of largest 4-digit number and smallest whole number.

16. A milkman supply 50 liters of milk on Monday. The next day, he supply 40 liters of milk. If the cost of milk be ₹ 75/ liter. How much did the milkman earned?

17. Find the value of: $22765 \times 145 - 22765 \times 45$.

18. If the cost of one bat is ₹ 500 and one ball is ₹ 50. Then find the cost of 40 bats and 40 balls.

19. The digit 2 and 3 of a number 73024 are interchanged. Find the difference between the two numbers.

20. There are 70 boxes containing 25 bottles each. If 5 more bottles were added in each box. Find the total number of bottles.

21. If $66 \times 12 = 792$, then find the value of 660×120.

22. Which least number should be added to 356, to make it exactly divisible by 5.

23. Which least number should be subtracted from 999 so that 33 divided the new number exactly?

24. Find the product of smallest 3-digit number and its successor.

25. Find the value of:-$437 \times 149 + 437 \times 21 - 437 \times 70$.

26. Find the product of largest one digit number and smallest 3-digit number.

27. How many times the digit 2 occurs in tens place in the whole numbers from 100 to 300?

28. Find the value of $2 \times 3567 \times 50$.

29. The school canteen charges ₹ 20 for lunch and ₹ 5 for milk each day. How much money will be charged in 8 days on these things?

30. Find the value of 1507 – (625/25).

31. What is the difference between the predecessor and successor of the greatest 5-digit number?

32. What is the sum of the predecessor of 701 and successor of 299?

33. Find the value of: $3+7(5+1) \div 3-2$.

34. Find the value of: $8937 \times 648 + 8937 \times 122 + 8937 \times 230$.

35. What is the difference between the successor of the least 5-digit number and the predecessor of the greatest 3-digit numbers?

36. The difference between 85 and the number obtained by reversing the digit is?

37. By using dot (.) patterns, which smaller 2-digit number can be arranged in all the three ways namely a line, a triangle and a rectangle?

38. Find the value of: $24 \div (9 \div 3)$.

39. A car driver filled his car petrol tank with 65 liters of petrol on Monday. On Tuesday, he fills the tank 35 liters of petrol. If the cost of petrol be ₹ 89/liter. How much did the driver spend?

40. Find the value of: $10 + 40 \div 8 \times 2 - 9$.

Answers:

1.	17996, 17997, 17998	21.	79200
2.	39	22.	4
3.	99	23.	9
4.	1099	24.	10100
5.	9800	25.	43700
6.	6500	26.	900
7.	15210	27.	20
8.	82400	28.	356700
9.	10989	29.	₹ 200
10.	1	30.	1482
11.	75	31.	2
12.	75432	32.	1000
13.	₹ 3150	33.	15
14.	750	34.	8937000
15.	0	35.	9003
16.	₹ 6750	36.	27
17.	2276500	37.	10
18.	₹ 22000	38.	8
19.	990	39.	₹ 8900
20.	2100	40.	11

Chapter-3

Playing with numbers

- Factors of a number: A factor of a number is an exact divisor of that number. For eg.   1, 2, 3, 6, 9 and 18 are factors of 18.

- Perfect number: The number which is equal to the sum of its proper factors.

  For eg.   6 is a perfect number, as proper factors of 6 are: 1, 2, 3 and 6=1+2+3.

- Prime numbers: A prime number is a natural number greater than 1 which has exactly two factors, 1 and itself.

- Composite numbers: Numbers with more than two factors.

- 1 is neither prime nor composite (as it has only one factor)

- Co-primes: Number with only 1 as a common factor. For e.g. 9 and 14 are co-primes.

- Twin primes: Two consecutive prime numbers, having a difference of 2.

  eg.   3 and 5 are twin primes.

- Prime triplets: Three consecutive prime numbers, having a difference of 2.

  e.g. 3,5,7

- Even number: Natural number that is exactly divisible by 2. For eg. 22, 456

- Odd numbers: Natural numbers that cannot be divided by 2 exactly e.g. 13,177

- Prime factorization: Prime factorization is the method of finding the factors of a number that are all prime. Prime factorization of any number is unique.

- **Factor tree: Factor tree is a tool that breaks down any number into its prime factors. For e.g. Factor tree of 48**
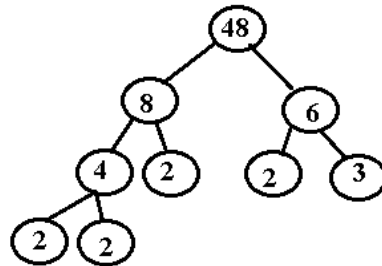
- **H.C.F. (Highest Common Factor): HCF of two or more numbers is the highest common factor that divides all the given numbers exactly.**

- **L.C.M. (Least Common Multiple): LCM of two or more numbers is the smallest/least number that is exactly divisible by the numbers.**

- **Product of two numbers = HCF × LCM**

- **Divisibility rules : A number is divisible by :**

Number	Divisibility rule
2	If last digit is 0, 2, 4, 6 or 8
3	If the sum of digits is divisible by 3
4	If the last two digits are divisible by 4
5	If the last digit is 0 or 5
6	If the number is divisible by 2 and 3
8	If last 3 digits are divisible by 8
9	If the sum of the digits is divisible by 9

10	If the last digit is 0
11	Subtract the last digit from the number formed by the remaining digits. If new number is divisible by 11, the original number is divisible by 11.

Questions:

1. Which is the smallest odd prime number?
2. How many prime numbers are there between1 to 50?
3. Find all pairs of prime numbers less than 15, whose difference is 2.
4. How many twin primes are there between 20 and 30?
5. Find the greatest 4 digit number divisible by 4.
6. Find the greatest 2 digit prime number.
7. Determine first five multiples of 12.
8. Find the HCF of 9 and 13.
9. Find the LCM of 12 and 15.
10. A vessel has 10 litres 500 ml of milk. In how many glasses each of capacity 150 ml   can it be filled?
11. Find all numbers less than 60, which are common multiples of 2 and 3.
12. Find all prime numbers less than 15.
13. Determine all the factors of 27.
14. Find the missing number :-
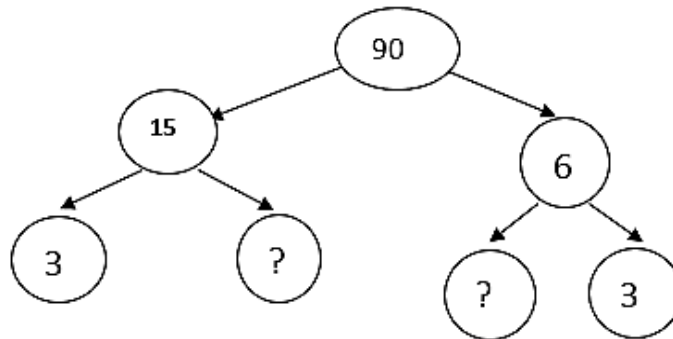
15. Complete the factor tree:-
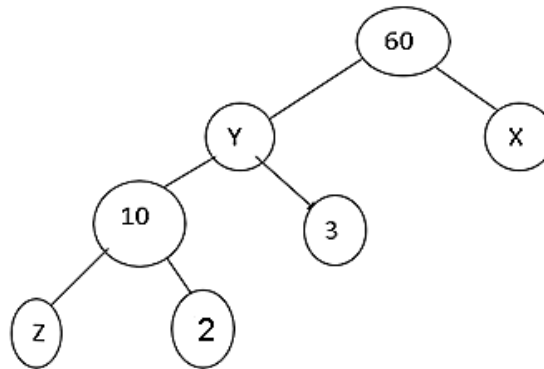
16. Find the least number which when divided by 12, 16, 24 and 36 leaves the remainder 7 in each case.

17. Three persons start walking at the same time. The lengths of their steps be 80cm, 85cm and 90cm respectively .Find the minimum distance that can be measured in exact number of steps.

18. Find the sum of prime numbers between 1 and 10.

19. A machine, on an average, manufactures 250 screws a day. How many screws did it manufacture in the month of November?

20. The Length, breadth and height of a room are 825cm, 675cm and 450 cm respectively. Find the maximum length of tape that can measure all the dimensions exact number of times.

21. Determine first five multiples of 9.

22. Find the HCF of 24 and 36.

23. Find the common factors of 4, 8 and 12.

24. Find the smallest 4 -digit number which is divisible by 6, 8 and 9.

25. Find the LCM of 12, 15 and 45.

26. Find the HCF of 27 and 63.

27. If a number is divisible by 10, then what is its one's digit?

28. Find the largest 3 -digit number which is exactly divisible by 3.

29. Find the prime numbers between 90 and 100.

30. 5*2 is a 3 -digit number with * as a missing digit. If the number is divisible by 6, find the least value of the missing digit.

31. What least value should be given to * so that the number 6342*1 is divisible by 3?

32. What least value should be given to * so that the number 915*26 is divisible by 9?

33. Find the sum of prime numbers between 60 and 75.

34. If the HCF of two numbers is 16 and their product is 3072. Find their LCM.

35. What is the HCF of two co-prime numbers?

36. If the HCF and LCM of two numbers be 4 and 24 respectively. One of the numbers is 8, then find another number.

37. How many prime numbers are there between 1 and 30?

38. Which of the following number is not a multiple of 27:- 1, 3, 9 and 6?

39. Which of the given numbers 4, 2, 3 and 8 is not a factor of 12?

40. Which of the given numbers 21, 12, 17 and 39 is a prime number?

41. Which of the following pairs of numbers are co-prime?
    (30, 415), (17, 68), (16, 81) and (15,100).

42. Which of the given pair of numbers (7, 15), (12, 49), (18, 23) and (12, 21) are not co-prime?

43. What is the HCF of 75, 60 and 210?

44. The numbers which have more than two factors are called_____.

45. If A is the 5th prime number and B is the 7th prime number then what is B – A?

46. Four bells ring at intervals of 6, 7, 8 and 9 seconds respectively. After how many seconds do all the bells ring together?

47. What is the greatest number that divides 37, 50 and 123 leaving remainders 1, 2 and 3 respectively?

48. What is the least value that should be given to? so that the number 653? 47 is divisible by 11?

49. The LCM of 64 and 48 is 192. What is the HCF of these numbers?

50. Find the sum of 1 + 3 + 5 + 7 + 9 + 11 + 13 +15?

Answers:

1.	3	26.	9
2.	15	27.	0
3.	(3,5), (5,7), (11,13)	28.	999
4.	None	29.	97
5.	9996	30.	2
6.	97	31.	2
7.	12, 24, 36, 48, 60	32.	4
8.	1	33.	272
9.	60	34.	192
10.	70	35.	1
11.	6, 12, 18, 24, 30, 36, 42, 48, 54	36.	12
12.	2, 3, 5, 7, 11, 13	37.	10
13.	1, 3, 9, 27	38.	6
14.	5, 2	39.	8
15.	X=2, Y=30, Z=5	40.	17
16.	151	41.	(16, 81)
17.	12240cm	42.	(12, 21)
18.	17	43.	15
19.	7500	44.	Composite numbers
20.	75cm	45.	6
21.	9, 18, 27, 36, 45	46.	504 seconds
22.	12	47.	12
23.	1, 2, 4	48.	1
24.	1008	49.	16
25.	180	50.	64

Chapter – 4

Basic Geometrical Ideas

Points to remember:

- **Point: Point represents a definite location. It is drawn as a dot (.). It is denoted by capital alphabets.**

<center>P•   •T</center>

- **Line Segment: It represents the shortest distance between two points. It has a definite length.**

<center>M   N</center>

- **Line: It is a line segment that extends indefinitely in both the directions. It doesn't have definite length.**

<center>P   Q ℓ</center>
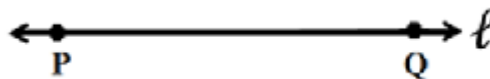
<center>**Line ℓ or $\overleftrightarrow{PQ}$ or $\overleftrightarrow{QP}$**</center>

- **Ray: It is a line segment that extends in only one direction.**

<center>S   T</center>
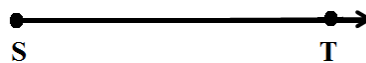
<center>**Ray $\overrightarrow{ST}$**</center>

- **Collinear Points: Three or more points are said to be collinear if they lie on a single straight line.**

<center>F   G   H</center>
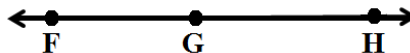
<center>**F, G and H are collinear points.**</center>

- **Non-Collinear Points:** Three or more points which don't lie on same line are known as non-collinear points.
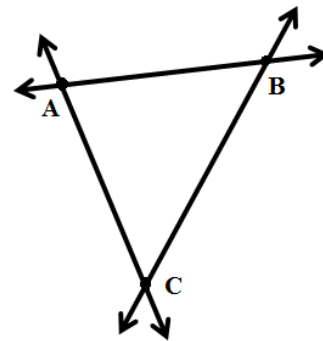
A, B and C are non-collinear points.

- **Angle:** It is formed when two rays have a common starting point, this common point is called the vertex of the angle and the rays are called the arms of the angle. $\overrightarrow{MN}$ and $\overrightarrow{ML}$ are two arms of the angle ∠LMN.
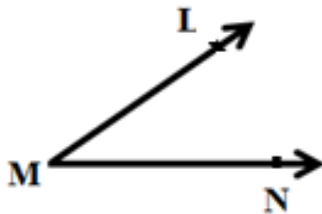
- **Intersecting Lines:** Two distinct lines meeting (or appearing to meet) at a point are called intersecting lines.
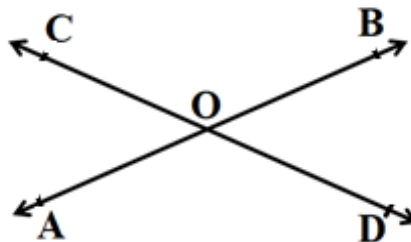
- **Parallel Lines:** Two lines in a plane are said to be parallel if they never meet. Here, AB and CD are parallel to each other. It is denoted by $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$.
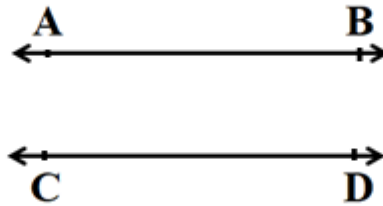
- **Curve:** A curve is a smooth flowing line with no shape changes. In mathematics, a line is also a curve.

- **Simple Curve:** A simple curve is a curve that doesn't cut itself.

For example: are simple curve.
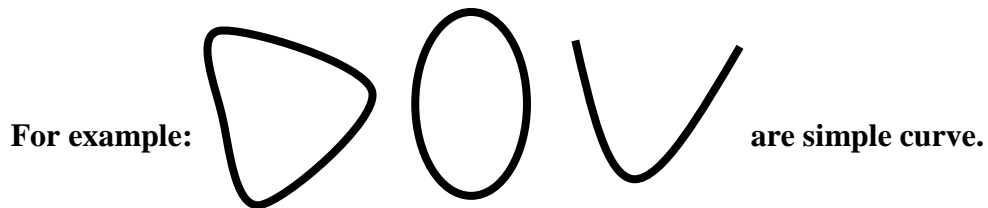
- **Closed and Open Curve:** A curve is said to be closed if its ends are joined otherwise it is said to be an open curve.
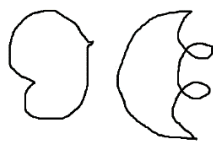
CLOSED CURVE   **OPEN CURVE**

- **Simple Closed Curve:** A closed curve which doesn't intersect itself at any point.

Simple Closed Curve

- **Polygon:** A simple closed curve made up of line segments is called a polygon.
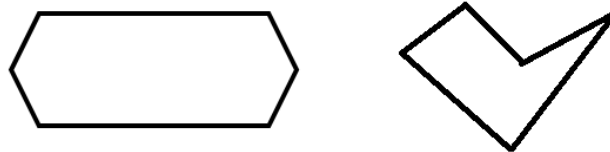
- **Regular Polygon:** A polygon whose all sides and all angles are equal.

- **Triangle:** A triangle is a three-sided polygon. Triangle has three vertices, three sides and three angles.

  Sides – AB, BC and CA

  Angles – $\angle ABC$, $\angle BCA$ and $\angle CAB$

  Vertices – A, B and C
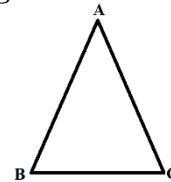
- **Quadrilateral:** A quadrilateral is a four-sided polygon. It has four sides AB, BC, CD and DA, four vertices A, B, C and D, four angles $\angle ABC$, $\angle BCD$, $\angle CDA$ and $\angle DAB$, two diagonals AC and BD.

  AB and DC are opposite sides.

  $\angle A$ and $\angle C$ are opposite angles.

  AB and BC are adjacent sides.
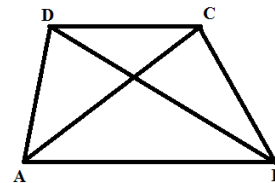
- **Circle:** A circle is a path taken a point such that its distance from a fixed point is always constant. The fixed distance is called the radius and the fixed point is the center of the circle.

Parts of Circle
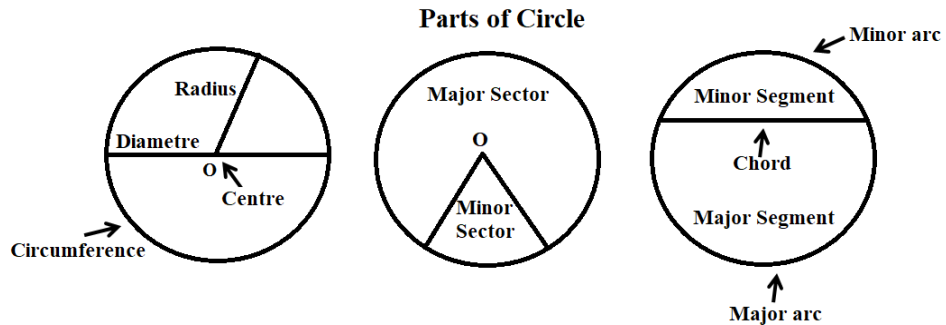
(i) **Chord:** A line segment joining any two points located on the circumference of the circle.

(ii) **Radius:** A line segment joining a point on the circumference of the circle to the centre of the circle.

(iii) **Diameter:** A chord passing through the centre of the circle. It is twice the radius.

(iv) **Sector:** It is the region in the interior of the circle enclosed by an arc and a pair of radii.

(v) **Segment:** A chord of a circle divides the circle into two regions, which are called the segments of the circle.

Questions:

1. How many points are shown in the given figure?
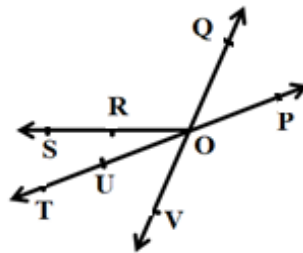
2. How many lines can pass through one given point?

3. How many lines can pass through two given points?

4. Find the number of diagonals in a regular hexagon.

5. Determine the maximum number of points where three lines can intersect.

6. Find the maximum number of points of intersection where four lines are drawn in a plane.

7. How many circles can be drawn through two given points?

8. How many circles can be drawn through three non-collinear given points?

9. Name the pair of opposite sides in the given figure.
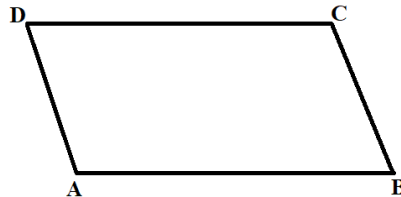
10. Name the pair of adjacent sides in the given figure.
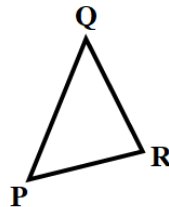
11. Name the following in the given figure:
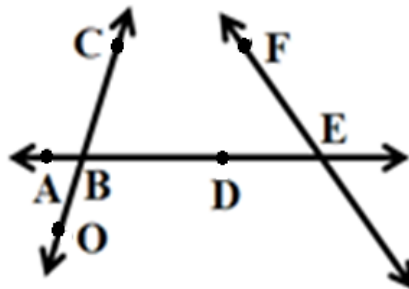
   (i)   Lines containing point E
   (ii)   Two pairs of intersecting lines
   (iii) Rays with B as their starting point

12. Name the following:

    (i) The point in the interior of ∠DOE

    (ii) The points exterior of ∠EOF

    (iii) Rays starting from point O
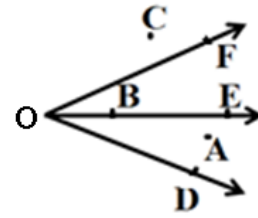
13. (i) How many triangles are there? Name them.

    (ii) How many angles are there?

    (iii) How many line segments are there? Name them.

    (iv) Name the triangles that have ∠B as common.
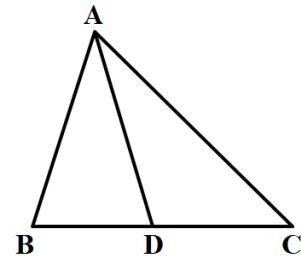
14. From the given figure, find:

    (i) The centre of the circle

    (ii) Three radii

    (iii) The diameter

    (iv) Chords
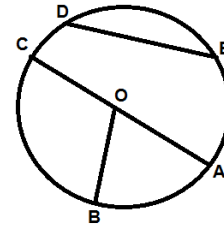
15. Name the vertices and the line segments in the given figure.
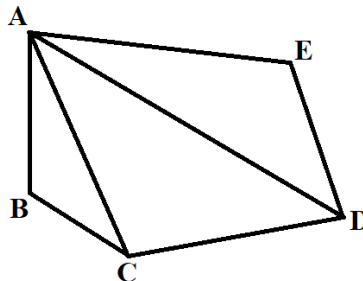
16. Determine the number of diagonals of a pentagon.

17. Determine the number of diagonals of a octagon.

18. How many angles are there in the given figure?
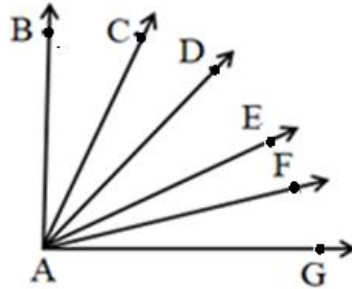
19. Determine the number of line segments in the given figure.
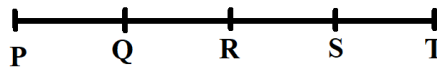
20. Find the number of triangles in the given figure.
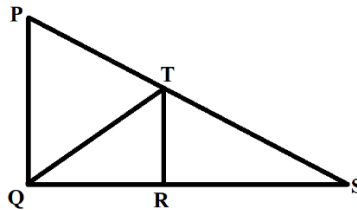
21. Name the common points in the two angles marked in the figure.
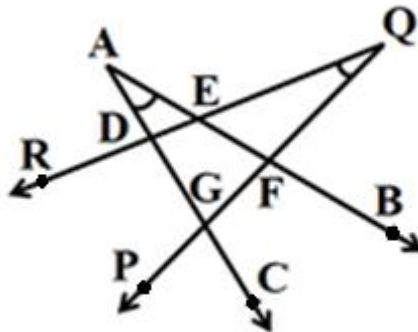
22. Find the number of triangles in the given figure.
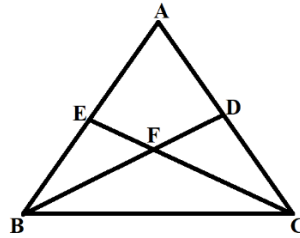
23. If the diameter of a circle is 7.4 cm, find its radius.

24. If the radius of a circle is 2.3 cm, find its diameter.

From the figure, find (Q. No. 25 and 26)
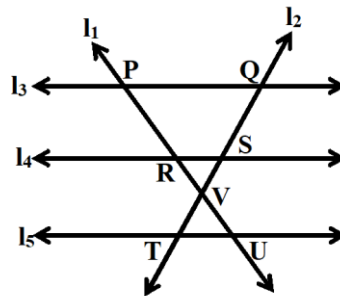
25. pair of parallel lines

26. pair of intersecting lines

27. Name the parallel lines in the given figure.
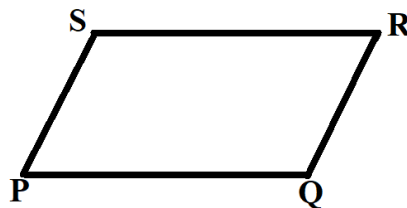
28. Find the number of line segments in the given figure.
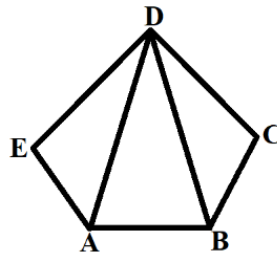
29. Name the lines intersecting each other at B.
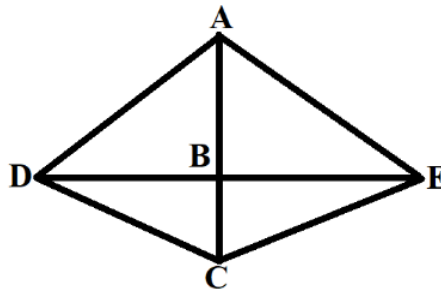
From the given figure, find (Q. No. 30 and 31)
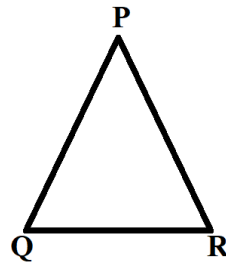
30. The vertex opposite to side PQ.

31. Two angles having a common arm PQ.

32. Identify the collinear points.
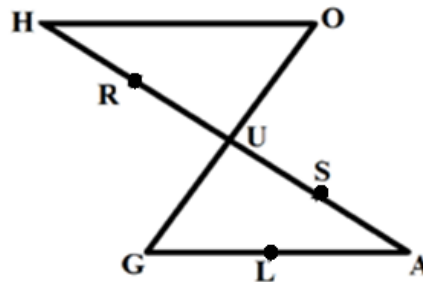
From the given figure, find (Q. No. 33 and 34)
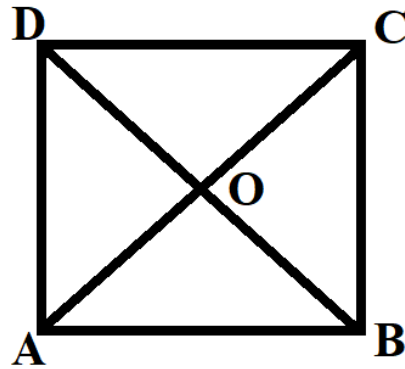
33. Number of triangles.

34. Number of line segments.

From the given figure, find (Q. No. 35 to 37)
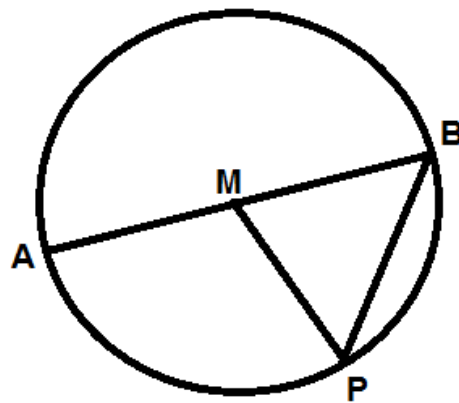
35. a chord which is also a diameter.

36. centre of the circle.

37. all radii

38.   **Find the number of triangles in the given figure.**
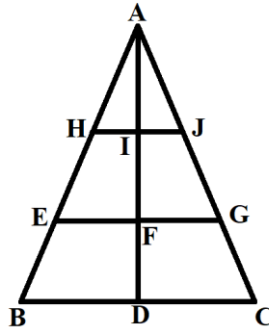
From the given figure, find (Q. No. 39 to 40)
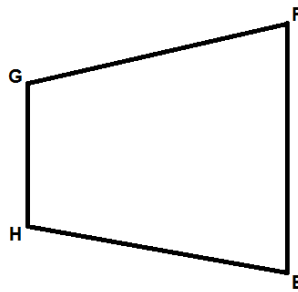
39.   **Name the sides adjacent to HG.**

40.   **Name the sides opposite to GF.**

Answers:

1.	8	16.	5
2.	Infinite	17.	20
3.	1	18.	15
4.	9 [Hint : number of diagonals = $\frac{n\,(n-3)}{2}$]	19.	10 [PQ, QR, RS, ST, PR, QS, RT, PS, QT, PT]
5.	3	20.	5
6.	6	21.	D, E, F, G
7.	Infinite	22.	8
8.	1	23.	3.7 cm
9.	AB and CD , AD and BC	24.	4.6 cm
10.	PQ and QR, QR and RP, RP and PQ	25.	l_3 and l_4, l_4 and l_5, l_5 and l_3
11.	(i) AE, EF	26.	l_1 and l_2, l_1 and l_3, l_1 and l_4, l_1 and l_5, l_2 and l_3, l_2 and l_4 and l_2 and l_5
(ii)	CO and AE, EF and AE	27.	PQ ‖ SR, PS ‖ QR
(iii)	BA, BD, BC, BE, BO	28.	7
12.	(i) A (ii) A, C, D (iii) OD, OE, OF	29.	DE and AC
		30.	R
13.	(i) 3 [ΔABC, ΔABD, ΔADC]	31.	∠PQR, ∠QPR
(ii)	8	32.	H, R, U, S, A ; O, U, G and G, L, A
(iii)	6 [AB, BD, AD, DC, AC, BC]		
(iv)	ΔABC, ΔABD	33.	8
14.	(i) O	34.	10
(ii)	OA, OB, OC	35.	AB
(iii)	CA	36.	M
(iv)	DE, CA	37.	MA, MB, MP
15.	Vertices:- A, B, C, D, E Line segments:- AB, BC, CD, DE, EA, AC, AD	38.	9
		39.	HE and GF
		40.	HE

Chapter – 5

Understanding Elementary Shapes

Points to remember:

- **The length of a line segment is the distance between its end points.**
- **An angle is formed by the hands of a clock when they move from one position to another.**
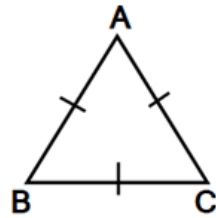- **A reflex angle is larger than a straight angle (180^0) and less than a complete angle (360^0).**
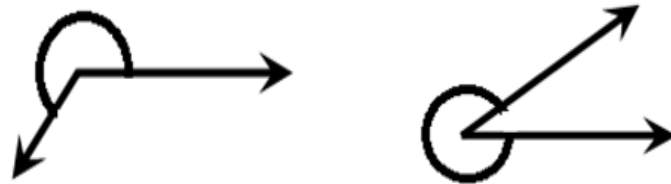
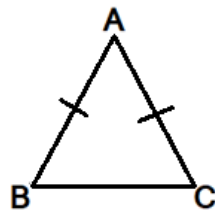- **Two intersecting lines are perpendicular if the angle between them is 90^0.**
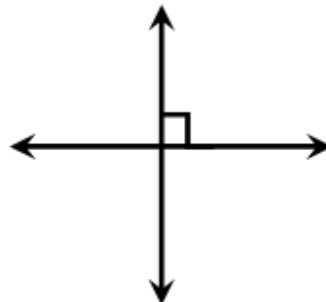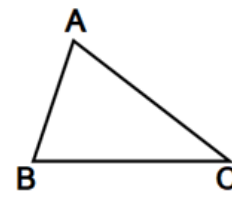
- **Types of triangles:**

(A) **Based on sides:-**

    (i)   **Equilateral triangle:- All sides are equal.**

    (ii)   **Isosceles triangle:- Any two sides are equal.**

    (iii)   **Scalene triangle:- Three unequal sides.**

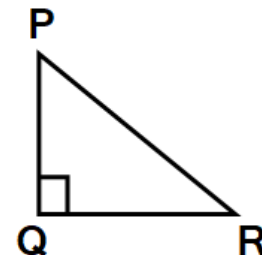Equilateral Triangle   Isosceles Triangle   Scalene Triangle

(B) **Based on angles:-**

    (i)   **Acute angled triangle:- All angles are acute (less than 90^0).**

    (ii)   **Obtuse angled triangle:- One angle is obtuse (greater than 90^0).**

    (iii)   **Right angled triangle:- One angle is right angle (90^0).**
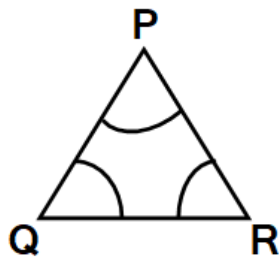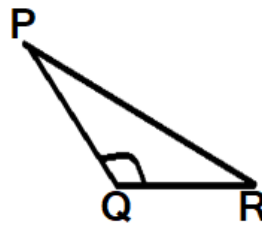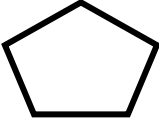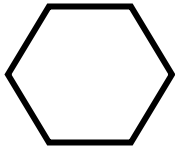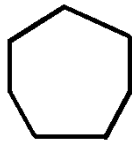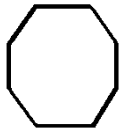

Acute Angled Triangle   Obtuse Angled Triangle   Right Angled Triangle
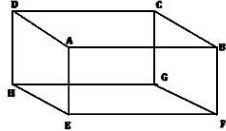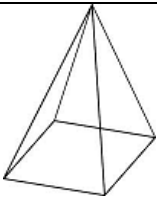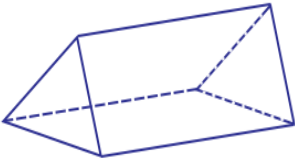
Note:- A triangle can't have two obtuse or two right angles.

- **Polygon: Two Dimensional figures**

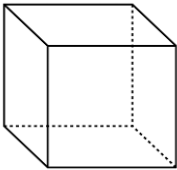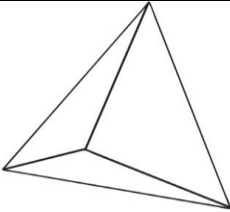| Number of Sides	Shape	Figure
3	Triangle	
4	Quadrilateral	
5	Pentagon	
6	Hexagon	
7	Heptagon	
8	Octagon	

- **Three dimensional figures**

Shape	Figure	Faces	Edges	Vertices/ Corners
Cuboid		6	12	8
Cube		6	12	8
Triangular Pyramid		4	6	4
Square Pyramid		5	8	5
Triangular Prism		5	9	6

Questions:

1. Find the number of lines that can be drawn parallel to a given line ℓ, from a point at a distance of 2.5 cm from line ℓ.

2. If PQ = 9.1 cm and PR = 2.9 cm, then find the length of line segment RQ.

3. Name the type of angle formed between two adjacent sides of a square.

4. Name the type of the quadrilateral PURE.
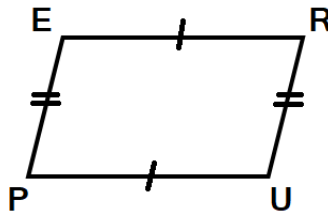
5. Find the sum of measure of ∠MSR and ∠RST.
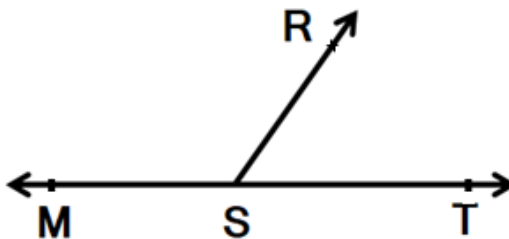
6. If two intersecting lines are perpendicular, then find the measure of the angle between them?

7. **Rohan was facing the school at the beginning. He turned clockwise to face South-East. What angle did he turn through?**
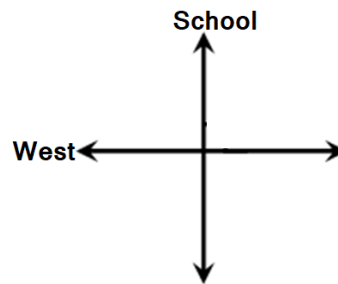
8. **Name the shape as shown in the figure.**
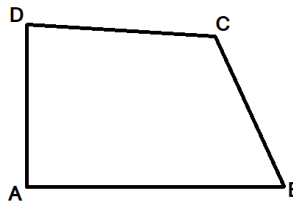
9. **Find the measure of the angle between the hour hand and minute hand of a clock at 5 o'clock.**

10. **Find the angle between a pair of two consecutive spokes in the given figure.**
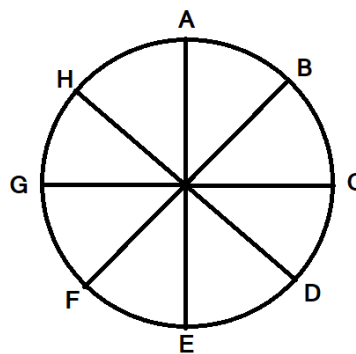
11. **Name the shape of a chess board.**

12. **Find the measure of the angle between the hour hand and minute hand of a clock at 6 o'clock.**

13. **Name the 3D shape as shown in the figure.**

14. **Name the 3D shape that is represented in the picture.**

15. **Name the shape of a CPU.**

16. **Name the shape of a soft drink Can.**

17. **Name the shape of a dice.**

18. **Name the shape of your geometry box.**
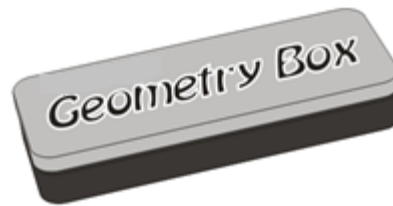
19. **Find the number of vertices in a triangular prism.**

20. **Find the number of acute angles in the given figure.**
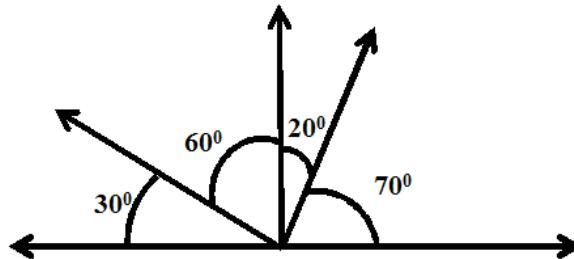
21. **Find the number of edges in a square pyramid.**

22. **Name the triangle, if MN = 7 cm, MO = 24 cm, ON = 25 cm and ∠M = 90⁰ in ΔNMO.**

23. **Name the type of angle formed between $\frac{1}{4}$ and $\frac{3}{4}$ of a revolution.**

24. **Name the type of triangle PQR, if PQ = QR = RP = 4.5 cm.**

25. **How many 30⁰ angles make a complete angle?**

26. **Name the type of the triangle ΔTRY, if m∠T = 50⁰, m∠R = 60⁰ and m∠Y = 70⁰.**

27. **How many 45⁰ angles make a complete angle?**

28. **Name the direction you will face, if you start facing East and make three fourth of revolution clockwise.**

29. Name the solid shape having 5 faces, 9 edges and 6 vertices.

30. Name the solid shape having 6 edges, 4 faces and 4 vertices.

31. Find the sum of two adjacent angles of a rectangle.

32. How many faces does a hexagon-based pyramid have?

33. You stand facing North, turn clockwise to West. By what angle have you turned?

34. Find the number of right angles turned through by the hour hand of a clock when it goes from 12 to 9.

35. Find the number of corners of the given figure.
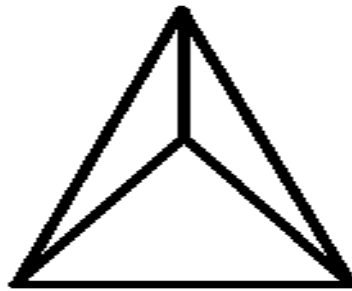
36. Name the shape of a road-roller.

37. Name the solid with only one vertex.

From the given figure, find: (Q. No. 38 to 43)
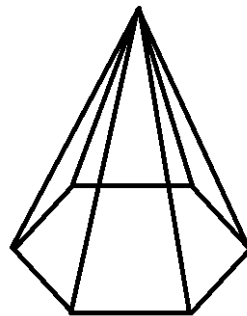
38. Number of vertices.

39. Number of edges.

40. Number of faces.

41. If V – vertices and F – faces, find 3V – 2F.

42. If E – Edges and V – vertices, find 2E – 3V.

43. **If E – Edge, V – vertices and F – Faces, find F + V – E.**

44. **How many perpendiculars can be drawn on a line segment from a point outside it?**

45. **How many rectangles are there in the figure?**

46. **How many triangles are there in the figure?**
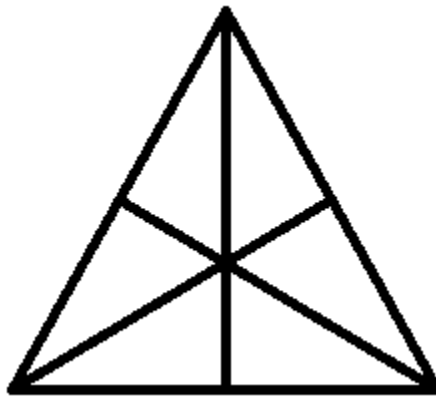
47. **How many faces are there in your classroom?**

48. **Name the type of triangle PQR, if PQ = QR = 5.6 cm and PR = 6.5 cm.**

49. **Mahesh has 15 (Ten rupees) coins of similar kind. He put them exactly one on the other. Name the shape will he get.**

50. **Meena glued 3 identical cubes together as shown in the figure. She painted the entire solid blue. How many faces of all the cubes were painted blue?**
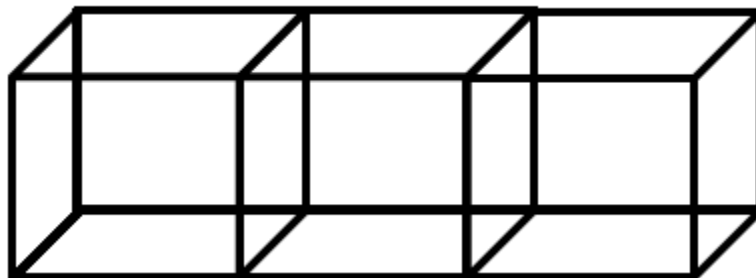
Answers:

1.	2 (Two)		26.	Acute angled triangle
2.	6.2 cm		27.	8
3.	90^0 (right angle)		28.	North
4.	Parallelogram		29.	Triangular prism
5.	180^0		30.	Triangular pyramid
6.	90^0		31.	180^0
7.	135^0		32.	7
8.	Quadrilateral		33.	270^0
9.	150^0		34.	3
10.	45^0		35.	4
11.	Square		36.	Cylinder
12.	180^0 (straight angle)		37.	Cone
13.	Cone		38.	7
14.	Sphere		39.	12
15.	Cuboid		40.	7
16.	Cylinder		41.	7
17.	Cube		42.	3
18.	Cuboid		43.	2
19.	6		44.	One
20.	5		45.	15
21.	8		46.	16
22.	Scalene and right-angled triangle		47.	6 (Generally)
23.	Straight angle (180^0)		48.	Isosceles triangle
24.	Equilateral triangle		49.	Cylinder
25.	12		50.	14

Chapter – 6

Integers

Points to remember:

- The collection of numbers …, -3, -2, -1, 0,1, 2, 3, … is called integers.
- The numbers -1, -2, -3, … are called negative integers.
- The numbers 1, 2, 3, ... are called positive integers.
- Additive inverse of a positive integer is a negative integer. e.g. additive inverse of 5 is (-5).
- Additive inverse of a negative integer is a positive integer. e.g. additive inverse of (-8) is 8.
- When two positive integers are added, sum is also a positive integer.
  e.g. $(+6) + (+9) = (+15)$
- When two negative integers are added, sum is also a negative integer.
  e.g. $(-11) + (-7) = (-18)$
- When a positive integer and a negative integer are added, actually they will be subtracted like whole numbers and the difference will take the sign of the integer which is greater in magnitude.
  e.g.   (a) $8 + (-5) = 3$ (b) $(-9) + (+2) = -7$
- The subtraction of an integer is the same as the addition of its additive inverse.
  e.g. subtract 4 from 9: $9 - 4 = 9 + (-4) = 5$
- The sum of an integer and its additive inverse is always zero.
- Zero is neither a positive integer nor a negative integer.

RATIONAL NUMBERS

$-\frac{2}{3}$ $\frac{3}{4}$

INTEGERS
..., -3,-2,-1

WHOLE NO.
0

NATURAL NUMBERS
1, 2, 3, 4, ...
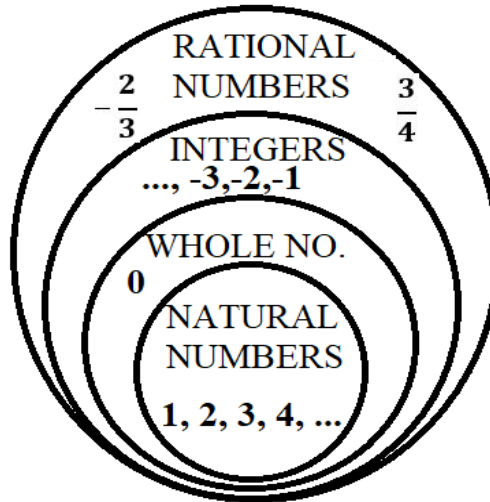
- **Representations through integers:**

(a)	**Going up**	=	**Positive integer**
(b)	**Going down**	=	**Negative integer**
(c)	**Going right**	=	**Positive integer**
(d)	**Going left**	=	**Negative integer**
(e)	**Above sea level**	=	**Positive integer**
(f)	**Below sea level**	=	**Negative integer**
(g)	**Temperature above 0^0C**	=	**Positive integer**
(h)	**Temperature below 0^0C**	=	**Negative integer**
(i)	**Deposit in bank**	=	**Positive integer**
(j)	**Withdrawal from the bank**	=	**Negative integer**
(k)	**Going East/North**	=	**Positive integer**
(l)	**Going West/South**	=	**Negative integer**

NORTH

WEST   EAST

SOUTH

Questions:

1. Find the smallest positive integer.

2. Find the smallest integer greater than all the negative numbers.

3. Find the integer which is neither positive nor negative.

4. Find the opposite of the following and represent with signs:

    (i)   1320 metre above sea level

    (ii)   Going 2 km towards West

    (iii)   Temperature 7° C above 0° C

Find the integers for the following: (Q. No. 5 to Q. No. 80)

5. Add 5 to additive inverse of (– 12).

6. Subtract (– 123) from (– 456).

7. 9 less than (– 5).

8. 5 more than (– 2).

9. Find the integer which when divided by (– 2) gives (– 24).

10. Find the integer which when divided by (– 3) gives 25.

11. On the number line, which number do we get if we move 5 numbers to the right of (– 2)?

12. On the number line, which number do we get if we move 9 steps to the left of 4?

Number Line

13. Find the value of :   4 – {13 – (23 – 18)}

Observe the given line and find the integers for the following: (Q. No. 14 to Q. No. 21)
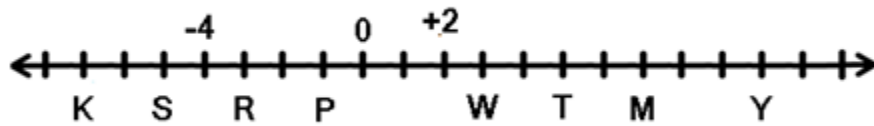
14. Find the integer for K

15. Find the integer for Y

16. Find the integer for M

17. Find the integer for R + P – W

18. Find the integer for Y + P – M

19. Find the integer for W + T + Y

20. Find the integer for S + R + W

21. Find the integer for P – T – M

22. Arrange in increasing order: 3, 0, – 3, 5, – 1

23. Arrange in decreasing order: 23, 15, – 5, 2, – 25

24. Arrange in increasing order: 5, –6, – 4, 0, 8, 6

25. Arrange in decreasing order: 13, – 21, 17, 15, – 15, 10

26. Find the value of 9999 – 999 – 100

27. Find the integers that lie between (– 3) and 1.

28. If you are at (– 3) on the number line, in which direction should you move to reach (– 8)?

29. If you are at (– 5) on the number line, in which direction should you move to reach at 2?

30. Subtract (– 104) from the sum of 38 and (– 27).

31. Subtract the sum of (– 100) and 225 from 50.

32. Find: (– 5) – (6) – (– 16)

33. Find: (– 10) + (18) + (– 28) + (– 6)

34. Find: (– 7) + (– 9) + (4) + (16)

Represent the following integers with appropriate sign: (Q. No. 35 to Q. No. 40)

35. A withdrawal of ₹ 2300 from the bank.

36. **A submarine is moving at a depth of five hundred metre below sea level.**

37. **Gaining a weight of 2 kg.**

38. **Going 600 metre above sea level.**

39. **Temperature six degree Celsius above 0 degree Celsius.**

40. **An aeroplane is flying at a height three thousand five hundred metre above the ground.**

41. **Sachin scores 35 runs more than his previous score,**

42. **The sum of two integers is (– 26). If one of them is 43, then find the other integer.**

43. **If a = (– 8), b = (– 6) and c = 6, then find the value of a + b – c.**

44. **The difference of an integer P and (– 5) is 4. Find the value of P.**

45. **What must be subtracted from (– 3) to get (– 8)?**

46. **A bucket contains 35 litres of water. Due to a small hole in the bucket, the quantity of water is decreasing at the rate of 2 litres every hour. Find the quantity of water in the bucket after 10 hours.**

47. **An insect crawls 10 cm every second on a 90 cm vertical rod and then falls down 4 cm over the next second. How many seconds will it take to climb the rod?**

48. **In a class test containing 20 questions. 5 marks are given for every correct answer, (– 2) marks is given for every incorrect answer. Heena attempts all questions and 14 of her answers are correct. What is her total score?**

49. **In a class test containing 20 questions, 5 marks are given for every correct answer, (– 1) mark is given for every incorrect answer and 0 mark for each unattempted question. Ravi gets 4 correct and 4 incorrect answers. Find his score.**

50. **A certain freezing process requires that room temperature be lowered from 40°C at the rate of 6°C per hour. What will be room temperature 10 hours after the process begins?**

Answers:

1.	1		25.	17 > 15 > 13 > 10 > (− 15) > (− 21)
2.	0		26.	8900
3.	0		27.	(− 2), (− 1), 0
			28.	West, left side
4 (i) 1320 m below sea level, -1320m			29.	East, right side
4(ii) Going 2 km towards East, + 2 km			30.	115
4(iii) Temperature 7°C below 0°C, − 7°C			31.	(− 75)
5.	17		32.	5
6.	(− 333)		33.	(− 26)
7.	(− 14)		34.	4
8.	3		35.	− 2300
9.	48		36.	− 500
10.	(− 75)		37.	+ 2 kg
11.	3		38.	+ 600 m
12.	(− 5)		39.	+ 6°C
13.	(− 4)		40.	+ 3500 m
14.	-7		41.	+ 35
15.	(+10)		42.	(− 69)
16.	(+7)		43.	(− 20)
17.	-7		44.	(− 1)
18.	(+ 2)		45.	5
19.	(+ 18)		46.	15 litres
20.	-5		47.	29 seconds
21.	-13		48.	58 marks
22.	(− 3) < (− 1) < 0 < 3 < 5		49.	16 marks
23.	23 > 15 > 2 > (− 5) > (–25)		50.	− 20°C
24.	(− 6) < (− 4) < 0 < 5 < 6 < 8			

Chapter – 7

Fractions

- A fraction is a part of whole or a part of collection

  For example: $\dfrac{5 \rightarrow \text{numerator}}{7 \rightarrow \text{denominator}}$

- Different type of fractions are as follows:

  (i) Proper fraction: where numerator is less than denominator.

  For example: $\dfrac{2}{3}, \dfrac{3}{5}, \dfrac{7}{9}$

  (ii) Improper fraction: where numerator is more than denominator.

  For example: $\dfrac{3}{2}, \dfrac{5}{3}, \dfrac{9}{7}$

  (iii) Mixed fraction: which has a whole number and a fractional part.

  For example: $3\dfrac{1}{2}, 5\dfrac{2}{3}, 3\dfrac{1}{2}$

  We can express a mixed fraction as an improper fraction for example $3\dfrac{1}{2} = \dfrac{7}{2}$

  (iv) Like fractions: fractions with same denominator.

  For example: $\dfrac{1}{8}, \dfrac{3}{8}, \dfrac{5}{8}, \dfrac{7}{8}$

  (v) Unlike fractions: fractions with different denominator.

  For example: $\dfrac{2}{3}, \dfrac{3}{7}, \dfrac{2}{5}, \dfrac{1}{4}$

  (vi) Equivalent fractions: Two or more fractions representing the same of a whole.

  For example: $\dfrac{3}{5} = \dfrac{6}{10} = \dfrac{9}{15} = \dfrac{12}{20}$

- To find an equivalent fraction of a given fraction, we multiply both numerator and denominator of the given fraction by the same non-zero number.

- A fraction is said to be in the simplest form (or lowest form) if its numerator and denominator have no common factor except 1.
- Comparison of fractions:
  - (i) For like fractions, smaller the numerator, smaller will be the fraction.

    For example: $\dfrac{5}{9} < \dfrac{7}{9}$, $\dfrac{1}{11} < \dfrac{3}{11}$

  - (ii) For fractions with same numerator, smaller the denominator, bigger will be the fraction

    For example: $\dfrac{5}{7} > \dfrac{5}{9}$, $\dfrac{1}{4} > \dfrac{1}{7}$

  - (iii) For the fractions with different numerators and denominators, make their denominators equal before comparing the numerators.

- While adding or subtracting like fractions, only numerators are operated upon (not the denominators).

  For example: $\dfrac{3}{4} + \dfrac{1}{4} = \dfrac{3+1}{4} = \dfrac{4}{4} = 1$

  $\dfrac{5}{7} - \dfrac{2}{7} = \dfrac{5-2}{7} = \dfrac{3}{7}$

- For adding or subtracting unlike fractions, convert them into like fractions.
- Mixed fraction is always greater than proper fraction.

  For example: $1\dfrac{3}{4} > \dfrac{2}{3}$

- If numerator and denominator of a fraction are equal (same), then value of fraction is 1.

  For example: $\dfrac{7}{7} = 1$, $\dfrac{11}{11} = 1$

- A fraction can be converted to its simplest form by dividing the numerator and denominator with their HCF.

$$\text{For example: } \frac{135 \div 15}{150 \div 15} = \frac{9}{10}$$

- While adding mixed fractions, we can add the whole number parts separately and the fractional parts separately.

For example: $5\frac{1}{8} + 6\frac{3}{8}$

$$= 5 + 6 + \frac{1}{8} + \frac{3}{8}$$

$$= 11 + \frac{4}{8} = 11 + \frac{1}{2} = 11\frac{1}{2}$$

OR

We can convert each mixed fraction into improper fraction and then add them.

For example: $5\frac{1}{8} + 6\frac{3}{8}$

$$= \frac{5 \times 8 + 1}{8} + \frac{6 \times 8 + 3}{8}$$

$$= \frac{41}{8} + \frac{51}{8}$$

$$= \frac{41+51}{8} = \frac{92}{8} = 11\frac{4}{8} = 11\frac{1}{2}$$

Questions:

1. Find the fraction representing the shaded portion.
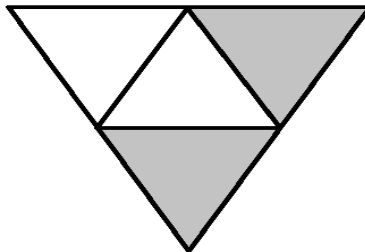
2. From the given number line, find the fraction that point 'A' denotes.
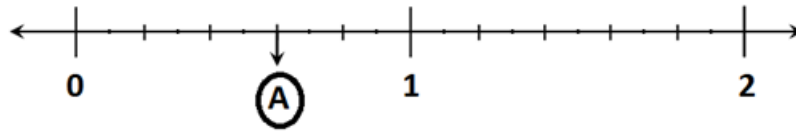
3. What fraction of 1 hour is 45 minutes?

4. Find the fraction representing the shaded portion.

5. Express $12\frac{2}{3}$ as improper fraction.

6. Express $\frac{123}{12}$ as mixed fraction.

7. Reduce $\frac{85}{119}$ to the simplest form.

Find the fraction for the following: (Q.8 to Q.12)

8. Seven oranges of two dozen oranges.

9. 27 seconds of a minute.

10. Three months of a year.

11. 80 paise of ₹ 2.

12. 200 m of a kilometre.

Find the sum of: (Q.13 to Q.16)

13. $\frac{2}{3}$ and $\frac{3}{4}$

14. $\frac{7}{10}$ and $\frac{3}{15}$

15. $2\frac{5}{6}$ and $3\frac{7}{12}$

16. $\frac{8}{13}$ and $\frac{2}{3}$

17. Arrange the following in ascending order.

$$\frac{2}{9}, \frac{7}{9}, \frac{3}{9}, \frac{1}{9}, \frac{5}{9}, -\frac{2}{9}$$

18. Which is the smallest of the fraction?

$$\frac{2}{3}, \frac{1}{3}, \frac{1}{4}, \frac{3}{4}, \frac{1}{2}$$

19. Find the sum of $\frac{5}{11} + \frac{0}{11} + \frac{6}{11}$

20. If $\frac{2}{3}$ of a number is 12. Find the number.

Find the difference of: (Q.21 to Q. 25)

21. $\frac{13}{24} - \frac{7}{16}$

22. $\frac{5}{18} - \frac{4}{15}$

23. $\frac{2}{3} - \frac{4}{7}$

24. $\frac{15}{13} - \frac{10}{13}$

25. $\frac{11}{12} - \frac{3}{4}$

26. How many $\frac{1}{10}$ are there in $\frac{7}{5}$?

27. Find the equivalent fraction of $\frac{3}{5}$ having numerator 21.

28. Find the equivalent fraction of $\frac{45}{60}$ having denominator 240.

29. Aman spends $1\frac{3}{4}$ hours in studies, $2\frac{1}{2}$ hours in playing cricket. How much time did he spend in all?

30. A square paper sheet has $10\frac{3}{4}$ cm long side. Find its Perimeter.

31. From the natural numbers 2 to 10, what fraction are prime numbers?

32. Find the sum of $3\frac{4}{17} + 5\frac{6}{17} + 7\frac{7}{17}$

Find the value of x (Q.33 to Q.38)

33. $\frac{39}{52} = \frac{x}{4}$

34. $\frac{5}{12} - x = \frac{1}{12}$

35. $x - \frac{4}{7} = \frac{3}{7}$

36. $x + \frac{11}{27} = \frac{25}{27}$

37. $\frac{27}{45} = \frac{3}{x}$

38. $\frac{3}{17} - x = \frac{11}{17}$

39. A film show lasted for $2\frac{3}{4}$ hours. Out of this time, 15 minutes spent on advertisements. What was the actual duration of the film?

40. Jaspreet bought $3\frac{1}{2}$ kg rice whereas Kareem bought $6\frac{1}{2}$ kg of rice. Find the total amount of rice bought by both of them.

41. Seema studied for $1\frac{3}{4}$ hours a day while Meena studies for 75 minutes a day. Who studied for a longer time and how much time?

42. Rajesh was given $\frac{3}{5}$ of a basket of oranges. Find the fraction of oranges (which fraction) was left in the basket.

43. Savita bought $\frac{2}{5}$ m of ribbon and Kavita $\frac{3}{4}$ m of ribbon. Find the total length of the ribbon they bought.

44. A piece of wire $\frac{3}{4}$ metre long broke into two pieces. One piece was $\frac{1}{2}$ metre long. Find the length of the other piece.

45. In a class, $\frac{3}{5}$ of the students are girls. Out of these, $\frac{1}{5}$ are absent on a particular day. Find the fraction of the girls present on that particular day.

46. Kapil takes $3\frac{2}{5}$ minutes to walk across the garden. Mohan takes $\frac{7}{4}$ minutes less time to do the same. Find the time taken by Mohan.

47. A cultural program lasted for $2\frac{2}{5}$ hours. Out of this, time $\frac{4}{5}$ hours spent on prize distribution. Find the actual duration of the program

48. Kanak's house is $\frac{8}{10}$ km from his school. She walked $\frac{1}{2}$ km with Rubi, after that she walked alone. Find the distance in fraction that she walked alone.

49. John has ₹ 1584 with him. He gives $\frac{7}{12}$ of his money to his sister. Out of the remaining amount, he gives ₹ 528 to his brother. What fraction of the original amount is left with him now?

50. There are 24 boys and 33 girls in a class. Find
    (a) the fraction representing boys among the total students.
    (b) the fraction representing girls among the total students.

Answers:

1.	$\frac{1}{2}$	**14.**	$\frac{9}{10}$	**27.**	$\frac{21}{35}$
2.	$\frac{3}{5}$	**15.**	$6\frac{5}{12}$	**28.**	$\frac{180}{240}$
3.	$\frac{3}{4}$	**16.**	$1\frac{11}{39}$	**29.**	$4\frac{1}{4}$ hours
4.	$\frac{4}{7}$	**17.**	$-\frac{2}{9} < \frac{1}{9} < \frac{2}{9} <$ $\frac{3}{9} < \frac{5}{9} < \frac{7}{9}$	**30.**	**43 cm**
5.	$\frac{38}{3}$			**31.**	$\frac{4}{9}$
6.	$10\frac{1}{4}$	**18.**	$\frac{1}{4}$	**32.**	**16**
				33.	**3**
7.	$\frac{5}{7}$	**19.**	**1**	**34.**	$\frac{1}{3}$
		20.	**18**		
8.	$\frac{7}{24}$			**35.**	**1**
		21.	$\frac{5}{48}$	**36.**	$\frac{14}{27}$
9.	$\frac{9}{20}$				
		22.	$\frac{1}{90}$	**37.**	**5**
10.	$\frac{1}{4}$				
		23.	$\frac{2}{21}$	**38.**	$-\frac{8}{17}$
11.	$\frac{2}{5}$				
		24.	$\frac{5}{13}$	**39.**	$2\frac{1}{2}$ hours
12.	$\frac{1}{5}$				
		25.	$\frac{1}{6}$	**40.**	**10 kg**
13.	$1\frac{5}{12}$				
		26.	**14**		

41.	$\frac{1}{2}$ hour , **Seema studied for longer time**

42.	$\frac{2}{5}$	**45.**	$\frac{2}{5}$	**48.**	$\frac{3}{10}$ km
43.	$1\frac{3}{20}$ metres	**46.**	$1\frac{13}{20}$ minutes	**49.**	$\frac{1}{12}$
44.	$\frac{1}{4}$ metre	**47.**	$1\frac{3}{5}$ hours	**50.**	(i) $\frac{8}{19}$
	(ii) $\frac{11}{19}$				

Chapter – 8

Decimals

- **<u>Decimal fractions</u>: Fractions with denominator 10, 100, 1000………. are called decimal fractions.**
- **<u>Place value chart:</u>**

Ten Thousands	Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
10,000	1000	100	10	1	$\dfrac{1}{10}$	$\dfrac{1}{100}$	$\dfrac{1}{1000}$

- **<u>Representing decimals on number line:</u>**
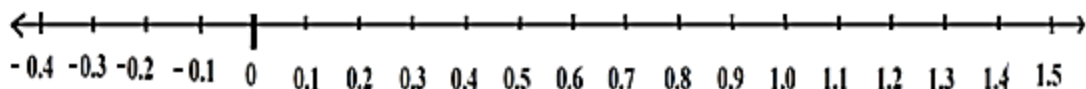
- **<u>Expansion and contraction of decimal numbers:</u>**

  For example: **(i)** $157.305 = 100 + 50 + 7 + \dfrac{3}{10} + \dfrac{0}{100} + \dfrac{5}{1000}$

  (ii) $700 + 8 + \dfrac{3}{100} + \dfrac{4}{1000} = 708.034$

- **<u>Writing decimals as fractions and vice versa:</u>**

  For example: **(i)** $3.74 = \dfrac{374}{100}$

  (ii) $0.135 = \dfrac{135}{1000}$

  (iii) $\dfrac{41}{1000} = 0.041$

- **Conversions:**

  (i) **rupees to paise** : **multiply by 100**

  For example: ₹ 5 = 5 × 100 = 500 paise

  (ii) **paise to rupees** : **divide by 100**

  For example: 5 paise $= ₹ \frac{5}{100} = ₹ 0.05$

  (iii) **kilogram (kg) to grams** : **multiply by 1000**

  (iv) **grams to kilogram (kg)** : **divide by 1000**

  (v) **kilometre (km) to metres (m)** : **multiply by 1000**

  (vi) **metres (m) to kilometre (km)** : **divide by 1000**

  (vii) **metres (m) to centimetres (cm)** : **multiply by 100**

  (viii) **centimetres (cm) to metres (m)** : **divide by 100**

  (ix) **centimetres (cm) to millimetres (mm)** : **multiply by 10**

  (x) **millimetres (mm) to centimetres (cm)** : **divide by 10**

  (xi) **metres (m) to millimetres (mm)** : **multiply by 1000**

  (xii) **millimetres (mm) to metres (m)** : **divide by 1000**

  (xiii) **kilolitres (kl) to litres (l)** : **multiply by 1000**

  (xiv) **litres (l) to kilolitres (kl)** : **divide by 1000**

  (xv) **litres (l) to millilitres (ml)** : **multiply by 1000**

  (xvi) **millilitres (ml) to litres (l)** : **divide by 1000**

- **<u>Like and Unlike decimals:</u>**

  (i) **Decimals having same number of decimal places are called like decimals.**
  For example: In 3.714 and 105.303, both have 3 decimal places.

  (ii) **Decimals having different number of decimal places are called unlike decimals.**
  For example: 17.8, 17.08, and 17.108

- When decimal numbers are multiplied by 10, 100, 1000,……. etc. the decimal point shifts to the right depending upon the number of zeros in 10, 100, 1000,…….. etc. .

  For example: $0.5 \times 10 = 5$, $0.5 \times 100 = 50$, $0.05 \times 100 = 5$

- When decimal numbers are divided by 10, 100, 1000,……. etc. the decimal point shifts to the left depending upon the number of zeros in 10, 100, 1000,…….. etc. .

  For example: $\frac{0.75}{100} = 0.0075$, $\frac{3.57}{100} = 0.0357$

- To convert the fractions into equivalent fractions with denominator as multiples of 10.

  $$\frac{1}{2} = \frac{1 \times 5}{2 \times 5} = \frac{5}{10}$$

  $$\frac{1}{5} = \frac{1 \times 2}{5 \times 2} = \frac{2}{10}$$

  $$\frac{1}{20} = \frac{1 \times 5}{20 \times 5} = \frac{5}{100}$$

  $$\frac{7}{25} = \frac{7 \times 4}{25 \times 4} = \frac{28}{100}$$

  $$\frac{3}{125} = \frac{3 \times 8}{125 \times 8} = \frac{24}{1000}$$

Questions:

1. Find the decimal form of $\frac{9}{2}$.

2. Find the decimal for the following:

   (i)   Twelve and seven tenths.

   (ii)   Four tens seven ones and three hundredths.

3. Find the decimal number for the points A, B and C as shown in the number line.
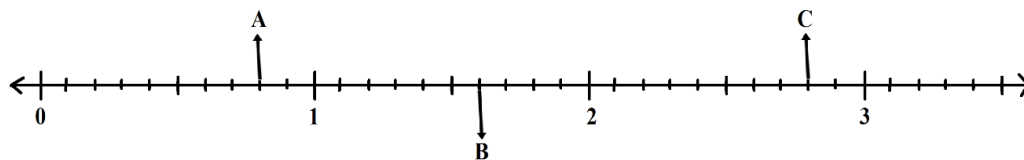
4. Find 3 km and 120m in km using decimal.

5. Find the decimal form of $7\frac{3}{4}$.

Express each of the following as decimals (Q. 6 to Q. 10)

6. $90 + 3 + \frac{2}{10}$

7. $900 + 90 + 9 + \frac{9}{10} + \frac{9}{1000}$

8. $200 + 5 + \frac{7}{100}$

9. $4 + \frac{3}{100} + \frac{2}{1000}$

10. $30 + \frac{8}{1000}$

11. Find the value of 0.125×100

12. Find the fractional form of 0.125

13. Find the decimal form of $\frac{13}{8}$.

14. Find the sum of $9.75 + 3.05 + 7.2$

15. Express the following decimal as fraction in lowest form:

    (i)   0.028

    (ii) 0.75

    (iii) 0.02

16. Find the place value of 4 in 12.045.

17. Find the digit which is at thousandth place in 753.864.

18. Find the decimal form of Seventy – eight, Eight tenths and nine hundredths.

19. Find the sum of $12.5 + 2.35 + 0.006$

20. Find the value of $0.2 - 0.06$

    Find the value of x (Q. 21 to Q. 25)

21. $3.2 + 0.32 + x = 3.99$

22. $0.123 + 1.23 + 12.3 = x$

23. $18.25 - 8.25 - x = 3.54$

24. $7 + 7.7 + 7.77 + 77.777 = x$

25. $3.5 - 8.8 + x = 10$

    Arrange the following in ascending order (Q. 26 to Q. 28)

26. 13.5,   2.37,   0.89,   1.25,   15.2

27.   0.89, 0.013, 0.325, 1.256, 2.1

28.   9.36, 3.9, 1.675, 1.089, 1.007

Find the next term of the series (Q. 29 to Q. 31)

29.   174, 17.4, 1.74, ……

30.   2 , 2.2 , 2.42 , …..

31.   1.008 , 5.04 , 25.2 , …..

Arrange the following in descending order (Q. 32 to Q. 34)

32.   3.03, 33.03, 3.3, 3.33, 3.34

33.   45.6, 4.56, 0.45, 5.46, 5.5

34.   4.04, 0.04, 44.4, 4.440, 4.444

35.   **Convert the following in decimal:**

      (i)   6 m 90 cm into m

      (ii)   4210 g into kg

      (iii)   80 mm into cm

36.   **Find the value of 0.89 + (0.89 × 100) − 10**

37.   **Find the value of $\frac{824}{10}$ − 80.1**

38.   **Express 50 rupees 95 paise as rupees using decimal.**

39.   **Express 8888 m as km using decimal.**

40.   **Express 15ml as litre using decimal.**

41.   **The weight of a baby elephant was 105.85 kg. After one year his weight increased by 54.95 kg. Find the weight of the baby elephant after one year.**

42.   **Renu had a rope of 45.65 m. She cut the rope into two pieces. If the length of one piece was 24.89 m, find the length of the other piece.**

43.   **ABCD is a quadrilateral. Find the sum of the lengths of sides of the quadrilateral.**
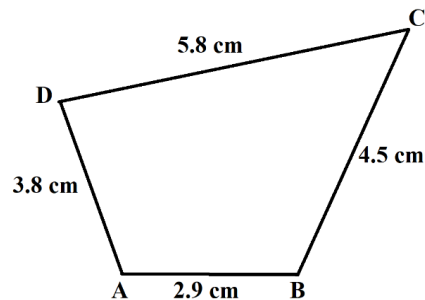
44.   The length of a ribbon is 1.25 m. The length of a rope is 3.54 m longer than the ribbon. Find the length of the rope.

45.   A pail holds 10.5 litres of water. A bottle holds 8.9 litres less water than the pail. Find the volume of water in the bottle.

46.   Tina bought vegetables weighing 10 kg. Out of this 3.250 kg are onions, 2.750 kg are tomatoes and the rest are potatoes. Find the weight of potatoes.

47.   Rashid bought 2 kg 50 g of grapes, 3 kg 250 g of apples and 4 kg 300 g of mangoes. Find the total weight of all the fruits (in kg) he bought.

48.   Tarun has ₹ 20. He bought toffees for ₹ 15.75. Find the balance amount left with Tarun.

49.   Mitali bought a box of pencils for ₹ 25.50. She gave ₹ 500 to the shopkeeper. Find the amount did she get back from the shopkeeper.

50.   If A = 2.35 and B = 1.75, then find the value of 3A – 2B.

Answers:

1.	4.5	26.	$0.89 < 1.25 < 2.37 < 13.5 < 15.2$
2.	(i) 12.7 (ii) 47.03	27.	$0.013 < 0.325 < 0.89 < 1.256 < 2.1$
3.	A = 0.8, B = 1.6, C = 2.8	28.	$1.007 < 1.089 < 1.675 < 3.9 < 9.36$
4.	3.120 km	29.	0.174
5.	7.75	30.	2.662
6.	93.2	31.	126
7.	999.909	32.	$33.03 > 3.34 > 3.33 > 3.3 > 3.03$
8.	205.07	33.	$45.6 > 5.5 > 5.46 > 4.56 > 0.45$
9.	4.032	34.	$44.4 > 4.444 > 4.440 > 4.04 > 0.04$
10.	30.008	35.	(i) 6.90 m (ii) 4.21 kg (iii) 8 cm
11.	12.5	36.	79.89
12.	$\frac{1}{8}$	37.	2.3
13.	1.625	38.	₹ 50.95
14.	20	39.	8.888 km
15.	(i) $\frac{7}{250}$ (ii) $\frac{3}{4}$ (iii) $\frac{1}{50}$	40.	0.015 litre
16.	$\frac{4}{100}$ or Four hundredths	41.	160.80 kg
17.	4	42.	20.76 metres
18.	78.89	43.	17 cm
19.	14.856	44.	4.79 metres
20.	0.14	45.	1.6 litres
21.	0.47	46.	4 kg
22.	13.653	47.	9.600 kg
23.	6.46	48.	₹ 4.25
24.	100.247	49.	₹ 474.50
25.	15.3	50.	3.55

CHAPTER – 9

Data Handling

Points to remember:

- <u>Data</u>: Collection of information in the form of numerical figures is called data.
- The original form of data is called raw data e.g. marks scored by 6 students are 38, 57, 98, 72, 48 and 56. This collection of data is raw data.
- Frequency is the number of times an event is repeated.
- <u>Organisation of Data</u>: It helps in bringing about meaningful conclusion from the data.
- Tally is a symbol like a vertical bar as shown ⊮ where each vertical bar represents 1 entry and ⫿⫿⫿ represents 5 entries.
- <u>Pictograph</u>: A pictograph is a way of representing data using pictures, things or symbols to match the frequencies of different information or events.
- <u>Bar Graph</u>: Bar graph is a chart with rectangular bars of equal width and lengths, proportional to the values that they represent. The bars can be horizontal or vertical with equal spacing between them. It is also called column graph.

Questions:

1. How many units will represent 90 on the scale if 1 unit of length is equal to 5?
2. If the scale of 1 unit length is equal to 10 thousand, then how many thousand will represent by the bar of length of 10 units?
3. If the scale of 1 unit length is equal to 50 kilograms, then how many kilograms will be represented by the bar of length of 8 units?
4. How many units will represent 70 on the scale if 1 unit of length is equal to 20?

5. The following table represents the number of students in class VI who choose third language among Sanskrit/ Urdu/ Punjabi :

S.No	Subject	Number of Students
1.	Sanskrit	27
2.	Urdu	
3.	Punjabi	19
	Total	70

Answer the following questions according to the table:
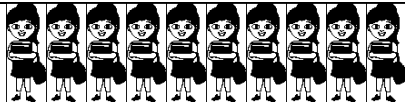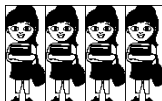
(i) How many students prefer to take Urdu?

(ii) Which subject was taken by the maximum number of students?

(iii) How many students are there in class VI?

6. The following table represents T-shirt size of students of a class:

T- shirt Size	Tally marks
30				
32	卌 |||
34	卌 ||
36	卌
38	卌 ||

Answer the following questions according to the table:

  (i)   **How many students wear T-shirt of size 34?**

  (ii)   **How many students are there in the class?**

7.   **A survey was carried out in a certain school to find out the popular school subject among the students of class VI to class VIII. The data in this regard is displayed as pictograph given below:**
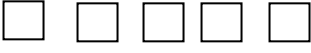
Subject	Number of students
Hindi	
English	
Mathematics	
Science	
Social Science	

Scale: **= 50 students**

From this pictograph answer the questions:-

(i) Which subject is more popular among the students?

(ii) How many students like Mathematics?

(iii) Find the number of students who like subjects other than Hindi and English.

8. Given pictograph shows different kinds of trees planted in park:

Banyan Tree	△ △ △ △△ △
Neem Tree	○ ○ ○ ○
Coconut Tree	☐ ☐ ☐☐ ☐
Mango Tree	⬠ ⬠ ⬠⬠ ⬠ ⬠ ⬠

Scale is given below:

△ = 7 Banyan Trees

○ = 7 Neem Trees

☐ = 7 Coconut Trees

⬠ = 7 Mango Trees

From the given pictograph answer the following questions:-

(i)   How many trees are there in all?

(ii)   Which tree is the least in the park?

(iii)   How many banyan trees are there?

9.   The following table represents the games that 700 students of a school would like to play:

S.No.	Games	Number of students
1.	Basket Ball	140
2.	Table Tennis	120
3.	Cricket	?
4.	Badminton	115
5.	Hockey	92
6.	Football	84

Answer the following questions using the above table:

(i)   How many students like to play football?

(ii)   Which game was most liked by the students?

(iii)   How many students like to play cricket?

10.   The following table represents the choice of milk shakes of class VI students:

S.No	Choice of milk shakes	Tally marks
1.	Mango shake only	⅂ℋℒ III
2.	Banana shake only	ℋℒ ℋℒ IIII
3.	Mango shake and Banana shake both	ℋℒ ℋℒ II

Answer the following questions according to the table:

(i)   How many students like banana shake only?

(ii)   Which shake was least liked by the students?

(iii)   How many students like both the shakes?

11.   13 workers were paid the following wages (in ₹) on a particular day:

135, 175, 140, 150, 120, 90, 85, 115, 90, 180, 120, 200, 120

(i)   How many workers get wages more than ₹ 100?

(ii)   How much money is received by most of the workers?

12.   In a mathematics test, the following marks were obtained by 20 students:

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

(i)   How many students obtained marks below 5?

(ii)   How many students obtained marks equal to or more than 7?

13.   In the following bar graph answer the following questions:
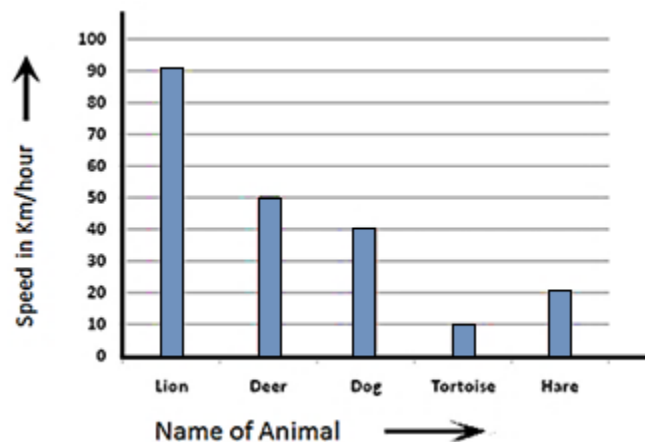
(i)   Which is the fastest animal?

(ii)   What is the speed of deer?

(iii)   How much faster is deer than dog?

14. **The result of pass percentage of class VI of 20 government schools in a locality in the year 2019 was as follows:**

66, 70, 90, 95, 90, 80, 75, 82, 74, 82, 74, 65, 66, 70, 90, 98, 85, 88, 99, 76

   (i)   How many schools had pass percentage more than 70% but less than 85%?

   (ii)   How many schools had pass percentage more than 90%?

15. **The following pictograph shows the number of absentees in a class of 40 students in a particular week:**

Days	Number of absentees
Monday	😊😊😊😊😊
Tuesday	😊😊😊
Wednesday	😊😊😊😊😊😊😊😊😊
Thursday	😊😊
Friday	😊😊😊😊😊😊
Saturday	

Scale: 😊 = 1 absentee

Answer the following questions:

   (i)   What was the total number of absentees in that week?

   (ii)   On which day there was full attendance?

   (iii) How many students were present on Monday?

16. **The different mode of travelling to school by 120 students are given below:**

Mode	Number of students
Walking	
Bicycle	
Bus	

Scale is given below:

    = **10 students (Walking)**

    = **10 students (Bicycle)**

    = **10 students (Bus)**

Observe the above pictograph and answer the following questions:

(i) **How many students travel by bus?**

(ii) **How many students go by walking?**

(iii) **How many students go by bicycle?**

(iv) **Which mode is used by maximum number of students?**

17. **The colours of cars preferred by people living in an apartment are represented by the pictograph shown below:**

Colour	Number of people
White	# # # #
Yellow	# # # # # # #
Black	# # # # # ‖
Red	# #

Scale: # = 20 people

‖ **= 10 people**

Observe the above pictograph and answer the following questions:

(i)   How many people prefer white colour?

(ii)   How many people prefer black colour?

18. **Shoe size of 18 students in a class are as follows:**

   5, 4, 4, 6, 7, 5, 6, 5, 6, 6, 5, 4, 6, 7, 8, 4, 4, 6

   Which shoe size is worn by maximum number of students?

19. **The expenditure of a company during the year 2017 under different heads is as follows:**

Heads	Expenditure (in lakhs Rs.)
Salary	32
Conveyance	12
Rent	10
Machines	8
Interest	3

What is the total expenditure of company during the year 2017?

20. **The following bar graph shows the marks obtained by Neeraj in five subjects:**
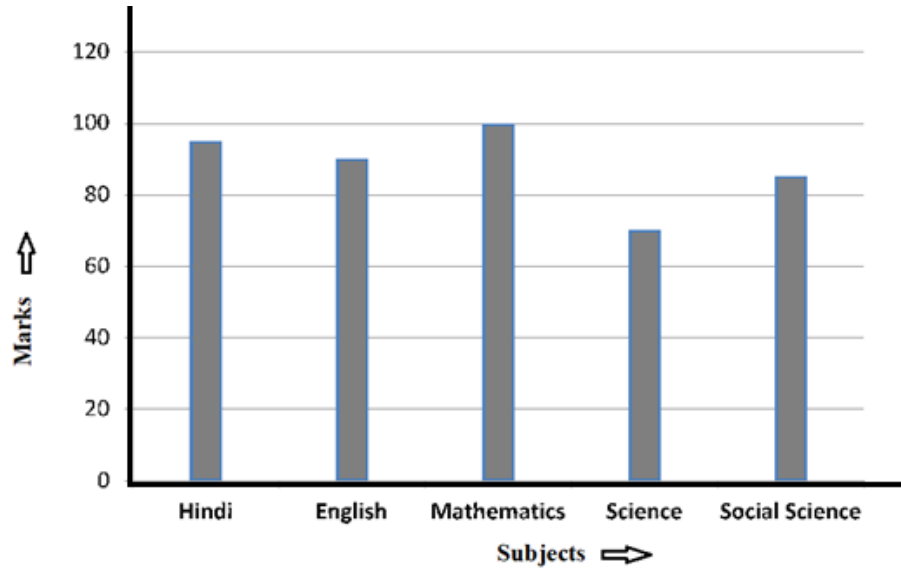
According to the bar graph answer the following questions:

(i)   In which subject does Neeraj get the lowest marks?

(ii)   How many marks does he get in Mathematics?

(iii)   In which subject does he get less than 75 marks?

Answers:

1.	18 units			
2.	100 thousand			
3.	400 kilograms			
4.	3.5 units			
5.	(i) 24	(ii) Sanskrit	(iii) 70	
6.	(i) 7	(ii) 30		
7.	(i) Hindi	(ii) 350	(iii) 700	
8.	(i) 154	(ii) Neem tree	(iii) 42	
9.	(i) 84	(ii) Cricket	(iii) 149	
10.	(i) 14	(ii) Mango	(iii) 12	
11.	(i) 10	(ii) ₹ 120		
12.	(i) 5	(ii) 8		
13.	(i) Lion	(ii) 50 km/hr	(iii) 10 km/hr	
14.	(i) 6	(ii) 3		
15.	(i) 25	(ii) Saturday	(iii) 35	
16.	(i) 30	(ii) 50	(iii) 40	(iv) Walking
17.	(i) 80	(ii) 110		
18.	6			
19.	₹ 65 lakhs			
20.	(i) Science	(ii) 100	(iii) Science	

CHAPTER – 10

Mensuration

- **Perimeter**

    (i) Perimeter of any closed figure is the distance covered along its boundary.

    (ii) Perimeter of ABCDE = AB + BC + CD + DE + EA
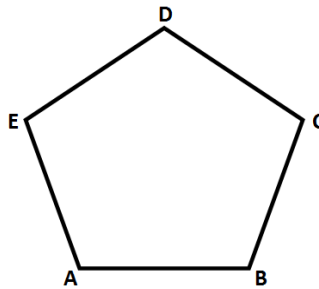
    (iii)Unit of Perimeter is mm (millimetre), cm (centimetre), m (metre), km (kilometre) etc.

- **Area**

    (i) Area of any closed figure is the surface enclosed by its boundary.

    (ii) Area of PQRS = Shaded portion
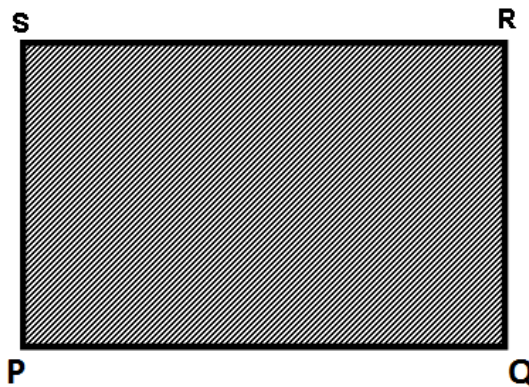
(iii) Unit of area is mm^2 (square millimetre), cm^2 (square centimetre), m^2 (square metre), km^2 (square Kilometre) etc.

- **Regular Polygons**

    (i) Figures, in which all sides and all angles are equal, are called regular polygons.

    (ii) Perimeter of regular closed figure = n × length of side

    where 'n' is number of sides of the regular closed figure

    (iii) Perimeter of Equilateral triangle = 3 × length of side
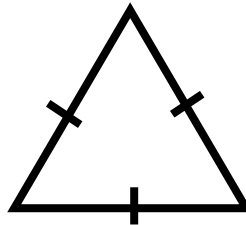
    (iv) Perimeter of square = 4 × length of side
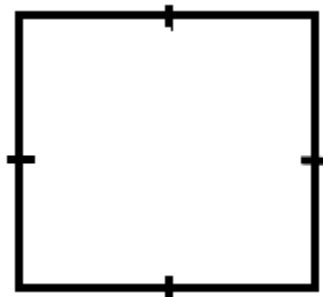
    (v) Perimeter of regular pentagon = 5 × length of side
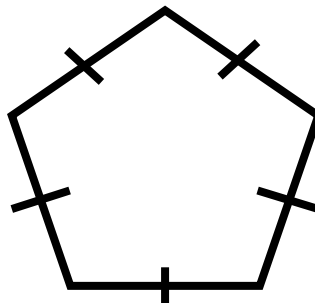
(vi) Perimeter of regular hexagon = 6 × length of side
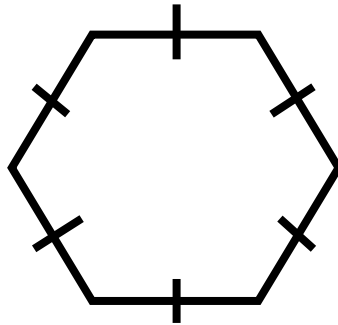
- **Perimeter of Rectangle = 2 × (Length + Breadth)**
- **Area of Rectangle = Length × Breadth**
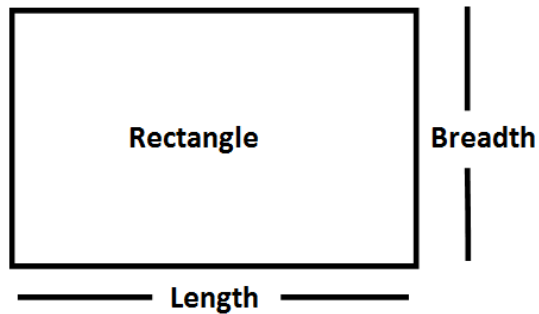
- **Area of Square = Side × Side**
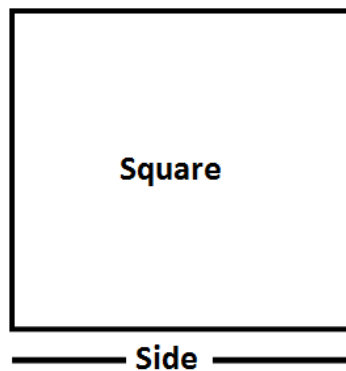
- **If an area of floor/wall is to be covered by tiles,**

  then number of tiles $= \dfrac{\text{Area of floor/ wall}}{\text{Area of 1 tile}}$

Questions:

1. Poonam walks around a park 350 m long and 150 m wide. She took 3 complete rounds. What was the distance covered by her?

2. Raju runs a total distance of 2 km around a square field of side 50 m. How many rounds will he complete?

3. What is the perimeter of the figure?
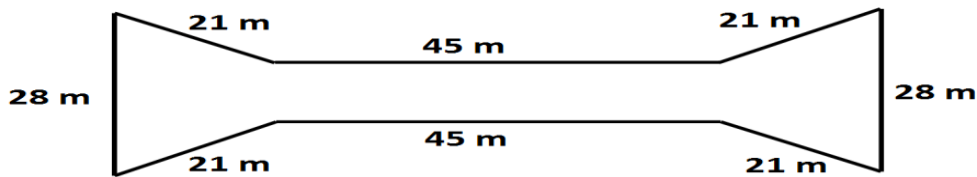
4. What will be the length of a rectangular park which is 70 m wide and has a Perimeter 520 m?

5. What is the perimeter of a rectangle whose length is 7.5 m and breadth is 2.7 m?

6. What is the perimeter of a square of side 6.75 mm?

7. Find the width of the rectangle whose area is 209 sq. m and length is 19 m.

8. Find the length of that rectangle whose area is 4200 sq. m and width is 35 m.

9. Radhika takes one round of a square field and travels 3496 m. Find the side of the square field.

10. What is the perimeter of a rectangle whose length is 1225 cm and breadth is 1 m?

11. What is the cost of fencing of a square park of length 325 m at the rate of ₹ 20 per metre?

12. What is the cost of fencing a regular pentagon park of side 120 m at the rate of ₹ 25 per metre?

13. What is the cost of fencing the park with sides given below, if the cost of fencing is ₹ 20 per metre?
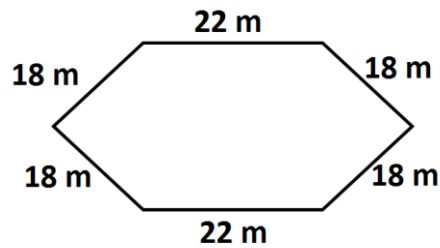
14. Sakshi has 1 m lace. She uses it to put it around a square hanky which had one side equal to 17.5 cm. How much lace will be left?

15. The perimeter of regular pentagon is 209 cm. What is the measure of each side?

16. What will be the length of rectangular wooden strip required to frame a picture whose length is 4 m 25 cm and width 65 cm?

17. The perimeter of a triangle is 62 cm. What is the measure of third side of the triangle if the measure of two sides is 27 cm and 14 cm?

18. Find the value of x in the given figure, if the perimeter of the figure is 200 cm.
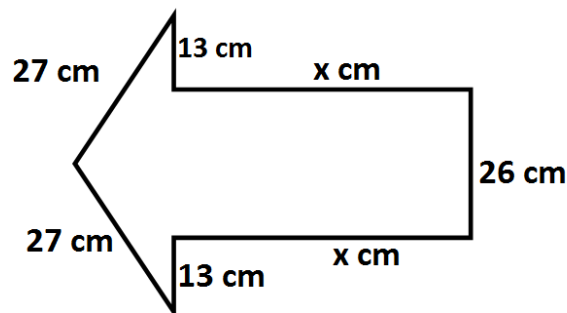
19. Find the value of y in the given figure if the perimeter of the figure is 110 cm.
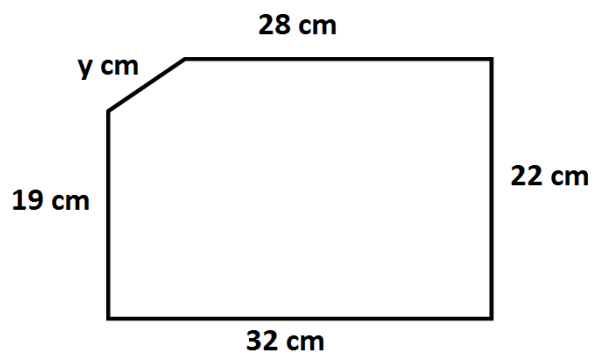
20. An isosceles triangle has a perimeter of 54 cm. If the measure of unequal side is 21 cm, then what will be the measure of each of the two equal sides?

21. What is the area of a square if its perimeter is 44 cm?

22. What is the perimeter of a square if its area is 36 sq. cm?

23. The length and breadth of a rectangle are 24 cm and 8 cm respectively. If its length is doubled and breadth is halved, then what is its new area?

24. The area of a rectangle is 12 sq. cm. If its length is doubled and breadth is halved, then what is its new area?

25. The length and breadth of a rectangle are 18 cm and 7 cm respectively. If its length is halved and breadth is doubled, then what is its new perimeter?

26. The length of a rectangle is thrice its breadth. If its perimeter is 80 m, then what is its area?

27. The length of a rectangle is thrice its breadth. If its area is 75 sq. m, then what is its perimeter?

28. A square of side 12 cm has the same area as a rectangle with length 16 cm. What is the perimeter of the rectangle?

29. What is the area of the given figure?
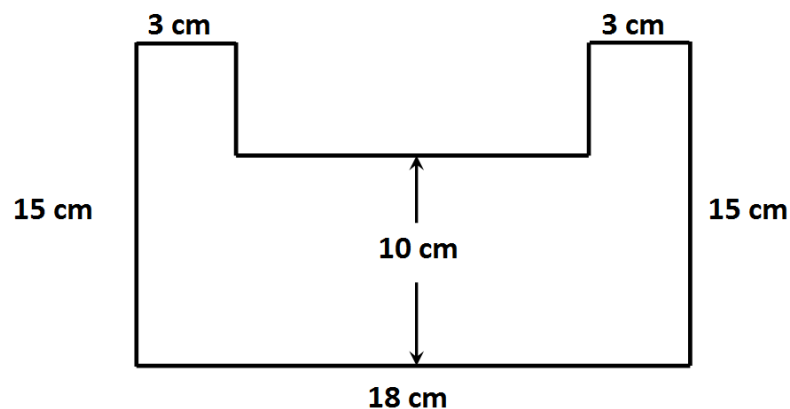
30. A rectangular floor with dimensions 150 m and 60 m is to be paved with square tiles of side 3 m. How many tiles will be required?

31. What is the area of rectangle in sq. cm whose dimensions are 6.5 cm and 4 m?

32. What is the cost of tiling a rectangular floor with length 40 m and breadth 30 m at the rate of ₹ 5 per square metre?

33. What is the length of a rectangle if its area is 15 sq. m and breadth is 2.5 m?

34. What is the area of the shaded portion in the given figure?
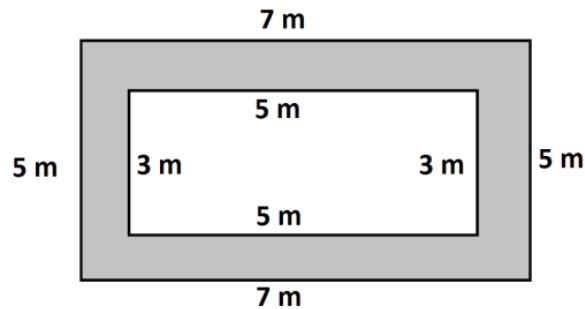
35. If the perimeter of two squares are 36 cm and 44 cm respectively. What will be the side of the square whose perimeter is equal to the sum of the perimeters of these two squares?

36. If the perimeter of three squares are 48 cm, 28 cm and 44 cm respectively. What will be the side of the square whose perimeter is equal to the sum of the perimeters of these three squares?

37. If the perimeter of two squares are 24 cm and 52 cm. What will be the area of the square whose perimeter is equal to the sum of the perimeters of these two squares?

38. If the area of two squares is 36 sq. cm and 64 sq. cm respectively. What will be the side of the square whose perimeter is equal to the sum of the perimeters of these two squares?

39. If the area of two squares is 9 sq. cm and 16 sq. cm respectively. What will be the perimeter of the square whose area is equal to the sum of the areas of these two squares?

40. In a square park of side 15 m, four squared flower beds each side 5 m are to be made as shown in figure. What is the area of remaining part of the park without flower beds?
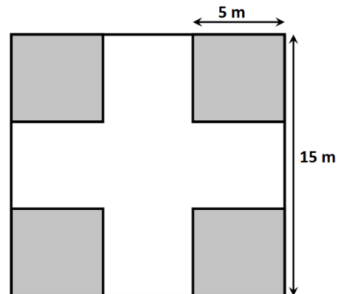
41. What is the perimeter of 10-sided regular polygon whose length of each side is 3.5 m?

42. What is the distance travelled in taking 3 rounds of a regular pentagon of side 5 m?

43. What will be the area of shaded portion in the figure?
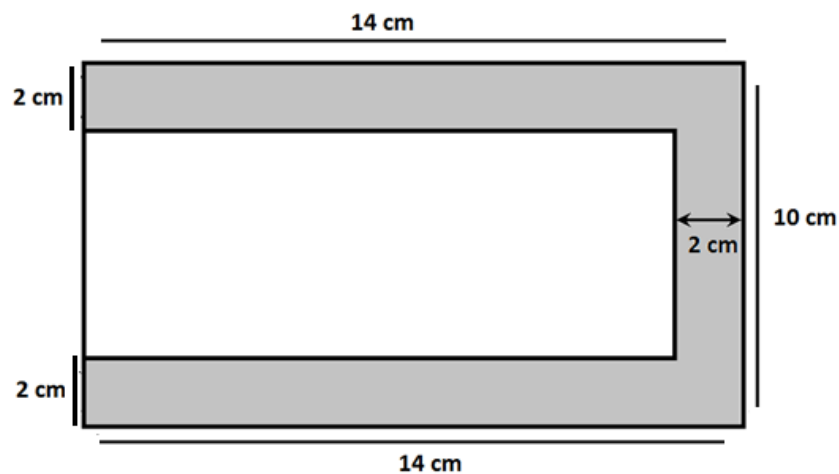
44. The perimeter of an equilateral triangle is 87 cm. What is the length of its each side?

45. What is the area of the figure given below?
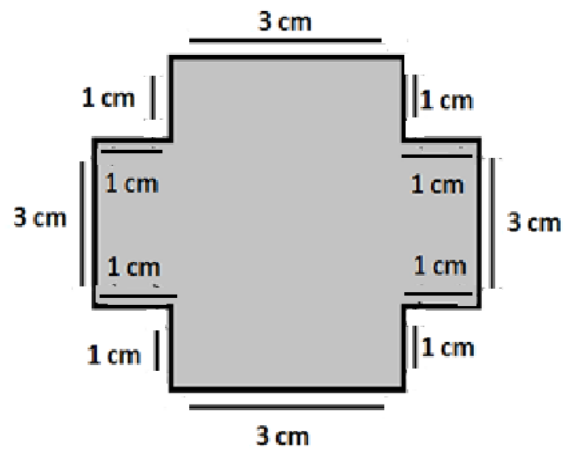
46. Mohan wants to cover the floor of a room 3 m wide and 4 m long by square tiles. If each tile is of side 0.5 m, then calculate the number of tiles he want to buy.

47. A square of 100 m side can be divided into how many rectangles of size 2 m $\times$ 1 m?

48. Ritu wants to cover the floor of a room 10 m wide and 12 m long by rectangular tiles. If the length and breadth of each tile are 2 m and 3m respectively, then calculate the number of tiles she wants to buy.

49. What is the area of that square whose perimeter is 40 m?

50. What is the perimeter of the figure?

Answers:

1.	3000 m	18.	47	35.	20 cm
2.	10	19.	9	36.	30 cm
3.	230 m	20.	16.5 cm	37.	361 sq. cm
4.	190 m	21.	121 sq. cm	38.	14 cm
5.	20.4 m	22.	24 cm	39.	20 cm
6.	27 mm	23.	192 sq. cm	40.	125 sq. m
7.	11 m	24.	12 sq.cm	41.	35 m
8.	120 m	25.	46 cm	42.	75 m
9.	874 m	26.	300 sq. m	43.	68 sq. cm
10.	26.5 m	27.	40 m	44.	29 cm
11.	₹ 26000	28.	50 cm	45.	21 sq. cm
12.	₹ 15000	29.	210 sq. cm	46.	48
13.	₹ 2320	30.	1000	47.	5000
14.	30 cm	31.	2600 sq. cm	48.	20
15.	41.8 cm	32.	₹ 6000	49.	100 sq. m
16.	9 m 80 cm	33.	6 m	50.	36 cm
17.	21 cm	34.	20 sq. m		

CHAPTER – 11

ALGEBRA

Points to remember:

- **Algebra:** It is a branch of Mathematics in which we use letters. Use of letters will allow us to write rules and formulas in a general way. A letter stands for an unknown quantity. By learning methods of determining unknown, we develop powerful tools for solving problems of daily life and puzzles

- **Variable:** $a, b, c \ldots \ldots \ldots x, y, z,$ etc. are used as variables. The variables obey all the rules and signs of addition, subtraction, multiplication and division.

$$5 \times x = 5x$$

$$2x + 3x = 5x$$

$$x \times y = xy$$

  In $5x$, we have 5 as the numerical factor and x as the variable factor.

- **Algebraic Expression:** A combination of constants and variables using any of the signs $(+, - \times \ \& \ \div)$ is called algebraic expression e.g., $7y, 5z + 2$ etc.

- **Equation:** An equation has equal sign ('=') between the two sides. An equation is a condition on a variable. It is expressed by an expression with a variable which is equal to a fixed number e.g., $x + 7 = 10$

Questions:

1. Express the perimeter of square of the side x units.
2. Express the perimeter of rectangle of length 5 cm and breadth y cm.
3. In a N.C.C. parade, there are 12 cadets in a row. What is the rule which gives the total number of cadets, if the number of rows is 'z'?
4. What is the rule for finding the next number in the following series:
   - I.   2, 4, 6, 8, 10 ………
   - II.   3, 7, 11, 15 ……….
   - III.   5, 10, 15, 20 ……....

5. In a Rangoli, there are 6 dots in every row. What is the total number of dots if there are 'z' rows?

6. Express the perimeter of regular octagon of side 'p' units.

7. 6 chocolates were left with Manoj after he gave 't' chocolates to his friend Raj. How many total chocolates Manoj had?

8. Express the perimeter of isosceles triangle whose equal sides are of 5 cm and third side of 'y' cm.

9. Sheena got "x" marks in English and 50 marks in Hindi. What are the total marks in two subjects?

10. Ashu writes one page in 'y' hours. How many pages can he write in 10 hours?

State the following algebraic expressions using numbers, variables and arithmetic operations in Q 11 to Q 20:-

11. 12 subtracted from a.

12. 10 added to b.

13. p multiplied by 5.

14. c divided by 9.

15. 'a' multiplied by (– 7).

16. 5 times m added to 8.

17. 10 times x added to (– 15).

18. 24 subtracted from 4 times q.

19. 12 less than 4y.

20. Cost of (x + 5) kg of rice, if cost of 1kg rice is ₹ 20.

Write the statements for the given expressions in Q 21 to Q 25:-

21. $a + 5$

22. $y - 8$

23. $8 - z$

24. $4x + 5$

25. $\frac{5y+5}{2}$

Solve the following equations (Q 26 to Q 35):

26. $x + 9 = 15$

27. $m - 2 = 10$

28. $\frac{m}{4} = 6$

29. $2a + 3 = 13$

30. $8m = 64$

31. $8t - 5 = 3$

32. $-3p + \frac{9}{2} = 0$

33. $\frac{x}{2} + 3 = 13$

34. $4x - 2 = 3 - x$

35. $\frac{5x - 9}{3} = 7$

36. Sum of two integers is -83. If one of them is -93, then what is the second integer?

37. I am an integer. If 21 is subtracted from me I become 9. Who am I ?

38. The sum of two integers is -25. If one of them is -50, then find the other integer.

39. If sum of two angles is 180^0 and greater angle is 5 times the smaller angle, then what are the measures of both angles?

40. The length of rectangular park is thrice its breadth. If perimeter of park is 640 m, then what are the dimensions of park?

41. Fare for hiring a taxi is ₹ 20 for first km, then Rs.10 for every additional kilometre travelled. What is the taxi fare for travelling 12 kilometres?

42. Father is 5 times as old as his son. Sum of their ages is 54 years. What are their ages?

43. On adding 21 to integer x, the result is -9. What is the value of x?

44. Anita got 45 marks in English, 48 marks in Hindi, x marks in Mathematics, 32 marks in Science and y marks in Social Science. Find the total marks she got.

45. The height of plant is 12 cm. If it increases by x cm everyday, then what will be its height after 10 days?

46. If 4 is subtracted from 5 times a number q, the result is 21. What is the value of q?

47. Find the value of y in
$$\frac{1}{5}(2y + 3) = 19$$

48. Two third of a number is 16, find the number.

49. Rahul's age is x years. Rahul is 4 years older than Reeta. If the sum of their ages is 20 years, what will be their ages?

50. Complete the following table: -

x	2	3	4	5	6	7	8	9	10
$6 - x$									

Answers:

1	$4x\ units$	26	$x = 6$
2	$(10 + 2y)\ cm$	27	$m = 12$
3	$12z$	28	$m = 24$
4	(i) $2n$ (ii) $4n - 1$ (iii) $5n$	29	$a = 5$
5	$6z$	30	$m = 8$
6	$8p$	31	$t = 1$
7	6+t	32	$p = \dfrac{3}{2}$
8	$(10 + y)\ cm$	33	20
9	$50 + x$	34	1
10	$10y$	35	6
11	$a - 12$	36	10
12	$b + 10$	37	30
13	5p	38	25
14	c ÷ 9	39	$30^0\ \&\ 150^0$
15	$-7a$	40	240 m & 80 m
16	$5m + 8$	41	₹130
17	$10x - 15$	42	45 years and 9 years
18	$4q - 24$	43	-30
19	$4y - 12$	44	$125 + x + y$
20	₹$(20x + 100)$	45	$(12 + 10x)\ cm$
21	5 added to a	46	5
22	8 subtracted from y	47	46
23	z subtracted from 8	48	24
24	5 added to 4 times x	49	Rahul's age 12 years, Reeta's age 8 years
25	Half of the sum of 5 times y and 5	50	4, 3, 2, 1, 0, -1, -2, -3, -4

CHAPTER – 12

Ratio and Proportion

Points to remember:

- **<u>Ratio</u>: A method of comparing two quantities of same kind and same unit by division.**

- **Ratio can be obtained only for quantities with same units.**

- **It can be expressed in its simplest form.**

- **Four quantities are said to be in proportion, if the ratio of the first and the second quantities is equal to the ratio of the third and the fourth quantities.**

   Example: If 4, 8, 24 and 48 are in proportion, then

$$\frac{4}{8} = \frac{24}{48}$$

- **Four quantities are in proportion if**

   Product of extreme terms= product of middle terms.

   Example: If $a : b :: c : d$ then $a \times d = b \times c$.

- **Unitary Method: The method in which we find the value of one unit is known as Unitary Method .**

   Example: 4 kg apples cost ₹ 480, then find the cost of 7kg apples.

   Cost of 4 kg apples = ₹ 480

   Cost of 1 kg apples = ₹ $\frac{480}{4}$ =₹ 120 (Division)

   Cost of 7 kg apples = 120×7 = ₹ 840 (Multiplication).

Questions:

1. Find the ratio of $96:108$.

2. Find the ratio of 40 minutes to 12 minutes.

3. Find the ratio of 4 weeks to 28 days.

4. The cost of a chocolate is ₹ 10 and the cost of a toffee is 50 paise. Find the ratio of the cost of chocolates to the cost of 2 toffees.

5. Vijay writes one page in 10 minutes and Vijeta writes two pages in an hour. Find the ratio of time taken to write one page by Vijay to the time taken to write one page by Vijeta.

6. Give 3 equivalent ratios of $3:11$.

7. The present ages of Anuj and Teena is 28 years and 34 years respectively. What was the ratio of their ages 4 years ago?

8. Divide 800 km into $9:7$.

9. Ratio of two numbers is $3:7$. If sum of the numbers is 180, find the greater number?

10. Divide ₹ 80 into the ratio $1:2:5$ between Anish, Reena and Yamini.

11. A total of 2275 people come to see an exhibition. Out of them 850 were male and the remaining are females. What is the ratio of number of males to females?

12. What is the ratio of smallest two-digit number and smallest three-digit number?

13. What is the ratio of 4th multiple of 3 and 2nd multiple of 6?

14. Divide ₹ 200 between Rinku and Tinku in the ratio $3:2$.

Answer Q.15 to Q.20 using the following statement:

"The present age of Raj is 12 years and his grandfather is 60 years old."

15. Find the ratio of present age of Raj to the present age of grandfather.

16. What is the ratio of present age of grandfather to the age of Raj 10 years ago?

17. What is the ratio of age of Raj after 8 years to the present age of grandfather?

18. What is the ratio of age of Raj to the sum of present ages of Raj and grandfather?

19. If Raj's father is 28 years older to him. What is the ratio of age of Raj's father to the age of grandfather?

20. What is the ratio of age of Raj to the age of grandfather when grandfather was 49 years old?

Whether the following are in proportion or not (Q.21 to Q.25)?

21.   15, 45, 20, 120

22.   40, 60, 80, 120

23. $32m : 64m$ = 6 minutes : 12 minutes

24.   8 minutes: 9 minutes = ₹ 24 : ₹ 27

25.   5km : 75km & $8m : 56m$

26. Find the value of x in the given proportion:

$$x :\ 48 :: 162 : 54$$

27. Find the value of x in the given proportion:

$$14 :\ x :: 28 : 196$$

28. Find the value of x in the given proportion:

$$92 :\ 4 :: 46 : x$$

29. Find the value of x in the given proportion:

$$21 :\ 35 :: x : 5$$

30. Find the value of x in the given proportion:

$$20 : 300 :: 40 : x$$

Fill the given number in the blanks to make them in proportion (Q.31 to Q.35):

31.   4, 10, 8, & 5

$$\frac{}{5} = \frac{8}{}$$

32. 5, 21, 35, & 3

$$\overline{35} = \overline{5}$$

33. 9, 45, 10, & 2

$$\overline{45} = \frac{2}{}$$

34. 32, 6, 12, & 64

$$\overline{12} = \overline{6}$$

35. 0.9, 0.4, 4, & 10

$$\overline{0.36} = \frac{10}{}$$

36. 7 boxes contain 294 apples. How many apples will be there in 5 boxes?

37. A salesman earns ₹ 75,000 in 3 months. How much will he earn in a year?

38. Neeraj buys 10 pens for ₹ 120 and Navya 8 pens for ₹ 72. Who bought the pens at a cheaper rate and by how much?

39. Rishabh made 72 runs in 6 overs and Kartik made 63 runs in 9 overs. Who made more runs per over?

40. The rent of a scooter is ₹ 1000 for 5 days. How much does Raj has to pay rent for 30 days?

41. If 3 pens costs ₹ $27\frac{1}{4}$. What is the cost of one dozen pens?

42. If the cost of a dozen bananas is ₹ 48. What is the cost of 7 bananas?

43. If 27 books weigh 108kg. What is the weight of 12 books?

44. 34 students of class collected ₹ 510 for a class party. If all the students have given equal contribution, then how much money will be collected by 150 students of the school?

45. A family of 6 members consume 3 litres of milk. What is the consumption of milk in a family of 15 members?

46. The first, third and fourth terms of a proportion are 2, 9, and 45. What is the second term of the proportion?

47. Rahul's annual salary is ₹ 80,000. How much salary does he earn in 3 months?

48. Vishakha and Ravi together have 60 kg of sweets. They want to divide it in the ratio of $1:2$. How much will each of them get?

49. In a year, Sohan earns ₹ 5,00,000 and saves ₹ 3,00,000. Find the ratio of money earned to the money saved?

50. In a year, Sohan earns ₹ 5,00,000 and saves ₹ 3,00,000. Find the ratio of money earned to the money spent?

Answers:

1.	8 : 9		27.	98
2.	10 : 3		28.	2
3.	1 : 1		29.	3
4.	10 : 1		30.	600
5.	1 : 3		31.	$\frac{4}{5} = \frac{8}{10}$
6.	6 : 22, 9 : 33, 12 : 44		32.	$\frac{21}{35} = \frac{3}{5}$
7.	4 : 5		33.	$\frac{10}{45} = \frac{2}{9}$
8.	450 km, 350 km		34.	$\frac{64}{12} = \frac{32}{6}$
9.	126		35.	$\frac{0.9}{0.36} = \frac{10}{4}$
10.	₹ 10, ₹ 20, ₹ 50		36.	210
11.	34 : 57		37.	₹ 300000 (₹ Three lakh)
12.	1 : 10		38.	Navya, cheaper by ₹ 3
13.	1 : 1		39.	Rishabh
14.	₹ 120, ₹ 80		40.	₹ 6000
15.	1 : 5		41.	₹ 109
16.	1 : 25		42.	₹ 28
17.	1 : 3		43.	48 kg
18.	1 : 6		44.	₹ 2250
19.	2 : 3		45.	7.5 litres
20.	1 : 49		46.	10
21.	No		47.	₹ 20,000
22.	Yes		48.	20 kg, 40 kg
23.	Yes		49.	5 : 3
24.	Yes		50.	5 : 2
25.	No			
26.	144			

CHAPTER – 13

SYMMETRY

Points to remember:

- **Symmetry**: Dividing the given figure into two identical parts.
- **Line of Symmetry**: The line along which the figure is divided into two identical parts.
- **Types of line of Symmetry**: Vertical, horizontal or diagonal.
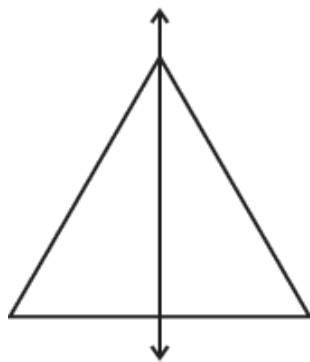
Vertical Line of Symmetry
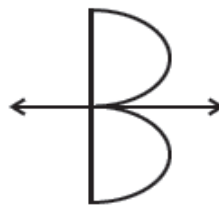
Horizontal Line of Symmetry
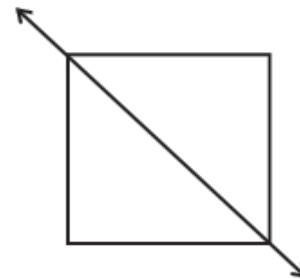
Diagonal Line of Symmetry

- **A line has no line of symmetry.**
- **A regular polygon has as many lines of symmetry as the number of sides.**
- **An object and its image are symmetrical with reference to the mirror.**
- **An object can have many symmetrical lines while another object can have no symmetrical line at all. eg circle has infinite lines of symmetry whereas scalene tringle doesn't have any line of symmetry.**

Equilateral triangle An isosceles triangle Scalene triangle

Circle Rectangle Square
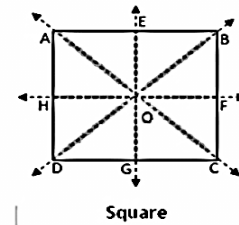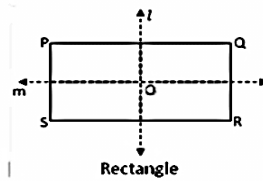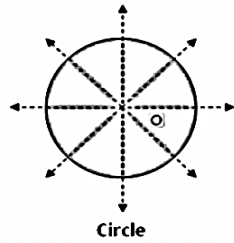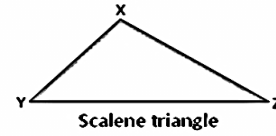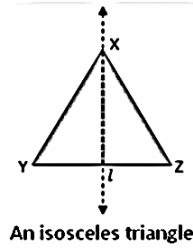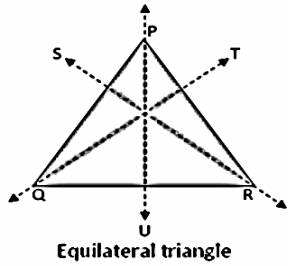
Questions:

1. How many symmetrical lines does a regular pentagon has?

2. Which quadrilateral has only two lines of symmetry?

3. How many lines of symmetry does a circle have?

4. Which alphabets have horizontal lines of symmetry?

B   A   T   M   R   S

5. How many symmetrical lines does a regular Octagon has?

6. Which alphabets have no lines of symmetry?

M   S   K   O   P   H

7. What is line 'n' in the following figure if B is the image of A?
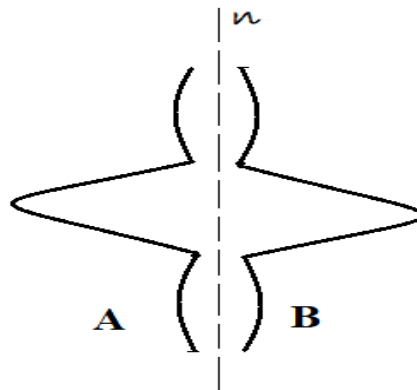
8. Which alphabets have the same image?

C   A   O   R   B   H

9. Complete the following figures such that dotted line acts as a line of symmetry?
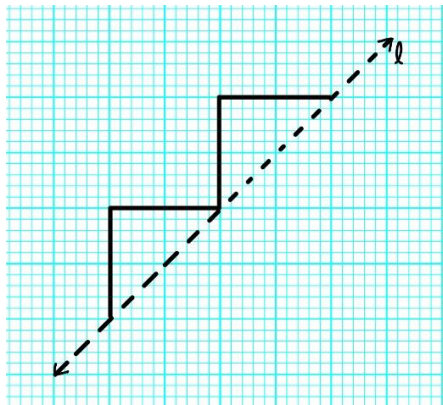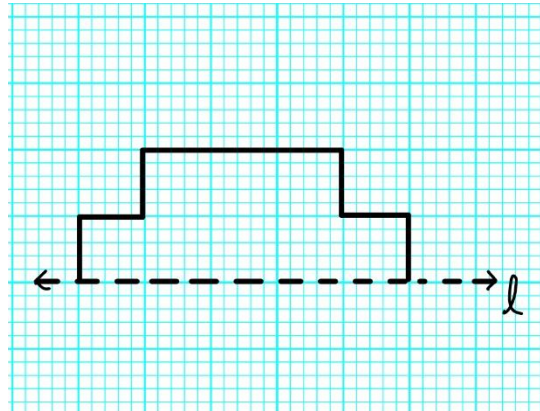
(A)   (B)

10. Complete the following figures such that lines l and m are lines of symmetry?
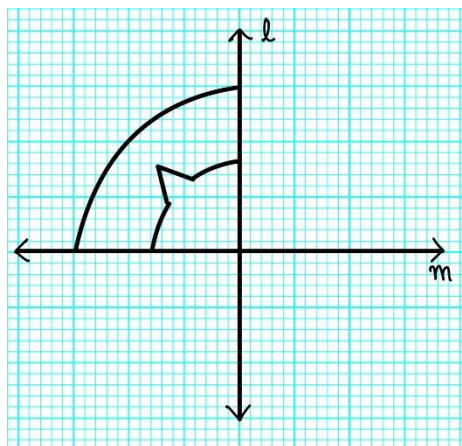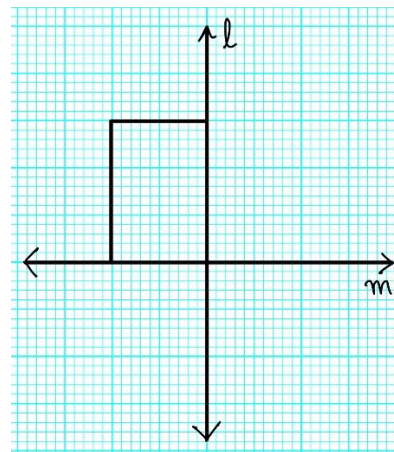
(A)   (B)

11. Which alphabets have vertical lines of symmetry?

B   G   T   E   W

Tell the number of lines of symmetry and draw them (Q. 12 to Q. 31):

12.
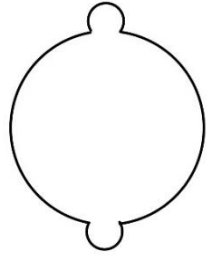
13.
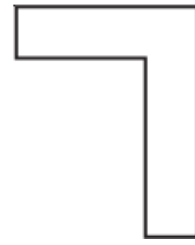
14.

15.

16.
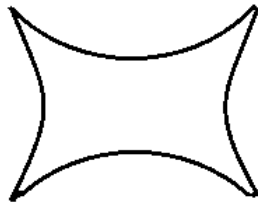
17.

18.
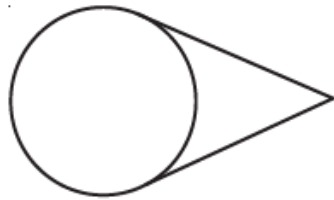
19.
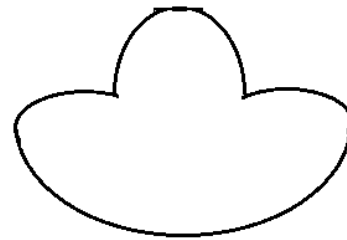
20.
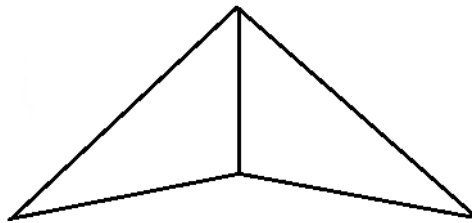
21.
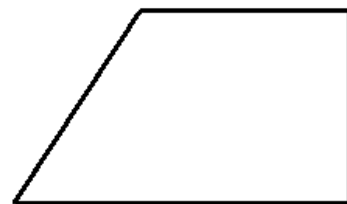
22

23.
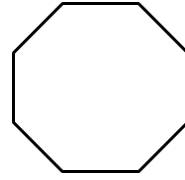
24.
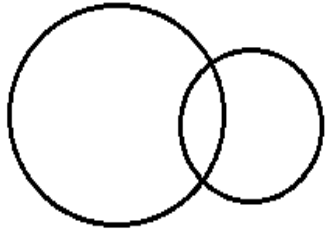
25.

26.

27.
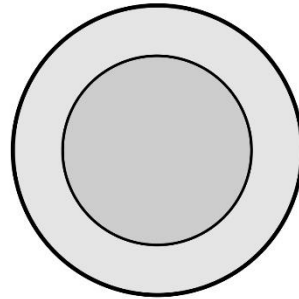
28.
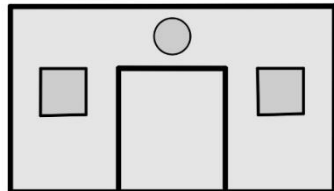
29.
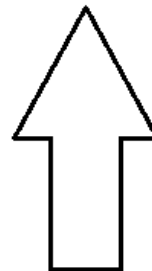
30.
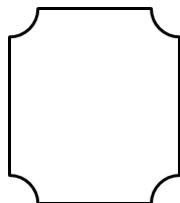
Answers:	
1.	**5 lines of symmetry**
2.	**Rectangle**
3.	**Many Lines of symmetry**
4.	**B**
5.	**8**
6.	**S and P**
7.	**Line of symmetry**
8.	**A, O and H**
9.	**Do it yourself**
10.	**Do it yourself**
11.	**W**
12.	**Two**
13.	**no line of symmetry**
14.	**One**
15.	**One**
16.	**Two**
17.	**One**
18.	**One**
19.	**One**
20.	**One**
21.	**no line of symmetry**
22.	**One**
23.	**Eight**
24.	**One**
25.	**One**
26.	**One**
27.	**many lines of symmetry**
28.	**One**
29.	**One**
30.	**Two**

CHAPTER – 14

PRACTICAL GEOMETRY

Points to remember:

- **Circle**:
  - ➢ A Circle is the set of all those points in a plane whose distance from a fixed point remains constant.
  - ➢ Fixed point is called Centre of the circle. In figure, O is the centre.
  - ➢ Fixed distance is called radius.
    In figure, radius OA = radius OB = radius OC.
  - ➢ Line segment joining any two points on the circumference of circle is called chord. In figure, EF is a chord.
  - ➢ Diameter is the line segment joining two points on the circumference of the circle passing through the Centre.
  - ➢ Diameter of a circle is the longest chord. A C is diameter.
  - ➢ An arc is a part of circumference of a circle. $\overset{\frown}{FGE}$ is an arc of circle
  - ➢ A circle can be constructed by taking the measurement of radius with the help of compass.
  - ➢ Diameter of circle = 2 × radius of circle
- **Line segment:**
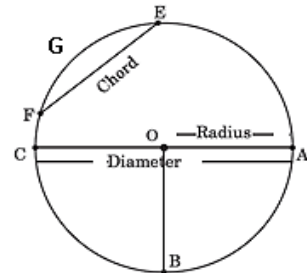
  ➢ Line segment is a part of line $\overleftrightarrow{AB}$ or ' l '.
  ➢ A line segment has two end points.
  ➢ A line segment has a definite length.
  ➢ A line segment of given length can be constructed using a ruler.

- ➢ **A line segment whose length is sum of two lines segments can be constructed.**
- ➢ **A line segment equal in measurement of a given line segment can be constructed with the help of compass.**

- • **Perpendicular:**

  Perpendicular lines: Two lines are said to be perpendicular if they intersect each other at an angle of 90°.

  In figure, CD $\perp$ AB.
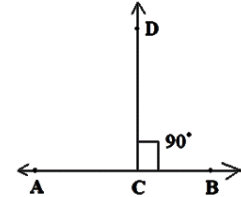
  - ➢ **Perpendicular to a line through a point on it can be constructed.**
  - ➢ **Perpendicular to a line through a point outside the line can also be constructed.**

- • **Perpendicular bisector:**
  - • **It is also known as axis of symmetry of a line segment.**
  - • **It divides the line segment into two equal parts.**

- • **Angles:**
  - ➢ **An angle is a figure formed by two rays with the same initial points.**
  - ➢ **line OP and line OQ are forming an angle POQ, where O is the vertex of angle.**
  - ➢ **Any angle having measure of a multiple of 15° can be constructed using a compass like 15°, 30° , 45° , 60° , 75° etc.**
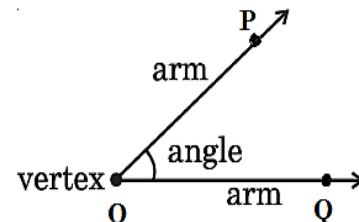
- ➢ **Angle bisector:**
  - ➢ **It is a ray which divides the angle in two equal parts.**
  - ➢ **The ray OY is an angle bisector of angle XOZ.**

    $\underline{\angle XOY = \angle YOZ}$
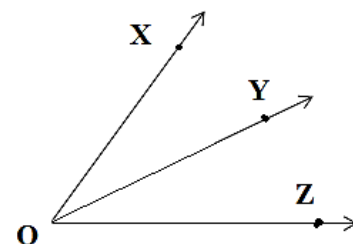
1.	Name the geometrical instrument which is used to measure and draw line segments.

2.	Name the geometrical instrument used to draw a circle.

3.	A line segment of measurement 15 cm is divided into three equal parts. Tell the length of $\frac{1}{3}$ of line segment.

4.	What is the diameter of a circle of radius 4.5 cm?

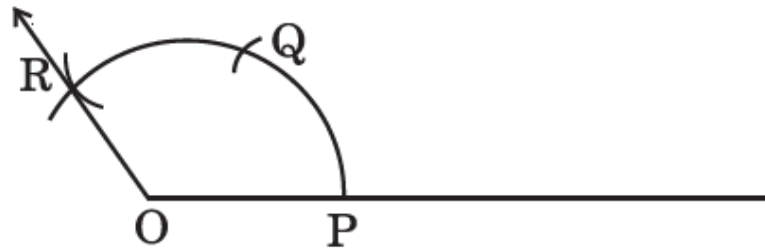5.	$\angle ABC = 80^{o}$ and BD is the angle bisector. Find the measure of $\angle ABD$.
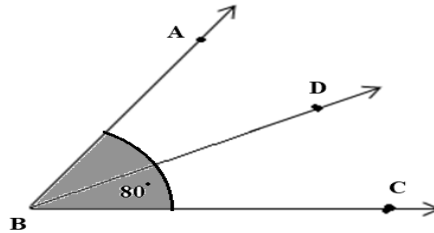
6.	A line segment CD is twice the length of $\overline{AB} = 3.8\ cm$. What is the length of line segment CD?

7.	Name the points in the interior, exterior and on the circle from below figure:
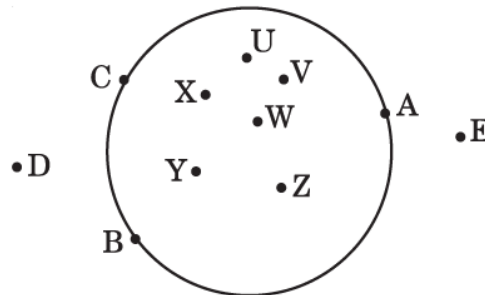
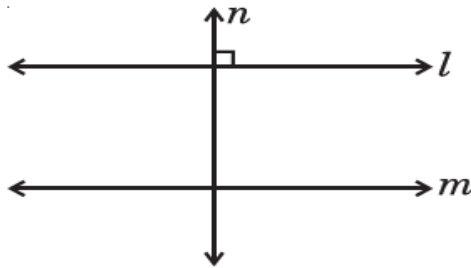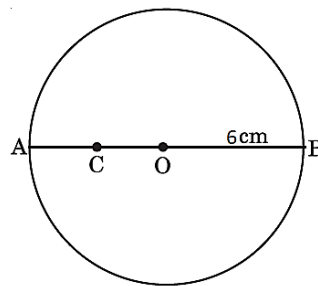8.	Tell the number of line segments in the given figure.
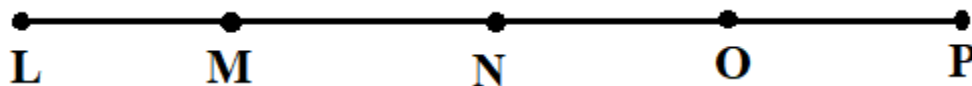
9. In the given figure if OP = PQ = QR , what will be the measure of $\angle POR$?

10. In the figure, n ⊥ m. How are lines l and m related to each other?

11. In the given figure, O is the centre of a circle of radius 6 cm, OC = AC, then what will be the length of BC and OC?
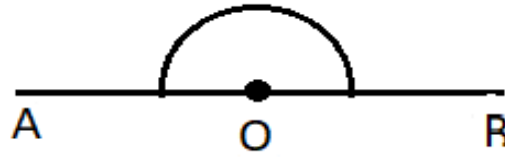

12. How many circles can be drawn through the following four scattered points?
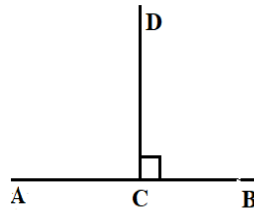

13. For dividing a line segment into four equal parts. How many perpendicular bisectors will be drawn?
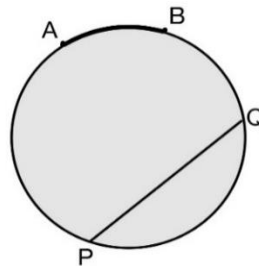
14. What is the measure of angle AOB ?

15. In the figure, AB = 9.6 cm and CD is perpendicular bisector of AB. What is the measure of AC and BC?

16. What are the measurements of line segments equal to the sum and difference of given line segments?

A   5.2cm   B   P   7.9cm   Q

17. What are the names of parts represented by AB and PQ in given figure?
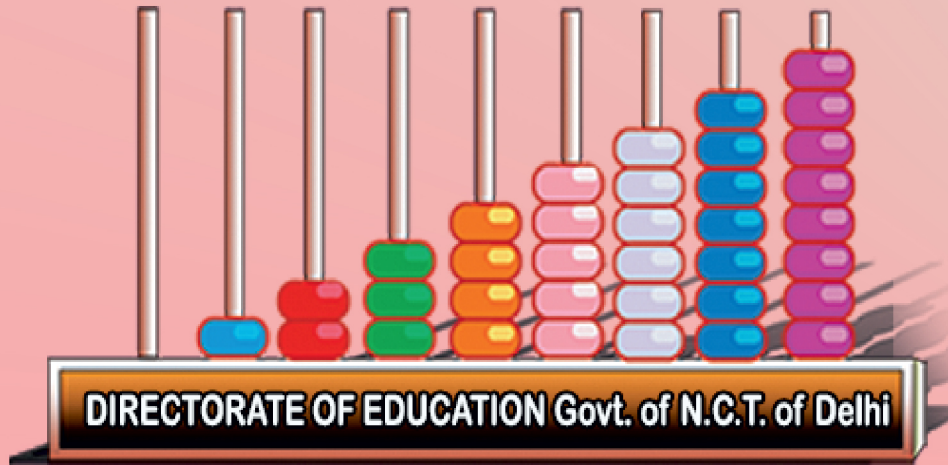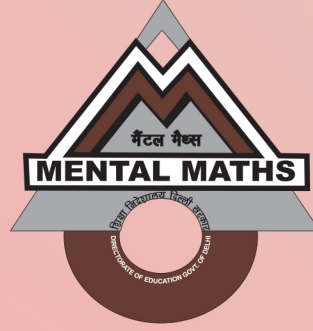

18. What is the measure of angle between two perpendicular lines?

19. If line segment AB = 8.4 cm such that AP = PQ =BQ. What are the measures of line segments PQ, AQ and BQ ?

A   P   Q   B

20.   **If the diameter of a circle is 7.8 cm. What is the length of its radius?**

21.   **If radius of a circle is 4 cm, what is the length of longest chord ?**

22.   **At which points the perpendicular bisectors of two chords of a circle meets?**

23.   **What is the measure of a supplementary angle of 50^0 ?**

24.   **A circle is drawn on a line segment as a diameter. At which point the centre of the circle lies?**

25.   **An angle is equal to its supplementary angle. What is the measure of angle?**

Answers:

1.	Ruler
2.	Compass
3.	5 cm
4.	9 cm
5.	40°
6.	7.6 cm
7.	Interior Points: U, V, W, X, Y, Z
	Exterior Points: D, E
	Points on the Circle: A, B, C
8.	10
9.	120°
10.	l is parallel to m
11.	BC = 9 cm and OC = 3 cm
12.	None
13.	3
14.	180°
15.	4.8 cm
16.	13.1 cm and 2.7 cm
17.	AB →Arc and PQ → chord
18.	90°
19.	PQ = 2.8 cm, AQ = 5.6 cm and BQ = 2.8 cm
20.	3.9 cm
21.	8 cm
22.	Centre
23.	130°
24.	midpoint
25.	90°

MENTAL MATHS

DIRECTORATE OF EDUCATION Govt. of N.C.T. of Delhi

पढ़े चलो बढ़े चलो