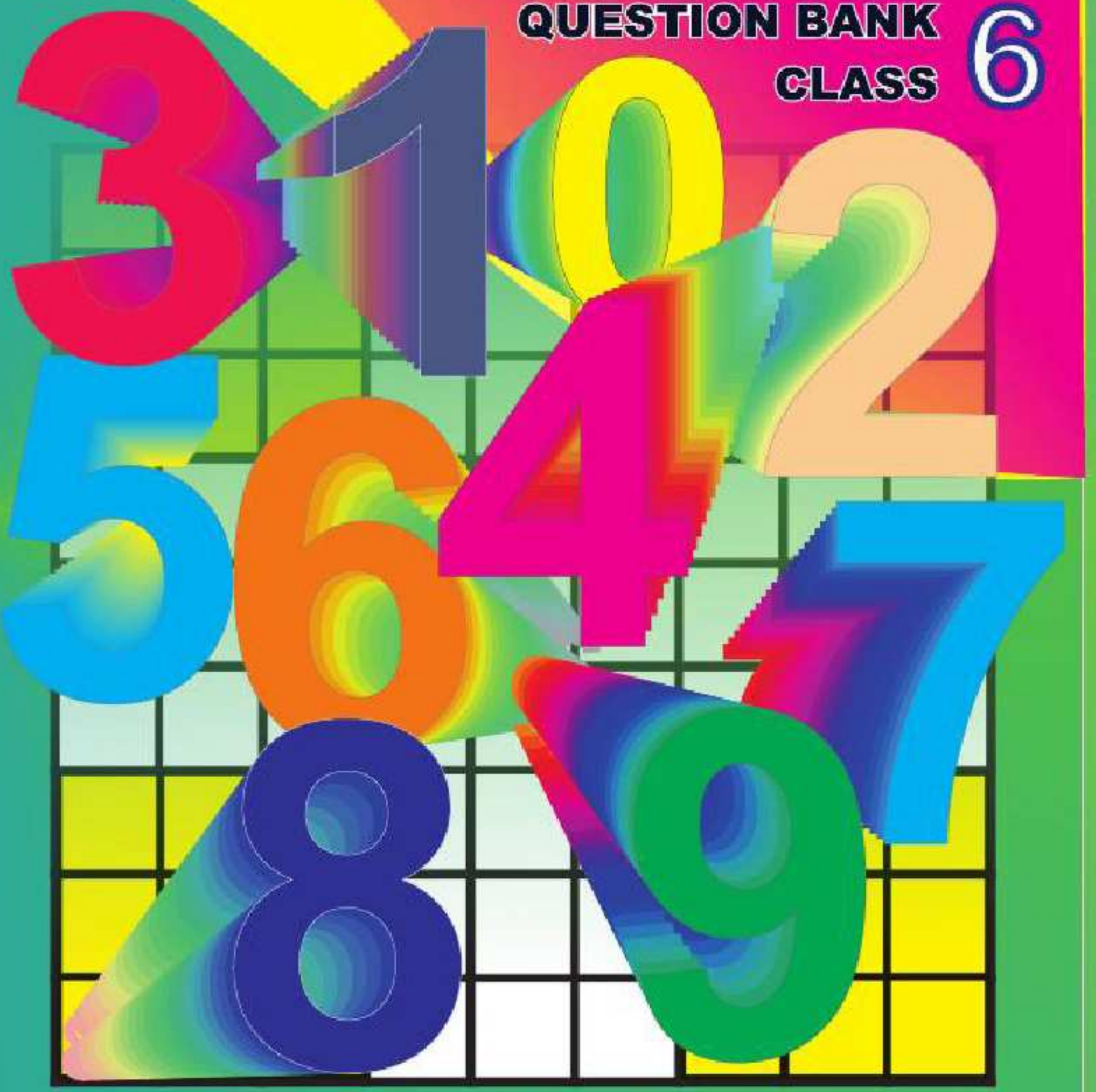
MENTAL MATHS

QUESTION BANK CLASS 6



DIRECTORATE OF EDUCATION GOVT.OF N.C.T.OF DELHI

MENTAL MATHS CLASS

VI

2024-25

DIRECTORATE OF EDUCATION

GOVT. OF NCT OF DELHI

ASHOK KUMAR
IAS

सचिव (शिक्षा)
राष्ट्रीय राजधानी क्षेत्र
दिल्ली सरकार
पुराना सचिवालय, दिल्ली-110054
दूरभाष: 23890187 टेलीफैक्स : 23890119

सत्यमेव जयते

Secretary (Education)
Government of National Capital Territory of Delhi
Old Secretariat, Delhi-110054
Phone : 23890187, Telefax : 23890119
E-mail : secyedu@nic.in

MESSAGE

The eloquent words of Galileo Galilei resonate: 'The laws of nature are written by the hand of God in the language of mathematics.' In this profound observation, the great astronomer awakened humanity to the paramount importance of mathematics. Within our school education system, mathematics holds a pivotal role, with a dedicated focus on foundational numeracy and literacy.

This year marks a significant milestone, as the project extends its reach to Government-Aided schools and introduces Level IV for classes 11th and 12th as well.

In the competitive arena, where time is of the essence, a strong command over mathematics is indispensable. These skills are not only prized in competitive exams but also wield significant influence in the realms of entrepreneurship and innovation. Mental Maths, with its transformative impact, enhances students' number sense, fosters an understanding of relationships between quantities, and cultivates logical thinking for problem-solving.

The meticulously crafted Mental Maths Question Banks recognize the diverse abilities, needs, and interests of students. As the saying goes, 'Nothing great can be achieved without consistent and persistent hard work'. Heartfelt congratulations to the State Core Team members, District Cordinators and Subject Experts for their silent and steadfast dedication to bring forth these impactful publications.

(Ashok Kumar)

BHUPESH CHAUDHARY, IAS
DIRECTOR (EDUCATION & SPORTS)

सत्यमेव जयते

Directorate of Education,
Govt. of NCT of Delhi
Room No. 12, Civil Lines,
Old Secretariat, Delhi-54
Phone: 011-23890172
Email: diredu@nic.in

MESSAGE

Beyond mere numbers and equations, Mathematics serves as a foundational language, intricately woven into the fabric of everything from the technology we rely on to the scientific principles shaping our understanding of the cosmos.

Enter Mental Maths – a captivating art of calculation sans paper or tools, a dance of numbers performed within the confines of the mind. It's not just about crunching numbers; it's about empowerment. Mental Maths nurtures the comprehension of place value, fortifies basic operations, and establishes a robust foundation for grappling with more complex mathematical concepts in the future.

Engaging in Mental Maths includes exercising multiple cognitive processes – memory, attention, and critical thinking. Studies reveal that regular Mental Maths exercises contribute to maintaining cognitive reserve, postponing the onset of age-related memory loss, and fending off other cognitive declines. In essence, Mental Maths keeps our minds agile and adaptable, akin to the benefits of physical activity for our bodies. It becomes the catalyst for swift decision-making and adept situational adaptation.

A heartfelt commendation goes to the dedicated State Core Team members and subject experts who meticulously crafted the Mental Maths Question Banks. These resources, tailored for students in Government and Government-Aided Schools of the Directorate of Education are a testament to their sincere efforts and the wise guidance of the Project Director of Mental Maths. It brings me immense pleasure to present this Mental Maths Question Bank to students, encouraging them to weave the magic of Mental Maths into the tapestry of their daily lives.

(BHUPESH CHAUDHARY)

विकास कालिया
क्षेत्रीय शिक्षा निदेशक
उत्तर एवं मध्य क्षेत्र,
पुरस्कार एवं कल्याण शाखाएँ,
पत्राचार विद्यालय एवं
रा. मुक्त विद्यालयी शिक्षा शाखाएँ
परियोजना निदेशक: मेंटल मैथ्स

सत्यमेव जयते

VIKAS KALIA
Regional Director of Education
Central & North,
Awards & Welfare Branches,
Patrachar Vidyalaya &
NIOS (Branches)
Project Director: Mental Maths

MESSAGE

At the tender age of 16, RPraggnanandhaa, the prodigious talent in Indian chess, sent waves through the global chess community by outsmarting Chess Grandmaster Magnus Carlsen in a lightning-fast game at the Airthings Masters Rapid Chess Tournament. His secret weapon was the remarkable ability for mental calculations. This young genius effortlessly combines his exceptional talent with lightning-quick numerical intuition, fortifying his strategic thinking skills.

At the age of 20, Neelakanta Bhanu Prakash of Hyderabad secures his place as the fastest human calculator on the planet, clinching India's first gold in the Mental Calculation World Championship at the Mind Sports Olympiad in London. Holding an impressive tally of 4 world records and 50 Limca records for speed calculation, his journey is even more remarkable considering a childhood setback. A skull fracture at the age of 5 kept him away from school for a year, but he turned adversity into opportunity, delving into puzzle-solving and mathematics games to hone his cognitive skills.

Mental Mathematics isn't just about acing exams; it's a cognitive superpower that equips the brain to think strategically, break down challenges into manageable steps, and devise creative solutions. This skill transcends academic boundaries, proving invaluable when estimating shopping costs, calculating expenses, or planning a trip. Imagine confidently tallying a shopping bill without reaching for any gadgets.

Recognizing that each student has a unique learning style, Mental Maths Question Banks cater to diverse needs, offering a plethora of materials. Through collaborative efforts, students engage in exhilarating Mental Maths competitions, learning from one another and building self-confidence.

A heartfelt acknowledgment goes to the Mental Maths State Core Team, District and Zonal Coordinators, and HOSs for their unwavering dedication to bringing the Mental Maths superpower to students across all Government and government-aided schools of the Directorate of Education. Gratitude extends to the esteemed Secretary Education and the Director of Education for their guidance and constructive feedback, steering the Mental Maths Project toward continuous improvement.

(VIKAS KALIA)
PROJECT DIRECTOR (MMP)

ACKNOWLEDGEMENT

SUBJECT EXPERTS & CONTENT DEVELOPMENT TEAM

Class-6 (SESSION 2024-2025)

Dr. SUNIL AGGARWAL, LECTURER

STATE COORDINATOR, MENTAL MATHS PROJECT

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

SAMPDA GULATI, VICE PRINCIPAL

STATE CO-COORDINATOR, MENTAL MATHS PROJECT

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

ANJALI ARYA, TGT

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

VANDANA RANI, TGT

GSKV, SP Road Nangloi (School ID-1617013)

SWATI SHARMA, TGT

GGSSS, Vasant Kunj (School ID- 1720026)

DEEPA BOHRA, TGT

SKV NO. 1, D - Block, Janak Puri (School ID- 1720014)

SHIVANI SINGH TGT

SKV, NO.3, Tilak Nagar (School ID- 1514016)

YUVRAJ SINGH, TGT

GS (CO-ED) SS School, D-Block, Vasant Kunj (School ID- 1720181)

RAKESH KUMAR, TGT

S CO-ED SSS, Qutab, Mehrauli (School ID-1923004)

COVER PAGE DESIGN & TECHNICAL SUPPORT

PREM KUMAR SHARMA, LECTURER

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

NARESH KUMAR, TGT

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

STATE LEVEL MENTAL MATH QUIZ COMPETITION RESULT 2022-2023
LEVEL-1
REGION-WEST (1st POSITION)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	KOMAL YADAV	SUBHASH CHANDRA YADAV	20200277648	GSKV NAGLOI	1617010	PURNIMA
2	VI	PRINCE GUPTA	MANOJ KUMAR GUPTA	20160047259	SCAN SBV NO2 B BLOCK JANAKPURI	1514008	ABHISHEK KATARIA
3	VI	VANSH MOURYA	RAMESH MOURYA	20190213112	SBV A BLOCK VIKASPURI	1618002	VIKAS KUMAR

REGION -EAST (1ST RUNNER UP)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	SHASHWAT TIWARI	DEV VRAT TIWARI	20210464465	GSBV JHILMIL COLONY	1001105	SANJAY KUMAR
2	VI	SATVIK SINGH	SHIV BHAJAN SINGH	20210537175	GBSSS NO2 BADARPUR	1925051	JASBIR SINGH
3	VI	AASTHA JHA	KUSHAL KUMAR JHA	20190132492	RSKV NO2 SHAKARPUR	1002193	HEMLATA

REGION -NORTH (2ND RUNNER UP)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	DEVANSH	RAJKUMAR TRIPATHI	20220334502	GBSSS BAWANA	1310019	SUDHIR ATRI
2	VI	ANUSHKA RANI	MAHENDER KUMAR	20160083606	BNNGSKV KHERA KALAN	1310039	MEENA
3	VI	KIRAN	HARI RAM MAHAWAR	20220318312	GGSSS ANANDWAS	1411038	MANJU LATA AGGARWAL

REGION -CENTRAL (4TH POSITION)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	SAUBHAGYA KUMAR SINGH	RAJESH SINGH	20170398780	RPSV NEW RAJINDER NAGAR	2128032	POONAM
2	VI	PRATEEK PANDEY	SATYA NARAYAN PANDEY	20220348757	GBSS BURARI	1207116	BACHAN KUMAR
3	VI	MAYANK	KARAN SINGH	20200229801	RPSV NEW RAJINDER NAGAR	2128032	ROHIT

REGION -SOUTH (5TH POSITION)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	PARAS	SUMER SIGH	20170180332	G COED SV DWARKA SEC-17	1821279	RAVI YADAV
2	VI	ADITYA RAJ	SANTOSH KASERA	20220242757	G COED SSS SEC 2 DWARKA	1821029	MANJU RAWAL
3	VI	HEMANT SHARMA	SITA RAM SHARMA	20220008932	VGSG J BLOCK SAKET	1923056	DEEPALI

STATE LEVEL MENTAL MATH QUIZ COMPETITION RESULT 2023-2024
LEVEL-1
REGION-WEST (1st POSITION)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	CHANDAN YADAV	SUBHASH CHANDRA YADAV	20230229492	GCOED SSS, PUNJABI BASTI, NANGLOI	1617027	VIJAY SAINI
2	VI	VIRAT KUMAR	SUNIL KUMAR	20170096775	SBV, A-BLOCK, VIKASPURI	1618002	VIKAS KUMAR
3	VI	HARSHIT	SANJAY	20210522416	GBSSS, WEST PATEL NAGAR	1516140	KRISHNA MOHAN

REGION -EAST (2nd POSITION)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	GARVIT	JITENDRA KUMAR	20170074918	GSBV VIVEK VIHAR	1001002	POONAM TOMAR
2	VI	UNNATI BHARDWAJ	TARUN BHARDWAJ	20210418869	RSKV NO 1 SHAKARPUR	1002196	SANTOSH KAPOOR
3	VI	AMAN KUMAR SHARMA	AJAY KUMAR SHARMA	20230121318	GBSS VASUNDHRA ENCLAVE	1002362	ARINDAM OJHA

REGION –SOUTH (3rd POSITION)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	PAWAN KUMAR	UPENDRA KUMAR	20180204061	SOE SECTOR 22 DWARKA	1821282	PANKAJ SINGH
2	VI	LAXMI KUMARI	DINESH KUMAR SINGH	20230157170	RSKV MEHRAULI	1923038	SARITA DAGAR
3	VI	HIMANSHI	ASHOK KUMAR	20230221841	SKV NO 1, D-BLOCK, JANAKPURI	1720014	BABITA

REGION -CENTRAL (4th POSITION)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	VEDANT PANDEY	SUNIL KUMAR PANDEY	20230263942	SALWAN BOYS SR SEC SCHOOL	2128098	NIDHI SHARMA
2	VI	KHYATI KASHYAP	MOHAN JHA	20230066761	SKV LALITA BLOCK, SHASTRI NAGAR	1208095	LALITA RANI
3	VI	SURAJ KUMAR	MUNNA SHARMA	20190464926	GBSS, DEV NAGAR	2128006	AKBAR KHAN

REGION -NORTH (5th POSITION)

S. No.	CLASS	NAME OF STUDENT	FATHER'S NAME	STUDENT ID	SCHOOL NAME	SCHOOL CODE	NAME OF GUIDE TEACHER
1	VI	VIVEK PODDAR	SHANKAR	20200385229	SV DR. MUKHERJEE NAGAR	1309003	SUDHIR CHAUDHARY
2	VI	TANUJ	SAROJ KUMAR THAKUR	20220098137	G. CO-ED. SS SEC-15, ROHINI	1413320	OM CHANDRA
3	VI	HARSH GUPTA	SUBODH KUMAR	20190206982	GBSSS KHERA KHURD	1310015	PARDEEP KUMAR

CONSTITUTION OF INDIA

[1][PART IV A

FUNDAMENTAL DUTIES

Article 51A. Fundamental duties. — It shall be the duty of every citizen of India—

a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
c) to uphold and protect the sovereignty, unity and integrity of India;
d) to defend the country and render national service when called upon to do so;
e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;
f) to value and preserve the rich heritage of our composite culture;
g) to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures;
h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
i) to safeguard public property and to abjure violence;
j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;]

[2][(k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.]

---

1. Ins. by the Constitution (Forty-second Amendment) Act, 1976, Sec. 11 (w.e.f. 3-1-1977).
2. Ins. by the Constitution (Eighty-sixth Amendment) Act, 2002, Sec. 4 (w.e.f. 1-4-2010).

THE CONSTITUTION OF INDIA

PREAMBLE

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a [1]**[SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC]** and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity;

and to promote among them all

FRATERNITY assuring the dignity of the individual and the [2][unity and integrity of the Nation];

IN OUR CONSTITUENT ASSEMBLY this twenty- sixth day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

---

1. Subs. by the Constitution (Forty-second Amendment Act,1976, Sec. 2, for "SOVEREIGN DEMOCRATIC REPUBLIC" (w.e.f. 3.1.1977)
2. Subs. by the Constitution (Forty-second Amendment Act,1976, Sec. 2, for "Unity of the Nation" (w.e.f. 3.1.1977)

SCHEDULE OF MENTAL MATHS QUIZ COMPETITIONS

FOR THE YEAR 2024-2025

DIRECTORATE OF EDUCATION

GOVT OF NCT OF DELHI

- **Practice to students from Question Bank** : 01.04.2024 to 19.10.2024
- **School Level Quiz Competitions** : 21.10.2024 to 30.10.2024
- **Cluster Level Quiz Competition** : 14.11.2024 to 20.11.2024
- **Zonal Level Quiz Competition** : 25.11.2024 to 30.11.2024
- **District Level Quiz Competition** : 07.12.2024 to 13.12.2024
- **Regional Level Quiz Competition** : 26.12.2024 to 31.12.2024
- **State Level Quiz Competition** : 18.01.2025 to 31.01.2025

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 3 in 9236 is 30.

- **Face value:**

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

  For e.g. :- The face value of 3 in 9236 is 3.

- 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 93516 to nearest:

  1. Tens 93520
  2. Hundreds 93500
  3. Thousands 94000

- **INDIAN SYSTEM OF NUMERATION:**

Period → Number↓	Crores		Lakhs		Thousands		Ones		
	Ten Crores	Crores	Ten Lakhs	Lakhs	Ten Thousands	Thousands	Hundreds	Tens	Ones
72053419	0	7	2	0	5	3	4	1	9
154039846	1	5	4	0	3	9	8	4	6

Numeral	Number Name
7,20,53,419	Seven Crore Twenty Lakh Fifty Three Thousand Four Hundred Nineteen.
15,40,39,846	Fifteen Crore Forty Lakh Thirty Nine Thousand Eight Hundred Forty Six.

- **INTERNATIONAL SYSTEM OF NUMERATION:**

Period → Number ↓	Millions			Thousands			ones		
	Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
72053419	0	7	2	0	5	3	4	1	9
154039846	1	5	4	0	3	9	8	4	6

Numeral	Number Name
72,053,419	Seventy Two Million Fifty Three Thousand Four Hundred Nineteen.
154,039,846	One Hundred Fifty Four Million Thirty Nine Thousand Eight Hundred Forty Six.

- 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

TRICK TO REMEMBER:

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. Height of Karan is CLXI cm and the height of Sahil is CLII cm. Find the sum of their heights.
2. Make the smallest 5 digit odd number using the digits 4,2,3,1,7 only ones.
3. 250 Lakh = _____ Millions.

4. Find the value of: $(13 \times 2) \times (7 - 5)$
5. Find the greatest 6 digit number formed by the digits (Using each digit only once)

4	1	3	0	5	6

6. In 246349, the place value of 4 at ten thousands place is____times the place value of 4 at tens place.
7. How many thousands are there in two Lakh?
8. Which of the following will be the greatest if each number is rounded off to nearest thousands?

   485932 ,480508 ,486702 ,485320.
9. A student Ajit's height is 1m 29 cm. Find his height in cm.
10. Find the Roman Numeral for the greatest three digit number.
11. Find the difference between the place value and the face value of 5 in 253761.
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. What will come next?

43269	44269	45369	46569	?

19. Make the largest 5 digit number using digits 4,7,5,0 at least once.
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. Estimate the product of 351×6 to the nearest thousands.

23. Arrange in descending order:-

    43251, 43521, 43125, 43152

24. Arrange in ascending order :-

    27643, 26743, 27634, 24736

25. Find the value of XXVIII−XIX in roman numerals.

26. Find the sum of place value of 7 with the difference between the place value and face value of 2 in 4325907.

27. A bucket can hold 16 liters of liquid in it. How many milliliters of water can it have?

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

29. Find the difference between the place value of 2 and 7 in the number 920873.

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. What is the estimated value of 5784 – 437 (to nearest hundred)?

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:

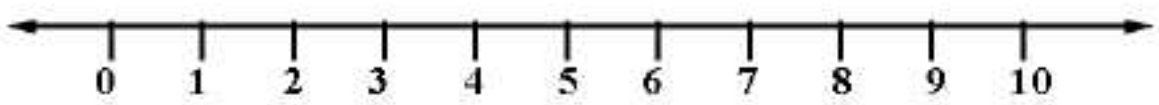
Q. No	ANSWER	Q. No	ANSWER
1.	313 cm / CCCXIII cm	21.	960 pages
2.	12347	22.	2000
3.	25	23.	43521>43251>43152>43125
4.	52	24.	24736<26743<27634<27643
5.	654310	25.	IX
6.	1000	26.	20005
7.	200	27.	16000 ml
8.	486702	28.	1001
9.	129cm	29.	19930
10.	CMXCIX	30.	₹ 5100
11.	49995	31.	1000
12.	420 seconds	32.	750
13.	31	33.	8 times
14.	6100 m	34.	XLVIII
15.	₹ 55000	35.	900
16.	₹ 550	36.	5400
17.	10099	37.	20085
18.	47869	38.	233000 m
19.	77540	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 80 is 80-1=79
  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 80 is 80+1 = 81.
  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).**

- **Commutative Property:**

If a and b are any two whole numbers, then

$$a + b = b + a;\ 3 + 5 = 5 + 3$$

$$ab = ba;\ 3 \times 5 = 5 \times 3$$

- **Associative Property:**

If a, b and c are any three whole numbers, then

$$(a + b) + c = a + (b + c)$$

$$\text{Ex. } (3 + 5) + 2 = 3 + (5 + 2)$$

$$(a \times b) \times c = a \times (b \times c)$$

$$\text{Ex. } (3 \times 5) \times 2 = 3 \times (5 \times 2)$$

- **Distributive Property:**

If a,b and c are any three whole numbers, then

$$(a + b) \times c = a \times c + b \times c$$

$$\text{Ex. } (3 + 5) \times 2 = 3 \times 2 + 5 \times 2$$

or

$$a \times (b + c) = a \times b + a \times c$$

$$\text{Ex. } 3 \times (5 + 2) = 3 \times 5 + 3 \times 2$$

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

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

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

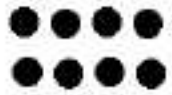
E.g The number 4 & 9 can be shown as squares

4

9

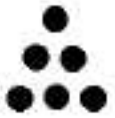
E.g. The number 8 is shown as rectangle.

8



The number 6 can be shown as triangle.

6

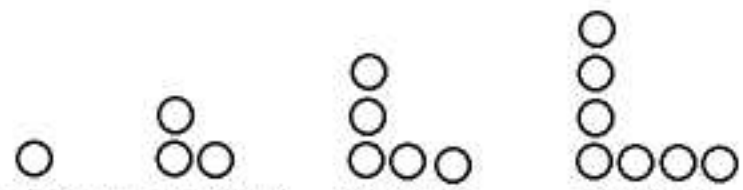


Questions:

1. What should be the number in the START box?

   START → ÷ 8 → × 2 → 438

2. What must be subtracted from 1 million to get 869500?
3. How many whole numbers are there between 20 and 51?
4. Each floor of a building is fitted with 20 doors. There are 12 floors in each building. How many doors will be there in 5 such buildings?
5. Find the product of successor of 99 and the predecessor of 8430.
6. How many circles will be there in pattern 8?



Pattern 1 Pattern 2 Pattern 3 Pattern 4

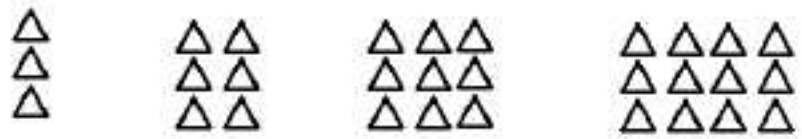
7. Simplify: $169 \times 20 + 169 \times 40 + 169 \times 30$.
8. Find the product of: $824 \times 4 \times 25$.
9. An ant is at number 5 on number line. It moves 3 numbers on right then 4 numbers on the left. At what number is the ant now?
10. Find the value of $1 + 2 - 3 - 4 + 5 - 6 + 7 + 8 - 9$.
11. 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. Sujata pays ₹ 50 for lunch and ₹ 20 for soft drink on each day. How much did she spend in 3 weeks on these things?

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

15. Find the number of triangles in pattern 515.



Pattern 1 Pattern 2 Pattern 3 Pattern 4

16. What will be the value of a, if $3a \div 2a = 2$?

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. What will be the sum of additive identity of 6 and the multiplicative identity of 248?

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 value of:

$$20 \times 5 + 95 \div 5 + 12 \times 2$$

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

28. Find the result if 2 is added to 5 times the smallest 3 digit whole number.

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: $3 + 7(5 + 1) \div 3 - 2$.

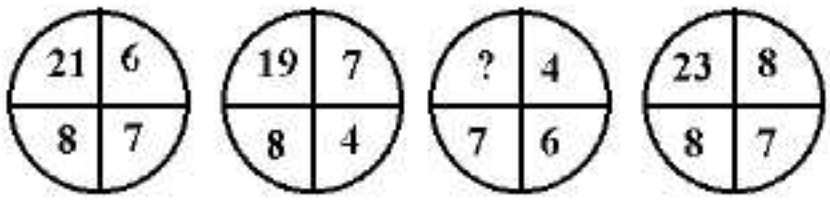
34. Find the product of $(120 \div 6)$ and$(15 + 4)$.

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

36. What will be the predecessor of the greatest 3 digit even number?

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 missing number:



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:

Q. No	ANSWER	Q. No	ANSWER
1.	1752	21.	79200
2.	130500	22.	1
3.	30	23.	9
4.	1200	24.	10100
5.	842900	25.	43700
6.	15	26.	143
7.	15210	27.	20
8.	82400	28.	502
9.	4	29.	₹ 200
10.	1	30.	1482
11.	75	31.	2
12.	75432	32.	1000
13.	₹ 1470	33.	15
14.	750	34.	380
15.	1545	35.	9003
16.	$a = 2$	36.	997
17.	2276500	37.	10
18.	₹ 22000	38.	17
19.	990	39.	₹ 8900
20.	2100	40.	11

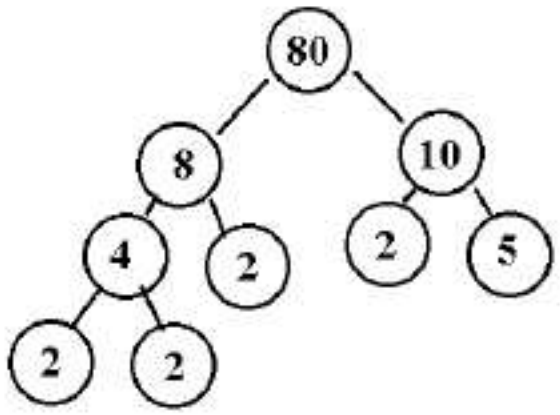
CHAPTER- 3

PLAYING WITH NUMBERS

Points to Remember:

- 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. (3,5),(5,7) and (11,13) 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. 28,252,432.
- Odd numbers: Natural numbers that cannot be divided by 2 exactly e.g. 17,233,419.
- 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 80.**

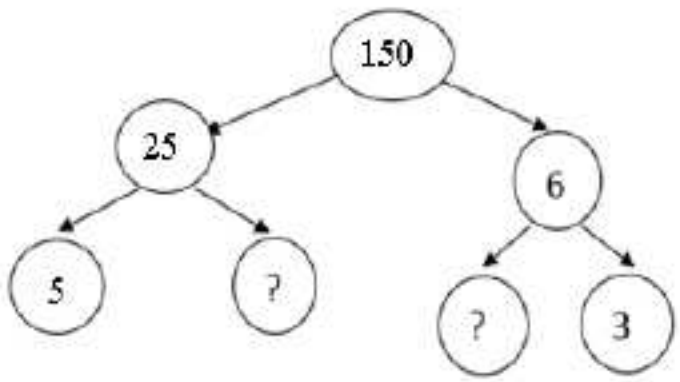


- **H.C.F. (Highest Common Factor): HCF of two or more numbers is the highest common factor that divides all the given numbers exactly.**
- **L.C.M. (Least Common Multiple): LCM of two or more numbers is the smallest/least number that is exactly divisible by the numbers.**
- **Product of two numbers = HCF × LCM**
- **Divisibility rules : A number is divisible by :**

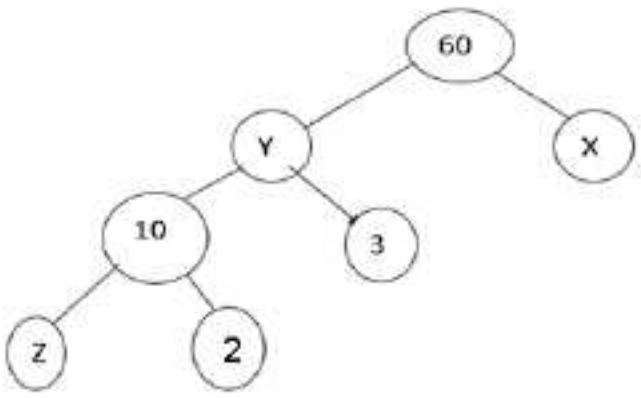
Number	Divisibility rule
2	If last digit is 0, 2, 4, 6 or 8
3	If the sum of digits is divisible by 3
4	If the last two digits are divisible by 4
5	If the last digit is 0 or 5
6	If the number is divisible by 2 and 3
8	If last 3 digits are divisible by 8
9	If the sum of the digits is divisible by 9
10	If the last digit is 0
11	Sum of the digits at even places – sum of the digits at odd places, should be 0 or 11 or multiple of 11.

Questions:

1. Find the smallest composite number.
2. Find the smallest two digit prime number.
3. How many prime numbers are there between 20 to 60 ?
4. Find all pair of twin prime numbers, less than 40.
5. Find the greatest 4 digit numbers divisible by 6.
6. Find the HCF 24 and 30.
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 liters 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 25.
13. Determine all the factors of 28.
14. Find the missing numbers.



15. Find the value of $(x + y + z)$.



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. In a factory, on an average 150 bicycles are manufactured in a day. How many bicycles did it manufacture in the month of January?
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 13.
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 smallest 4 -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 third multiple of 4 and fifth multiple of 8.
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. Find the HCF of smallest prime number and smallest composite number.

38. Find all natural numbers less than 50, which are common multiple of 3 and 4.

39. Find the largest 2 digit number which is a common multiple of 3 and 5.

40. Find the sum of smallest two digit odd number and largest two digit even 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. Find the pair of prime numbers less then Hundred, having same digits.

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 653x47 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:

Q. No	ANSWER	Q. No	ANSWER
1.	4	26.	9
2.	11	27.	0
3.	9	28.	1002
4.	(3,5), (5,7), (11,13), (17,19), (29,31)	29.	97
5.	9996	30.	2
6.	6	31.	2
7.	12, 24, 36, 48, 60	32.	4
8.	1	33.	52
9.	60	34.	192
10.	70	35.	1
11.	6, 12, 18, 24, 30, 36, 42, 48, 54	36.	12
12.	2,3,5,7,11,13,17,19,23	37.	2
13.	1, 2,4,7,14,28	38.	12,24,36,48
14.	5, 2	39.	90
15.	37	40.	109
16.	151	41.	(16, 81)
17.	12240cm	42.	(12, 21)
18.	17	43.	15
19.	4650	44.	(13,31),(17,71), (37,73), (79,97)
20.	75cm	45.	6
21.	13,26,39,52,65	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

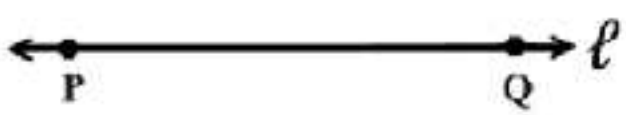
Points to remember:

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

P• •T

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

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

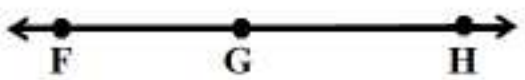


Line ℓ or $\overleftrightarrow{PQ}$ or $\overleftrightarrow{QP}$

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

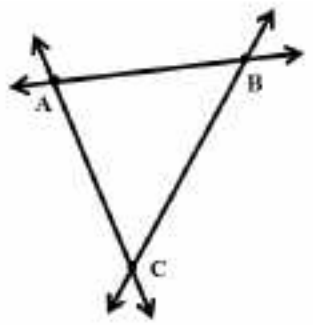
Ray $\overrightarrow{ST}$

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



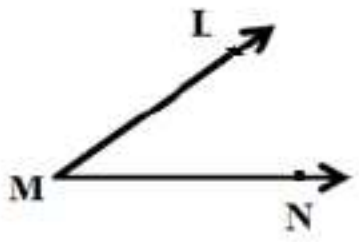
F, G and H are collinear points.

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

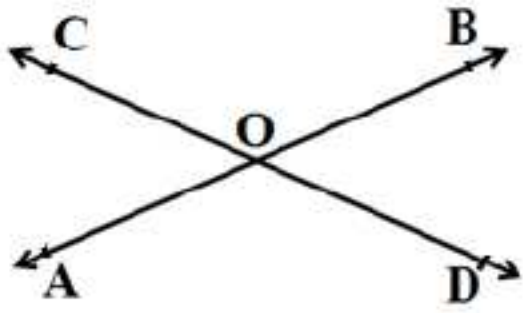


A, B and C are non-collinear points.

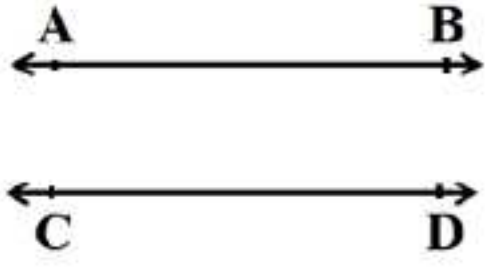
- **Angle: It is formed when two rays have a common starting point, this common point is called the vertex of the angle and the rays are called the arms of the angle. $\overrightarrow{MN}$ & $\overrightarrow{ML}$ are two arms of the angle ∠LMN or ∠NML.**



- **Intersecting Lines: Two distinct lines meeting (or appearing to meet) at a point are called intersecting lines.**

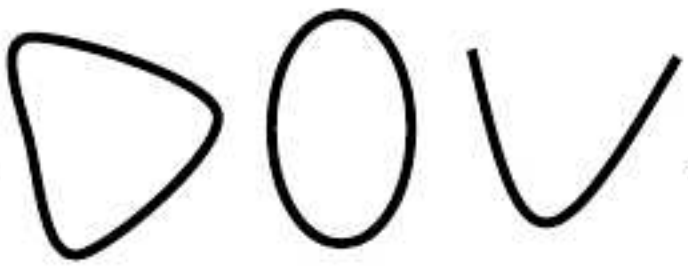


- **Parallel Lines: Two lines in a plane are said to be parallel if they never meet. Here, AB and CD are parallel to each other. It is denoted by $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$.**



- **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.**

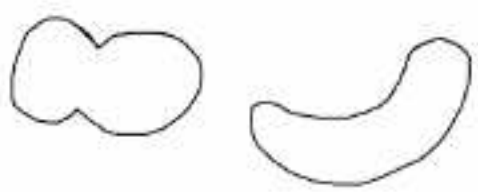
For example:  **are simple curve.**

- **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

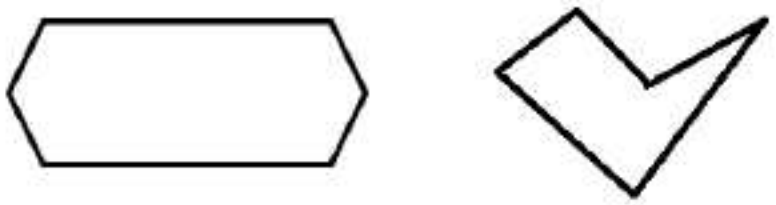
OPEN CURVE

- **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.**



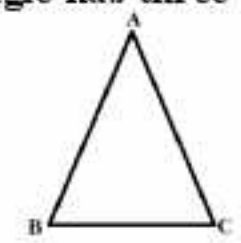
- **Regular Polygon: A polygon whose all sides and all angles are equal.**

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

  Sides – AB, BC and CA

  Angles – ∠ABC, ∠BCA and ∠CAB

  Vertices – A, B and C

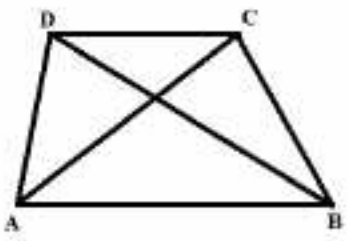


- **Quadrilateral: A quadrilateral is a four-sided polygon. It has four sides AB, BC, CD and DA, four vertices A, B, C and D, four angles ∠ABC, ∠BCD, ∠CDA and ∠DAB, two diagonals AC and BD.**

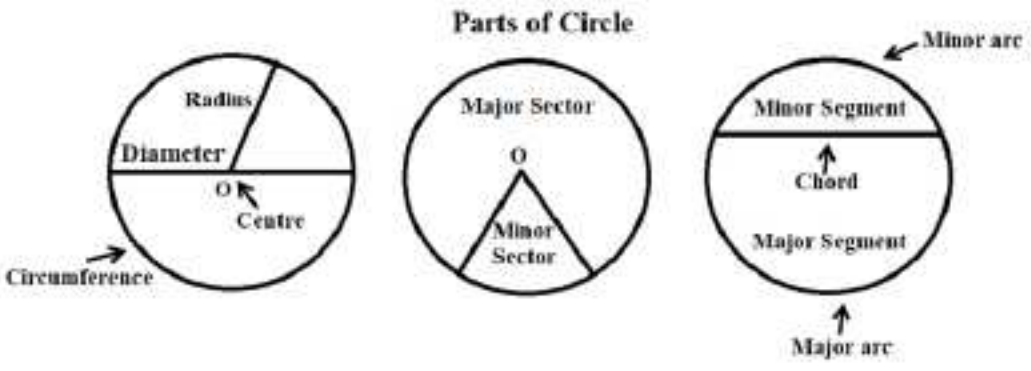
  AB and DC are opposite sides.

  ∠A and ∠C are opposite angles.

  AB and BC are adjacent sides.



- **Circle: A circle is a path taken from a fixed 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.**



(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.

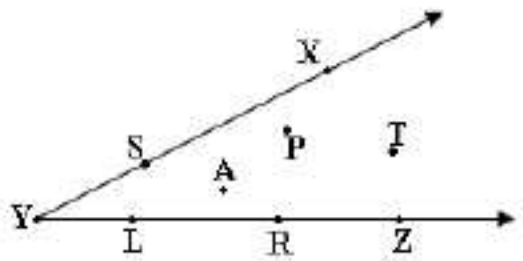
(iii) Diameter: A chord passing through the centre of the circle. It is twice the radius.

(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. Name the interior points in the following figure.

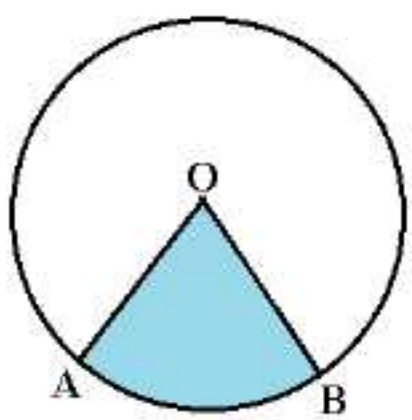


2. How many lines can pass through

   (i) One given point?

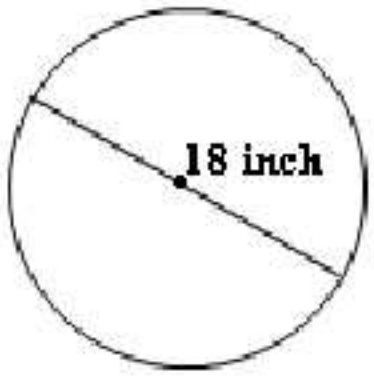
   (ii) Two given points?

3. Name the shaded portion OAB in the given figure.

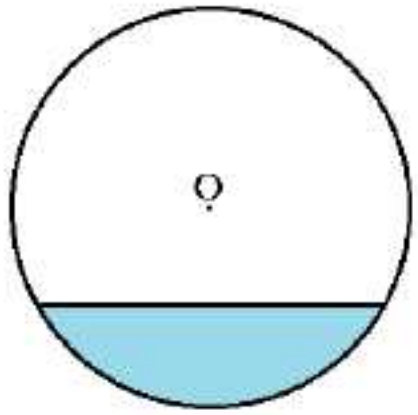


4. Find the number of diagonals in a regular hexagon.

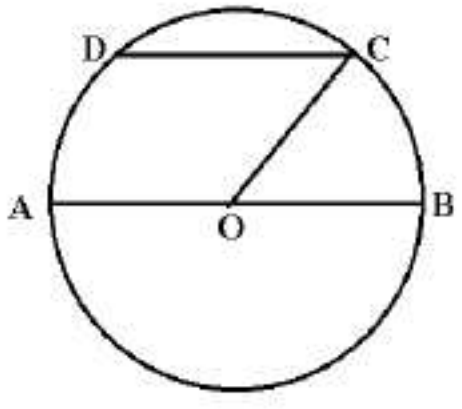
5. In the following figure, 18 inch is the length of_____.



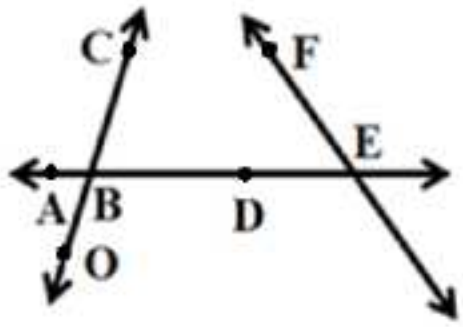
6. Find the maximum number of points of intersection where four lines are drawn in a plane.
7. How many circles can be drawn through two given points?
8. How many circles can be drawn through three non-collinear given points?
9. Name the shaded portion in the given figure.



10. How many line segments are there in the given figure?



11. Name the following in the given figure:



(i) Lines containing point E

(ii) Two pairs of intersecting lines

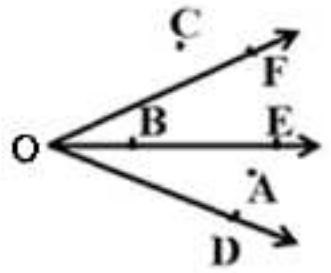
(iii) Rays with B as their starting point

12. Name the following:

(i) The point in the interior of ∠DOE

(ii) The points exterior of ∠EOF

(iii) Rays starting from point O

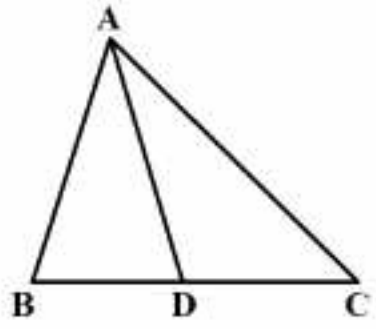


13. (i) How many triangles are there? Name them.

(ii) How many angles are there?

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

(iv) Name the triangles that have ∠B as common.



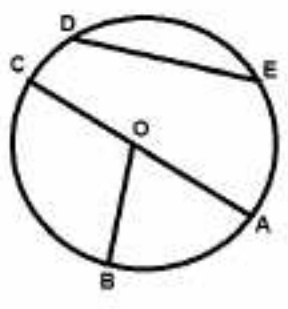
14. From the given figure, find:

(i) The centre of the circle

(ii) Three radii

(iii) The diameter

(iv) Chords

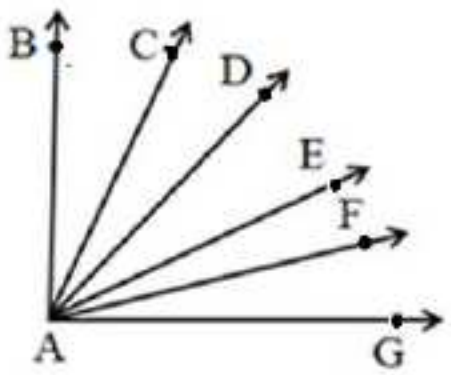


15. How many arcs are made by the chord on a circle?

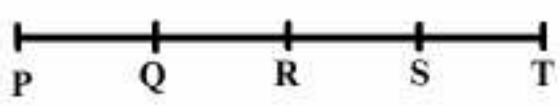
16. Determine the number of diagonals of a pentagon.

17. Determine the number of diagonals of a octagon.

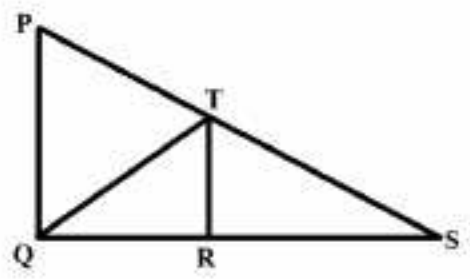
18. How many angles are there in the given figure?



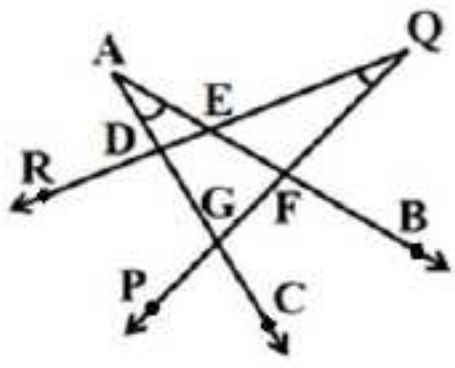
19. Determine the number of line segments in the given figure.



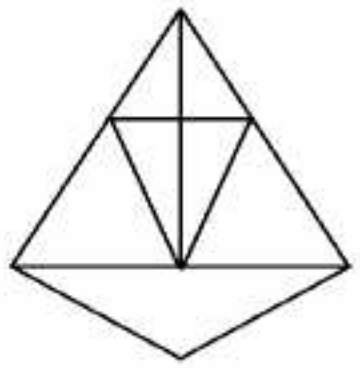
20. Find the number of triangles in the given figure.



21. Name the common points in the two angles marked in the figure.



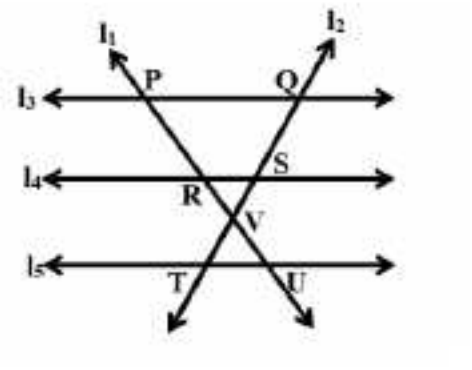
22. Find the number of triangles in the given figure.



23. Diameter of a circle = $2 \times$ ____ .

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

From the figure, find (Q. No. 25 and 26)

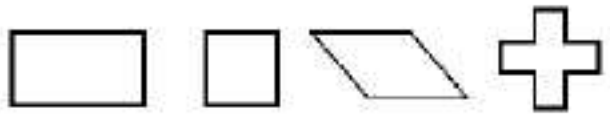


25. pair of parallel lines

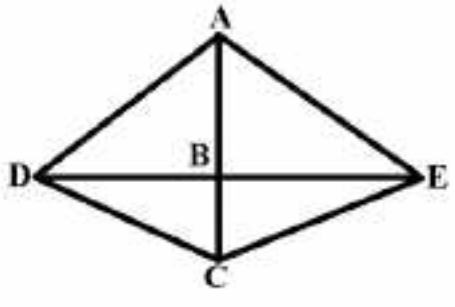
26. pair of intersecting lines

27. If a diameter of a circle is 9.4 cm then, find its radius.

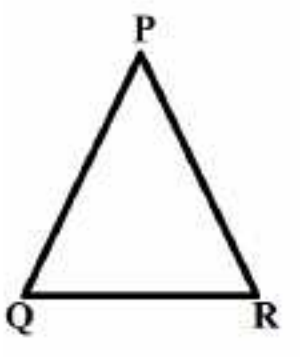
28. In the given figures, which is the following is a regular polygon?



29. Name the lines intersecting each other at B.



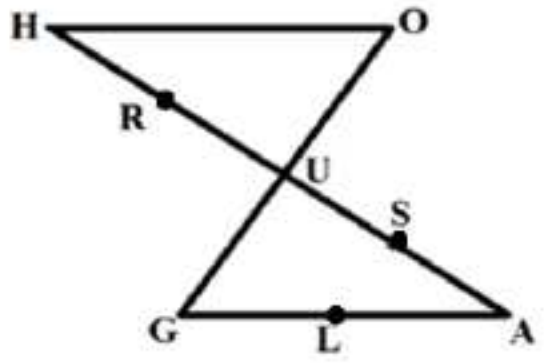
From the given figure, find (Q. No. 30 and 31)



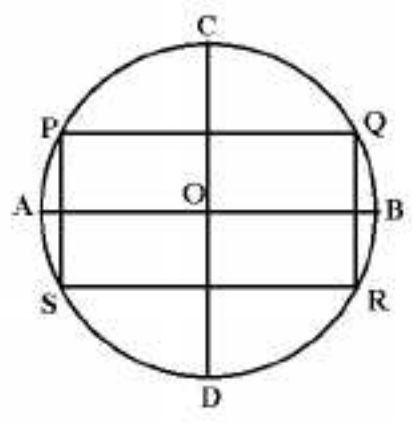
30. **The vertex opposite to side PQ.**

31. **Two angles having a common arm PQ.**

32. **Identify the collinear points.**



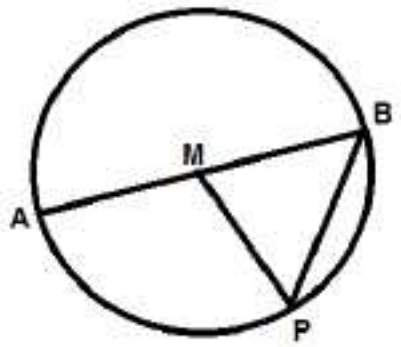
From the given figure, find (Q. No. 33 and 34)



33. **Name the diameters of the circle.**

34. **Name the chords of the circle.**

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. **A polygon has a prime number of sides. Its number of sides is equal to the sum of two least consecutive prime numbers. Find number of diagonals of the polygon.**

39. **Find the circumference of the circle of radius 7 cm.**

40. **If the perimeter and the area of a circle are numerically equal then, find the radius of the circle.**

Answers:

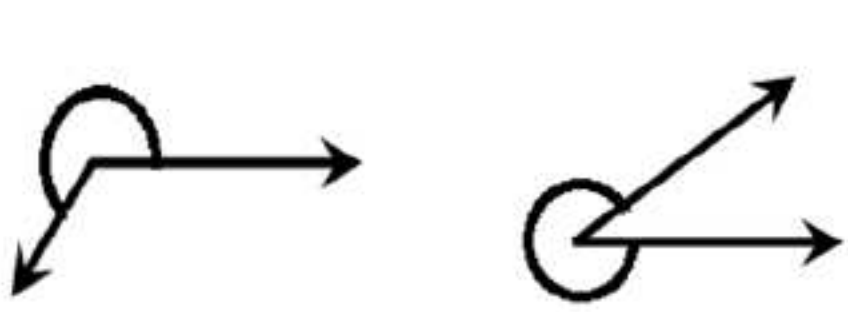
Q. No.	ANSWER	Q. No.	ANSWER
1	A, P,T	21	D, E, F, G
2	(i) Infinite (ii) one	22	14
3	Minor Sector	23	Radius
4	9 [Hint : number of diagonals $= \frac{n\,(n-3)}{2}$] Where, n = no. of sides	24	4.6 cm
5	Diameter	25	l_3 and l_4, l_4 and l_5, l_5 and l_3
6	6	26	l_1 and l_2, l_1 and l_3, l_1 and l_4, l_1 and l_5, l_2 and l_3, l_2 and l_4 and l_2 and l_5
7	Infinite	27	4.7 cm
8	1	28	(b)
9	Minor segment	29	DE and AC
10	5	30	R
11	(i) AE, EF (ii) CO and AE, EF and AE (iii) BA, BD, BC, BE, BO	31	∠PQR, ∠QPR
12	(i) A (ii) A, C, D (iii) OD, OE, OF	32	H, R, U, S, A ; O, U, G and G, L, A
13	(i) 3 [△ABC, △ABD, △ADC] (ii) 8 (iii) 6 [AB, BD, AD, DC, AC, BC] (iv) △ABC, △ABD	33	AB,CD
14	(i) O (ii) OA, OB, OC (iii) CA (iv) DE, CA	34	AB,CD,PQ,QR,RS,SP
15	2	35	AB
16	5	36	M
17	20	37	MA, MB, MP
18	15	38	5
19	10 [PQ, QR, RS, ST, PR, QS, RT, PS, QT, PT]	39	44 cm
20	5	40	2 unit

CHAPTER- 5

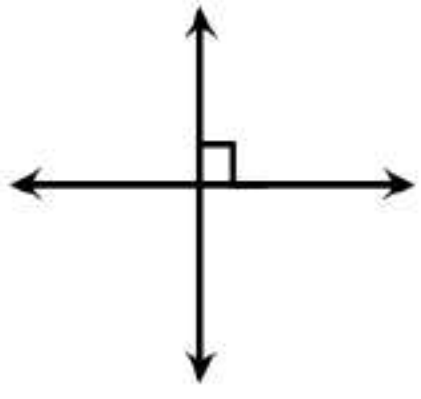
UNDERSTANDING ELEMENTARY SHAPES

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.



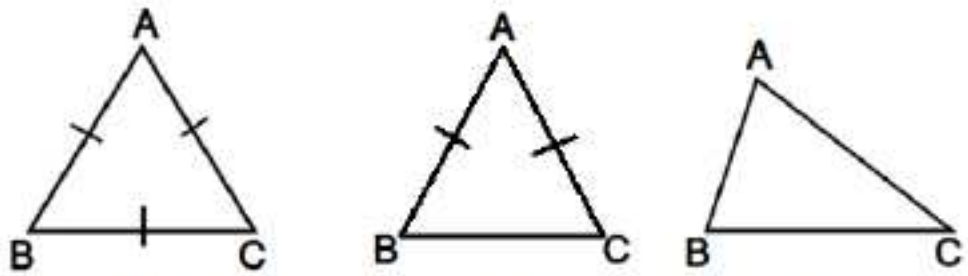
- **Types of triangles:**

  (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.



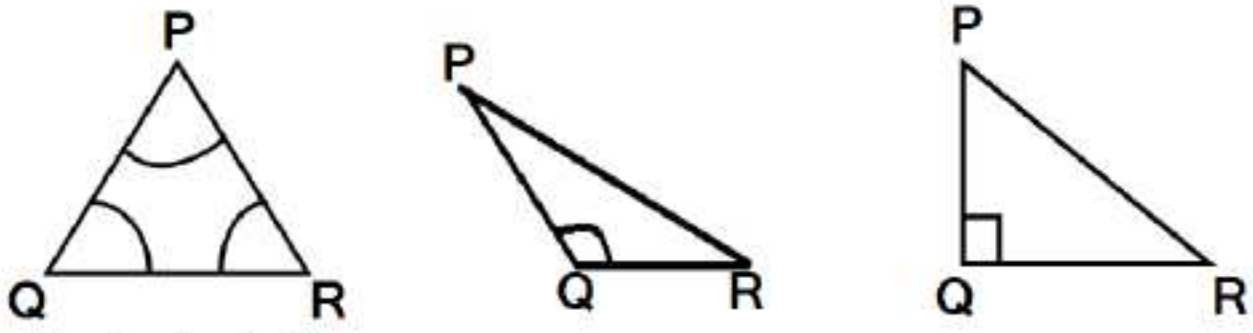
Equilateral Triangle **Isosceles Triangle** **Scalene Triangle**

(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).

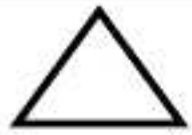
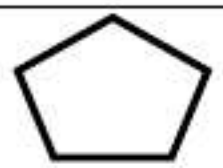
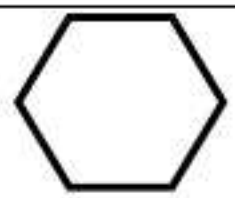
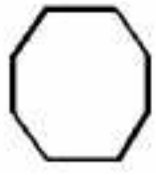
(iii) Right angled triangle:- One angle is right angle (90^0).



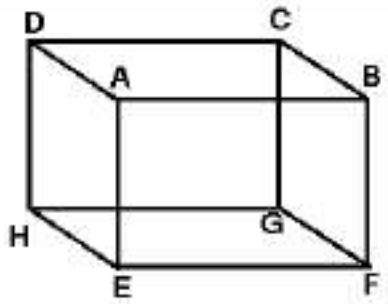
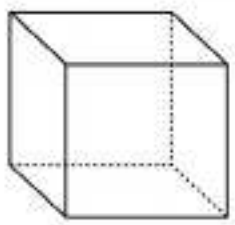
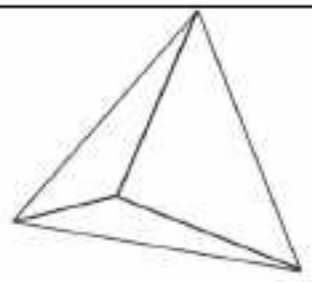
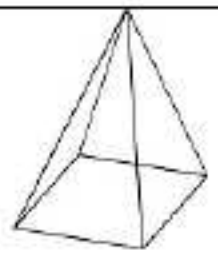
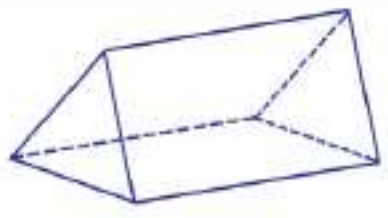
Acute Angled Triangle Obtuse Angled Triangle Right Angled Triangle

Note:- A triangle can't have two obtuse or two right angles.

- **Polygon: Two Dimensional figures**

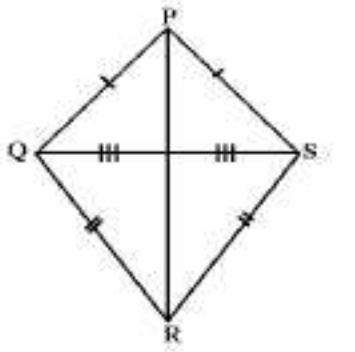
Number of Sides	Shape	Figure
3	Triangle	
4	Quadrilateral	
5	Pentagon	
6	Hexagon	
7	Heptagon	
8	Octagon	

- **Three dimensional figures**

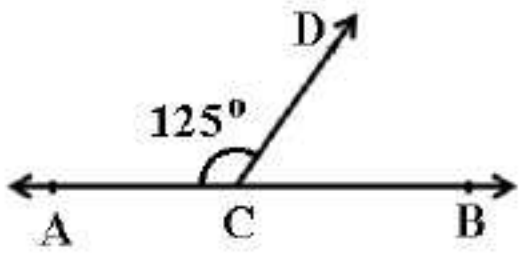
Shape	Figure	Faces	Edges	Vertices/ Corners
Cuboid		6	12	8
Cube		6	12	8
Triangular Pyramid		4	6	4
Square Pyramid		5	8	5
Triangular Prism		5	9	6

Questions:

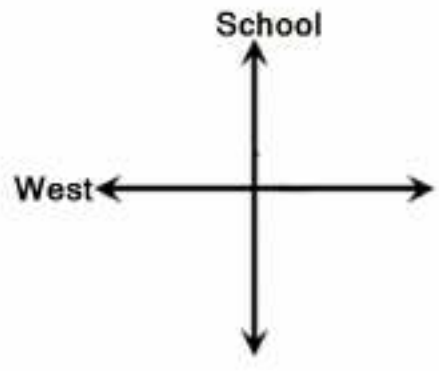
1. Name the type of angle formed between two adjacent side of square.
2. Find the measure of sum of four right angles.
3. Find the measure of angle formed by two adjacent numbers in the clock.
4. What type of quadrilateral is PQRS ?



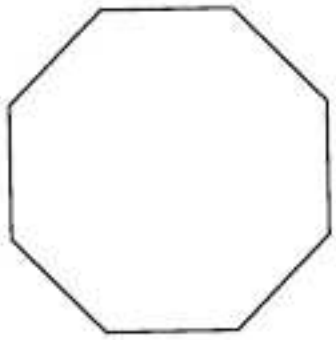
5. Find the value of ∠BCD.



6. Find the reflex angle of 80°.
7. Rohan was facing the school at the beginning. He turned clockwise to face South-East. What angle did he turn through?

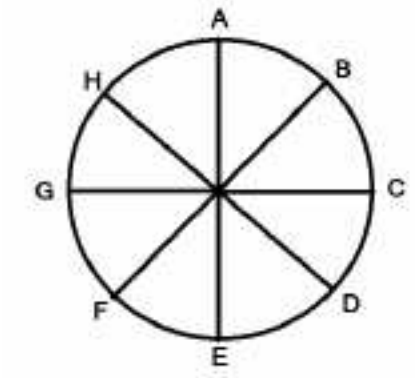


8. **Name the shape as shown in the figure.**

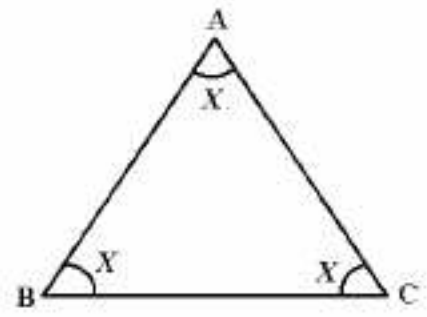


9. **Find the measure of the angle between the hour hand and minute hand of a clock at 5 o' clock.**

10. **Find the angle between a pair of two consecutive spokes in the given figure.**



11. **Find the value of x.**



12. **Find the measure of the angle between the hour hand and minute hand of a clock at 2 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.**

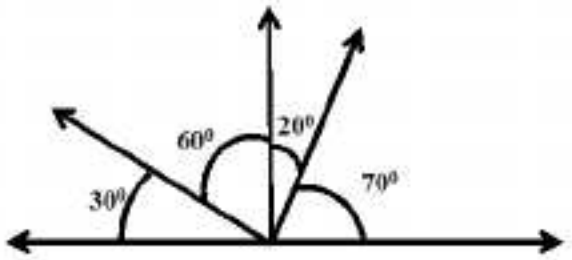
16. **Name the shape of a soft drink Can.**

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

18. **Find the number of vertices in square pyramid.**

19. **What is the twice of difference of number of faces of square pyramid and triangular prism.**

20. Find the number of acute angles in the given figure.



21. Find the edges of triangular prism.

22. Name the triangle, if MN = 7 cm, MO = 24 cm, ON = 25 cm and $\angle M = 90^0$ 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. A 12 m long wire is converted into equilateral triangle. Find its each side.

26. Name the type of the triangle ΔTRY, if $m\angle T = 50^0$, $m\angle R = 60^0$ and $m\angle Y = 70^0$.

27. How many 45^0 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?

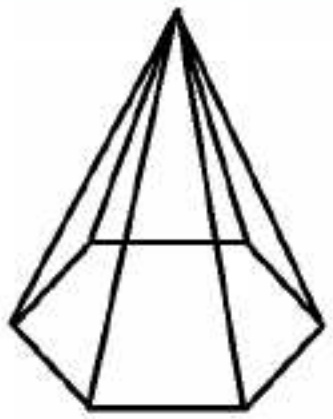
34. Find the number of right angles turned through by the hour hand of a clock when it goes from 12 to 9.

35. How many sides does a heptagon have?

36. If you are facing north and turn though $\frac{3}{4}$ in anti-clockwise direction. Which direction will you face?

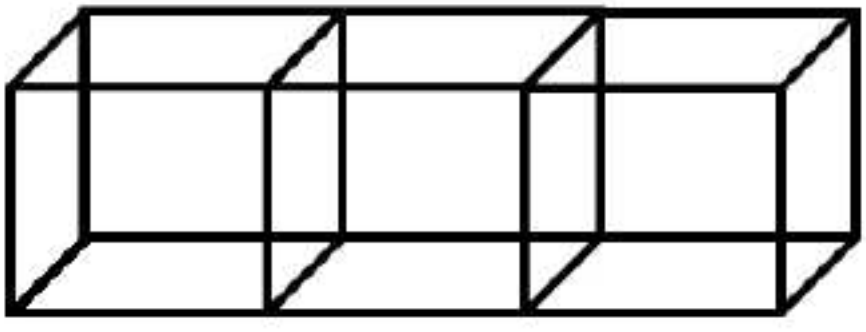
37. How many degrees are there in one third of right angle?

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. Which direction will you face if you start facing east and make $1\frac{1}{2}$ of a revolution clock-wise?
46. Find the angle measure between the hands of the clock in the figure.

47. In an isosceles triangle XYZ, $\angle X = \angle Z, \angle Y = 54°$. Find $\angle X$ and $\angle Z$
48. Name the type of triangle PQR, if PQ = QR = 5.6 cm and PR = 6.5 cm.
49. Mahesh has 15 similar coins of Ten rupees. 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:

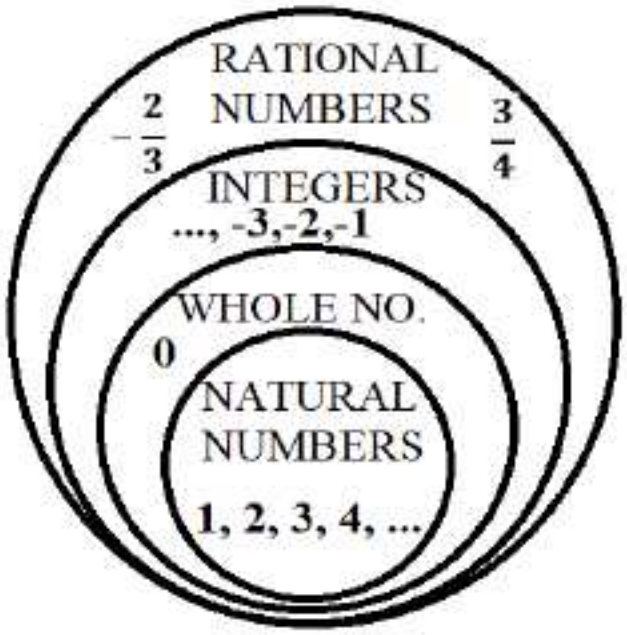
Q. No	ANSWER	Q. No	ANSWER
1.	Right Angle	26.	Acute angled triangle
2.	360°	27.	8
3.	30^0	28.	North
4.	Kite	29.	Triangular prism
5.	55^0	30.	Triangular pyramid
6.	280^0	31.	180^0
7.	135^0	32.	7
8.	Octagon	33.	270^0
9.	150^0	34.	3
10.	45^0	35.	7
11.	60^0	36.	East
12.	60^0	37.	30^0
13.	Cone	38.	7
14.	Sphere	39.	12
15.	Cuboid	40.	7
16.	Cylinder	41.	7
17.	Cube	42.	3
18.	5	43.	2
19.	0	44.	One
20.	5	45.	West
21.	9	46.	180^0
22.	Scalene and right-angled triangle	47.	63^0
23.	Straight angle (180^0)	48.	Isosceles triangle
24.	Equilateral triangle	49.	Cylinder
25.	4 m	50.	14

CHAPTER- 6

INTEGERS

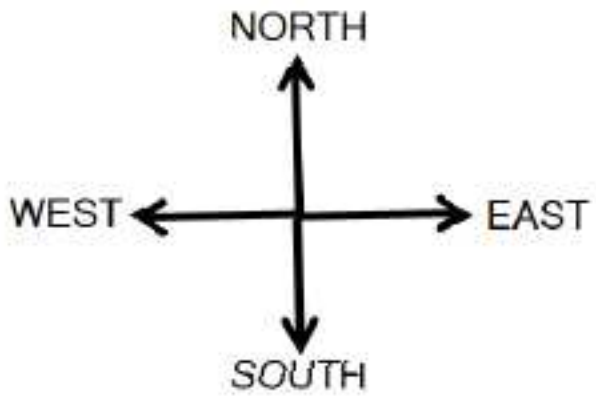
Points to remember:

- 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 7 is (– 7) .
- Additive inverse of a negative integer is a positive integer. e.g. additive inverse of (– 3) is 3.
- When two positive integers are added, sum is also a positive integer.
  e.g. (+ 8) + (+ 5) = (+ 13)
- When two negative integers are added, sum is also a negative integer.
  e.g. (– 15) + (– 7) = (– 22)
- 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) 9 + (– 3) = 6 (b) (– 8) + (+3) = – 5
- 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.



- **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**



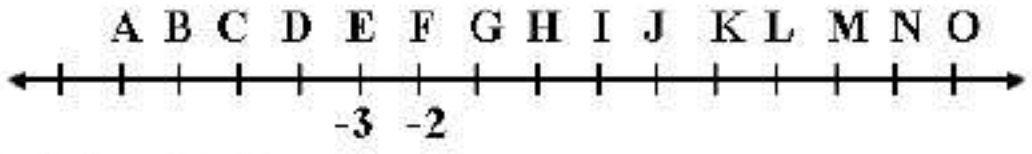
Questions:

1. Find the greatest negative integer.
2. Find the smallest integer which is smaller than all the positive integers.
3. Find the integer which is neither positive nor negative.
4. Find the opposite of the following and represent with signs:
   (i) Profit of ₹ 20
   (ii) Second floor below the ground level.
   (iii) Going 4 km towards east.
5. Find additive inverse of 6.

Find the integers for the following: (Q. No. 6 to Q. No. 8)

6. Subtract (– 123) from (– 456).
7. 9 less than (– 5).
8. 5 more than (– 2).
9. What is the succeeding number of the number zero?
10. What is the preceding number of the number zero?
11. What is the succeeding number of the number (– 1)?
12. What is the preceding number of the number (-4) ?
13. Fill in the box :
    (i). (-1) + ☐ =0
    (ii). ☐ -4 = -2

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



14. Find the integer for C

15. Find the integer for J
16. Find the integer for M
17. Find the integer for C + J
18. Find the integer for B + M
19. Find the integer for C -H
20. Find the integer of successor for C
21. Find the preceding integer of K
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 2-(-1) -2-(-3).
27. Find the value of 5 - {12-(10-8)}
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. Shekhar scores 25 runs less 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:

Q. No	ANSWER	Q. No	ANSWER
1.	(−1)	26.	(+ 4)
2.	(+1)	27.	(– 5)
3.	0	28.	West, left side
4.	(i) Loss of ₹ 20 (−20) (ii) Second floor above the ground (+2) (iii) Going 4 km towards west (−4)	29.	East, right side
5.	−6	30.	115
6.	(– 333)	31.	(– 75)
7.	(– 14)	32.	5
8.	3	33.	(– 26)
9.	(+1)	34.	4
10.	(– 1)	35.	– 2300
11.	0	36.	– 500
12.	(– 5)	37.	+ 2
13.	(i). (+1) (ii). (+2)	38.	+ 600
14.	(−5)	39.	+ 6°C
15.	(+2)	40.	+ 3500 m
16.	(+5)	41.	(−25)
17.	(−3)	42.	(– 69)
18.	(−1)	43.	(– 20)
19.	(−5)	44.	(– 1)
20.	(−4)	45.	5
21.	(+2)	46.	15 litres
22.	(– 3) < (– 1) < 0 < 3 < 5	47.	29 seconds
23.	23 > 15 > 2 > (– 5) > (–25)	48.	58 marks
24.	(– 6) < (– 4) < 0 < 5 < 6 < 8	49.	16 marks
25.	17 > 15 > 13 > 10 > (– 15) > (– 21)	50.	– 20°C

CHAPTER- 7

FRACTIONS

Points to remember:

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

  For example: $\frac{7 \rightarrow \text{numerator}}{9 \rightarrow \text{denominator}}$

- Different type of fractions are as follows:

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

For example: $\frac{3}{4}, \frac{2}{7}, \frac{4}{9}$

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

For example: $\frac{5}{3}, \frac{6}{5}, \frac{7}{4}$

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

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

We can express a mixed fraction as an improper fraction for example $6\frac{2}{3} = \frac{20}{3}$

(iv) Like fractions: fractions with same denominator.

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

(v) Unlike fractions: fractions with different denominator.

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

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

For example: $\frac{4}{5} = \frac{8}{10} = \frac{12}{15} = \frac{20}{25}$

- **To find an equivalent fraction of a given fraction, we multiply or divide 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: $\frac{5}{9} < \frac{7}{9}$, $\frac{1}{11} < \frac{3}{11}$

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

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

(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: $\frac{3}{4} + \frac{1}{4} = \frac{3+1}{4} = \frac{4}{4} = 1$

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

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

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

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

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

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

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

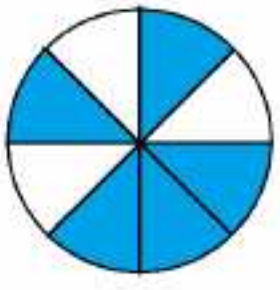
$$= \frac{5 \times 8 + 1}{8} + \frac{6 \times 8 + 3}{8}$$

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

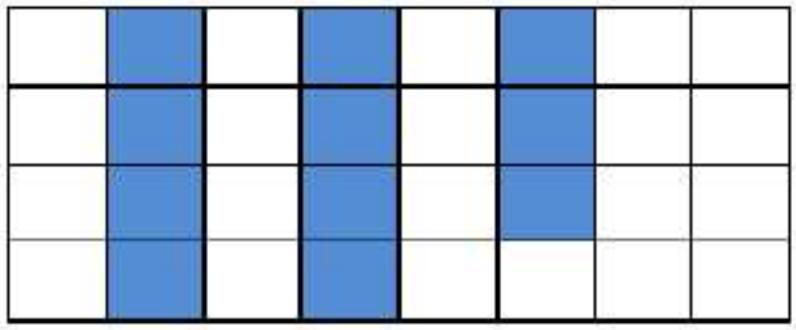
$$= \frac{41+51}{8} = \frac{92}{8} = 11\frac{4}{8} = 11\frac{1}{2}$$

Questions:

1. **Find the fraction representing the shaded portion.**



2. Find the fraction representing the shaded portion.



3. From the given number line, find the fraction that point 'P' denotes.

4. Reduce $\frac{72}{80}$ to the simplest form.

5. Express $\frac{60}{7}$ in mixed form.

6. Express $7\frac{2}{3}$ as improper fraction.

7. Find the fraction of 24 second to 1 minute.

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

8. Two eggs of two dozen eggs.

9. 20 cm to 1m.

10. 20 m to 1Km.

11. 50 paise to ₹ 1.

12. 4 month to 1 year.

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

13. $\frac{1}{3}$ and $\frac{2}{4}$

14. $\frac{3}{5}$ and $\frac{3}{4}$

15. $2\frac{3}{4}$ and $3\frac{1}{4}$

16. $\frac{70}{5}$ and $\frac{30}{4}$

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. $\frac{7}{24} - \frac{3}{48}$

22. $\frac{3}{10} - \frac{2}{15}$

23. $\frac{7}{15} - \frac{4}{15}$

24. $\frac{7}{18} - \frac{2}{24}$

25. $4\frac{2}{3} - 2\frac{1}{3}$

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:

Q. No.	ANSWER	Q. No.	ANSWER	Q. No.	ANSWER
1	$\frac{5}{8}$	18	$\frac{1}{4}$	35	1
2	$\frac{11}{32}$	19	1	36	$\frac{14}{27}$
3	$(-\frac{3}{4})$	20	18	37	5
4	$\frac{9}{10}$	21	$\frac{11}{48}$	38	$-\frac{8}{17}$
5	$8\frac{4}{7}$	22	$\frac{1}{6}$	39	$2\frac{1}{2}$ hours
6	$\frac{23}{3}$	23	$\frac{1}{5}$	40	10 kg
7	$\frac{2}{5}$	24	$\frac{11}{36}$	41	$\frac{1}{2}$ hour , Seema studied for longer time
8	$\frac{1}{12}$	25	$2\frac{1}{3}$		
9	$\frac{1}{5}$	26	14	42	$\frac{2}{5}$
10	$\frac{1}{50}$	27	$\frac{21}{35}$	43	$1\frac{3}{20}$ metres
11	$\frac{1}{2}$	28	$\frac{180}{240}$	44	$\frac{1}{4}$ metre
12	$\frac{1}{3}$	29	$4\frac{1}{4}$ hours	45	$\frac{2}{5}$
13	$\frac{5}{6}$	30	43 cm	46	$1\frac{13}{20}$ minutes
14	$\frac{27}{20}$ or $1\frac{7}{20}$	31	$\frac{4}{9}$	47	$1\frac{3}{5}$ hours
15	6	32	16	48	$\frac{3}{10}$ km
16	$21\frac{1}{2}$	33	3	49	$\frac{1}{12}$
17	$-\frac{2}{9} < \frac{1}{9} < \frac{2}{9} < \frac{3}{9} < \frac{5}{9} < \frac{7}{9}$	34	$\frac{1}{3}$	50	(i) $\frac{8}{19}$ (ii) $\frac{11}{19}$

CHAPTER- 8

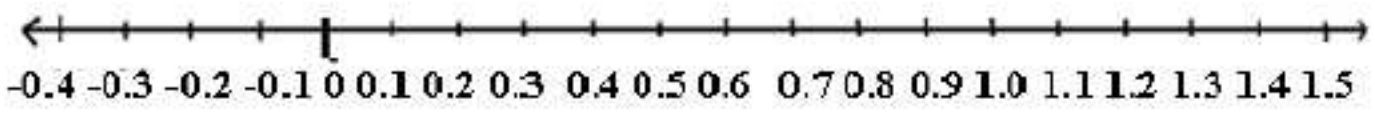
DECIMALS

Points to remember:

- **Decimal fractions**: Fractions with denominator 10, 100, 1000..... are called decimal fractions.
- **Place value chart**:

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

- **Representing decimals on number line:**



- **Expansion and contraction of decimal numbers:**

(i) $138.407 = 100 + 30 + 8 + \frac{4}{10} + \frac{0}{100} + \frac{7}{1000}$

(ii) $900 + 7 + \frac{2}{100} + \frac{5}{1000} = 907.025$

- **Writing decimals as fractions and vice versa:**

  (i) $5.73 = \frac{573}{100}$

  (ii) $0.237 = \frac{237}{1000}$

  (iii) $\frac{67}{1000} = 0.067$

- **Conversions:**

  (i) Rupees to paise : multiply by 100

  For example: ₹ $5 = 5 \times 100 = 500$ 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

- **Like and Unlike decimals:**

  (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:

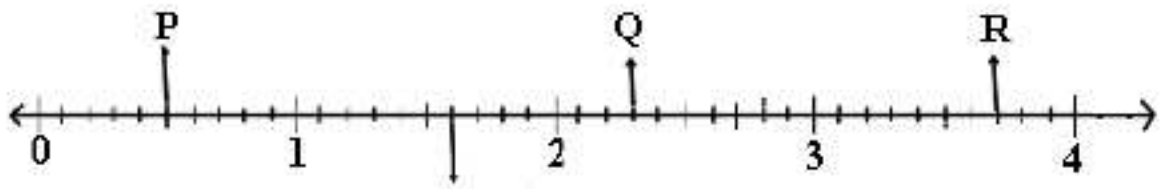
1. Find the nine tenth in decimal form.
2. Find the digit at tenth place in :
   (i) 36.42
   (ii) 8.543
3. Find the digit of unit place.
   (i). 543.2 (ii) 30.24

Fill in the box (Q.4 to Q.7).

4. $\frac{426}{\square} = 4.26$
5. $72.4 \times 100 = \square$
6. $\frac{\square}{1000} = 7.020$
7. $\frac{1444}{\square} = 14.44$

Convert into decimal form (Q. 8 to Q. 12)

8. 76 m = ...km
9. 25 gm = ...kg
10. 250 ml =.....l
11. 65 paisa = ₹.....
12. 25 mm =.....cm.
13. Find the decimal number for the points P,Q, R as shown in the number line.



14. Express $6\frac{1}{5}$ in decimal form.
15. What is decimal form of thirty nine and sixth hundredth?

16. What will be the next number in the series?

0.0132, 0.132, 1.32 …

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 value (in decimal form).

(i) $90 + 2 + \frac{1}{10}$

(ii) $99 + \frac{9}{10} + \frac{9}{1000}$

(iii) $800 + 4 + \frac{2}{10}$

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 $0.89 + (0.89 \times 100) - 10$

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

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

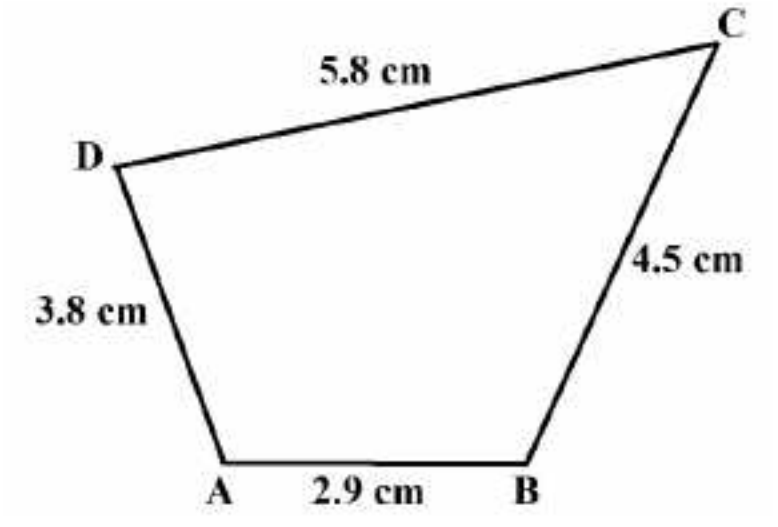
39. Express 8888 m as km using decimal.

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:

Q. No.	ANSWER	Q. No.	ANSWER
1	0.9	26	0.89 < 1.25 < 2.37 < 13.5 < 15.2
2	(i) 4 (ii) 5	27	0.013 < 0.325 < 0.89 < 1.256 < 2.1
3	(i) 3 (ii) 0	28	1.007 < 1.089 < 1.675 < 3.9 < 9.36
4	100	29	0.174
5	7240	30	2.662
6	7020	31	126
7	100	32	33.03 > 3.34 > 3.33 > 3.3 > 3.03
8	0.076	33	45.6 > 5.5 > 5.46 > 4.56 > 0.45
9	0.025	34	44.4 > 4.444 > 4.440 > 4.04 > 0.04
10	0.250	35	(i) 6.90 m (ii) 4.21 kg (iii) 8 cm
11	0.65	36	79.89
12	2.5	37	2.3
13	P=0.5 , Q=2.3 ,R=3.7	38	₹ 50.95
14	6.2	39	8.888 km
15	39.06	40	0.015 litre
16	13.2	41	160.80 kg
17	4	42	20.76 metres
18	78.89	43	17 cm
19	(i) 92.1 (ii) 99.909 (iii) 804.2	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:

- Data: Collection of information in the form of numerical figures is called data.
- The original form of data is called raw data e.g. height(in cm) of 6 students are 110,112,120,115,130,125. This collection of data is raw data.
- Frequency is the number of times an event is repeated.
- Organisation of Data: It helps in bringing about meaningful conclusion from the data.
- Tally is a symbol like a vertical bar as shown 𝍸 where each vertical bar represents 1 entry and 𝍸 represents 5 entries.
- Pictograph: A pictograph is a way of representing data using pictures, things or symbols to match the frequencies of different information or events.
- Bar Graph: 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.
- Height of Bar = number of units represented as per scale.

Questions:

1. If the scale of one unit length is equal to ₹ 10 crore, how much money will be represented by 11 units?
2. If the scale of 1 unit length is equal to 15 km, then what will be the height of bar in bar graph for 135 km?

3. How many students are represented by given tally marks?

4. If the scale of 1 unit is equal to 5 books and cost of each book is ₹ 20, then how much money is needed to buy 5 units.

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. A dice is rolled 20 times. The following tally marks table shows which number came up how many times.

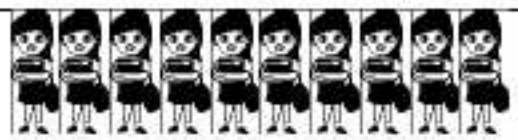
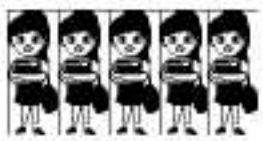
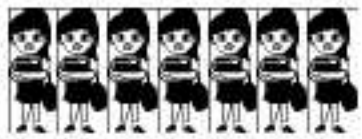
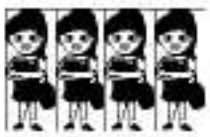
Number on dice	No. of times appeared
1	
2	
3	
4	
5	
6	

Answer the following questions according to the table:

(i) **Which two numbers appeared same number times?**

(ii) **Which number appeared least time?**

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	𝍸 III
2.	Banana shake only	𝍸 𝍸 IIII
3.	Mango shake and Banana shake both	𝍸 𝍸 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?

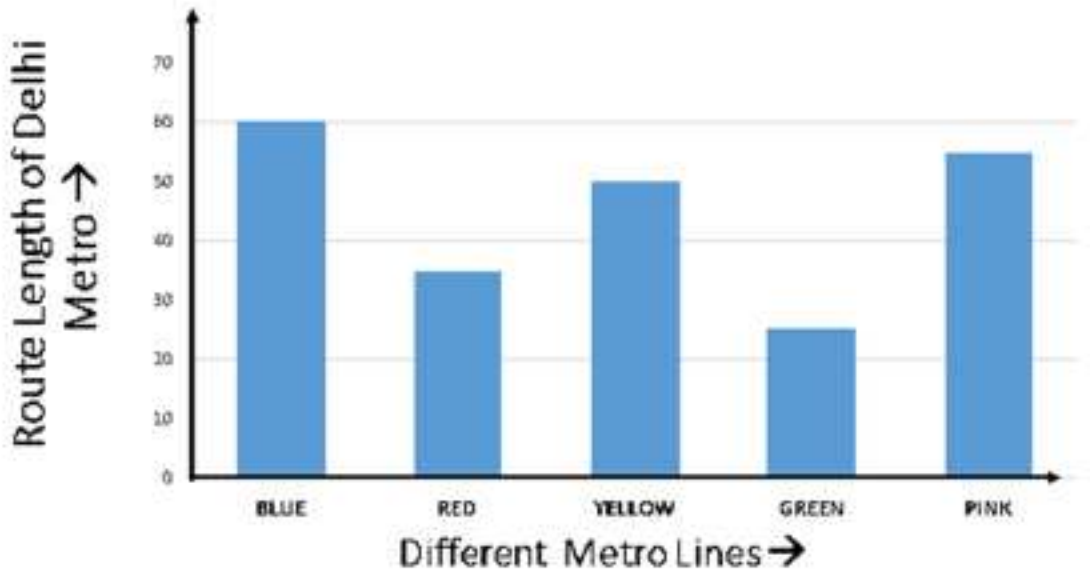
12. In class VI, height (in cm) of 10 students are as follows:

141, 135, 145, 137, 143, 132, 142, 128, 140, 130

(i) How many students have height less than 140 cm ?

(ii) How many students have height more than 130 cm and less than 141 cm ?

13. In the following bar graph answer the following questions:



(i) What is the length of Blue line?

(ii) What is combined route length of Yellow line and Pink line ?

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

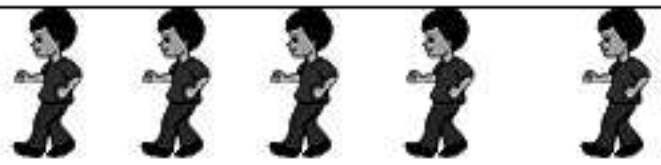
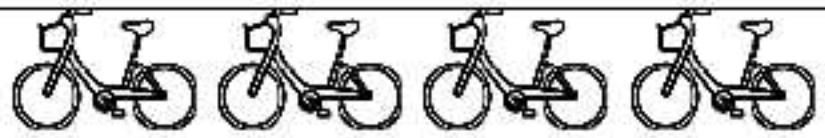
Answer the following questions:

(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 Lakh 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 represents the number of schools in different years in a city.**

According to the bar graph answer the following questions:

(i) **In which year, number of schools were minimum?**

(ii) **How many more schools were there in 1998 than in 1976?**

(iii) **In which year, city had 125 schools?**

Answers:

Q. No.	ANSWER	Q. No.	ANSWER
1	₹ 110 crore	11	(i) 10 (ii) ₹ 120
2	9 units	12	(i) 5 (ii) 4
3	18 students	13	(i) 60 Km (ii) 105 Km
4	₹ 500	14	(i) 7(ii) 3
5	(i)24 (ii) Sanskrit (iii) 70	15	(i) 25(ii) Saturday(iii) 35
6	(i) 3 and 4 (ii) 5	16	(i) 30(ii) 50(iii) 40 (iv) Walking
7	(i) Hindi (ii) 350 (iii)700	17	(i) 80 (ii) 110
8	(i) 154 (ii) Neem Tree (iii)42	18	6
9	(i) 84 (ii) Cricket (iii) 149	19	₹ 65 Lakh
10	(i) 14 (ii) Mango Shake (iii)12	20	(i) 1969 (ii) 100 (iii) 1976

CHAPTER- 10

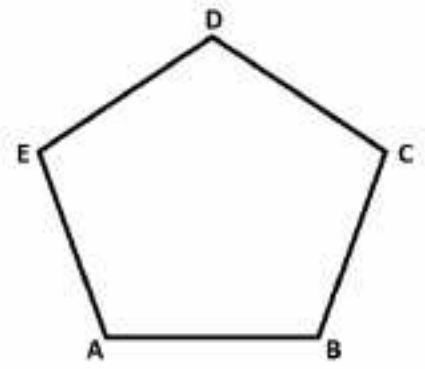
MENSURATION

Points to remember:

- **Perimeter**

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

  (ii) Perimeter of ABCDE = AB + BC + CD + DE + EA

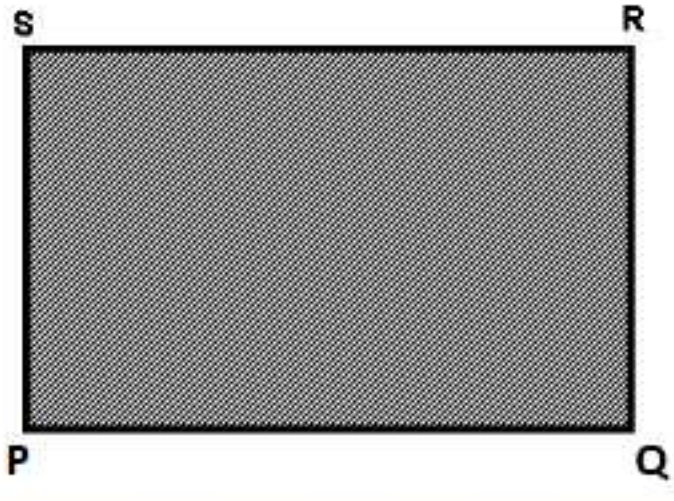


  (iii) Unit of Perimeter can be mm (millimetre), cm (centimetre), m (metre), km (kilometre) etc.

- **Area**

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

  (ii) Area of PQRS = Shaded portion



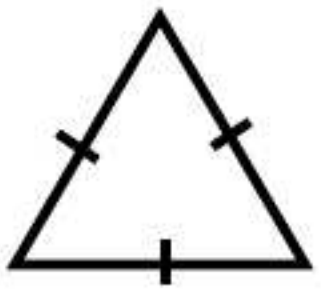
(iii) Unit of area can be mm^2 (square millimetre), cm^2 (square centimetre), m^2 (square metre), km^2 (square Kilometre) etc.

- **Regular Polygons**

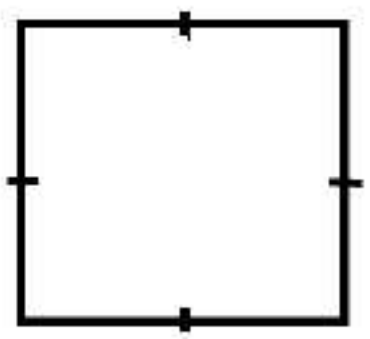
(i) Figures, in which all sides and all angles are equal, are called regular polygons.

(ii) Perimeter of regular closed figure = n × length of side
where 'n' is number of sides of the regular closed figure

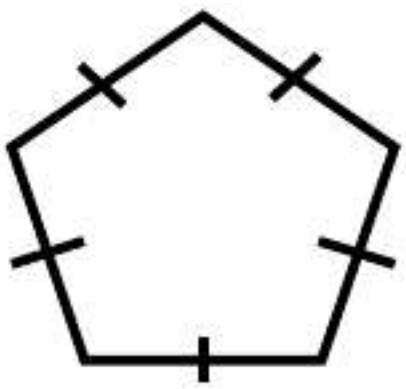
(iii) Perimeter of Equilateral triangle = 3 × length of side



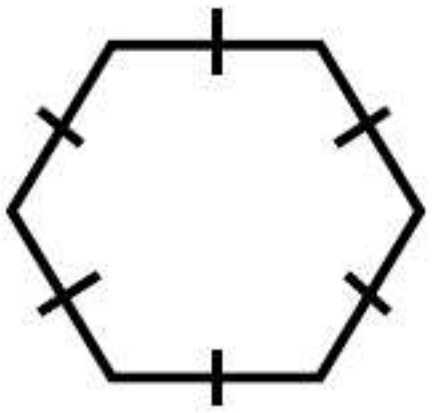
(iv) Perimeter of square = 4 × length of side



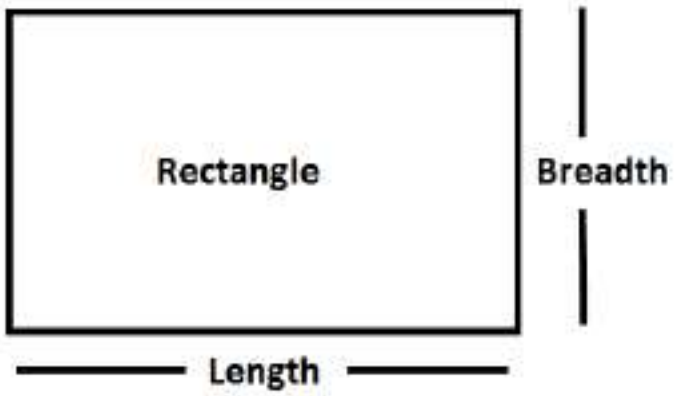
(v) Perimeter of regular pentagon = 5 × length of side



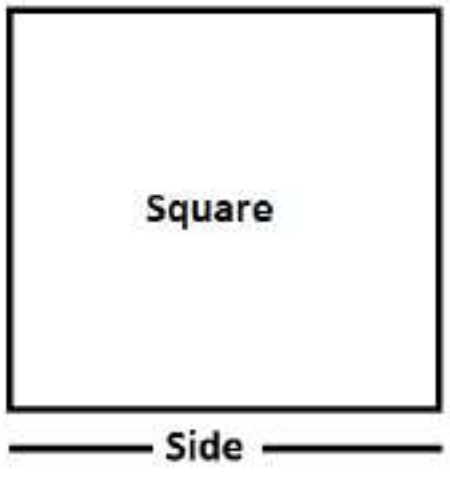
(vi) Perimeter of regular hexagon = 6 × length of side



- Perimeter of Rectangle = 2 × (Length + Breadth)
- Area of Rectangle = Length × Breadth



- Area of Square = Side × Side

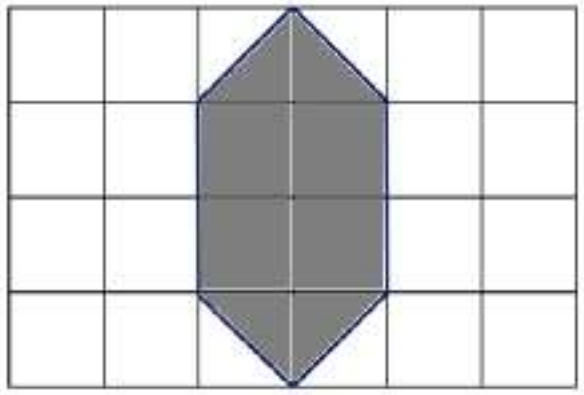


- If an area of floor/wall is to be covered by tiles,

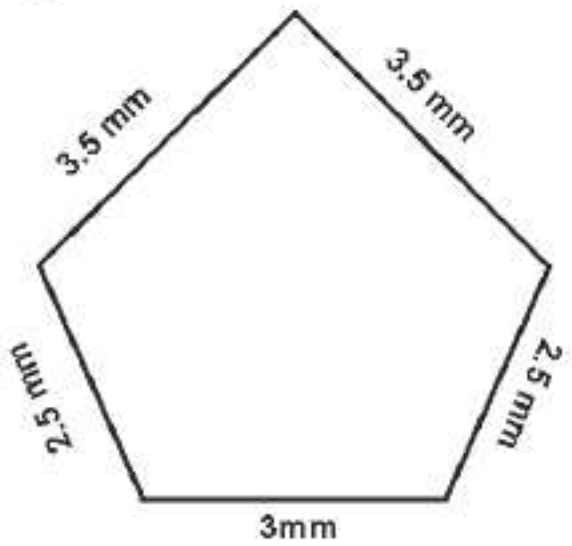
  then number of tiles = $\frac{\text{Area of floor/ wall}}{\text{Area of 1 tile}}$

Questions:

1. Find the perimeter of regular octagon with length of each side of 2 cm.
2. Neena swims along with boundary of a pool with the measurements of length 12 feet and width 8 feet. Find perimeter of pool.
3. Find the area of figure if, each box is a square of side 1 cm.



4. Kajal has a polygon with sides 5 cm, 3 cm and 7 cm. What is the name of this polygon and what is its perimeter?
5. What is the perimeter of a rectangle whose length is 7.5 m and breadth is 2.7 m?
6. Find perimeter of the figure.



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.

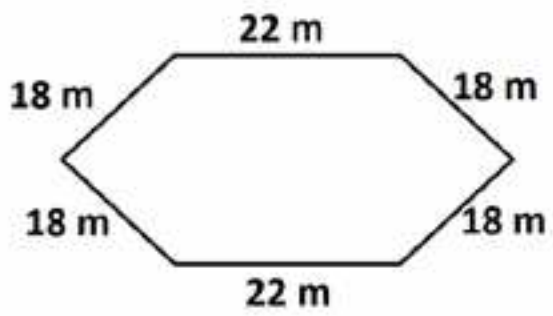
9. A girl walks around a regular pentagon with side 350 m. She took 3 complete rounds. Find the distance covered by her.

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 garden with dimensions 400 m ×500 m at the rate of ₹ 20 per metre?

12. Shree bought 8 Km long wire to fence his field. If field is 1.5 km long and 2 km wide, how much wire will be left after fencing?

13. What is the cost of fencing the park with sides given below, if the cost of fencing is ₹ 20 per metre?



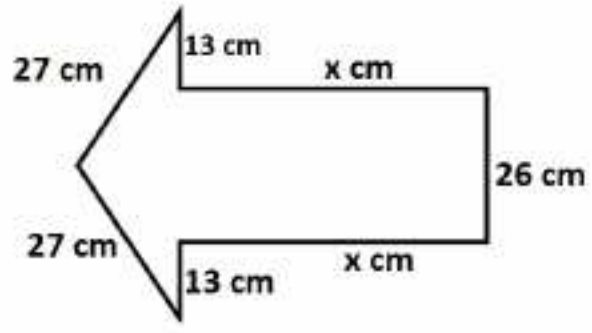
14. Sakshi has 1 m lace. She uses it to put it around a square hanky which had one side equal to 17.5 cm. How much lace will be left?

15. A box has 6 square faces which are to be painted. Each face has side of 5 m. What will be the cost of painting at the rate of ₹ 3 per sq m ?

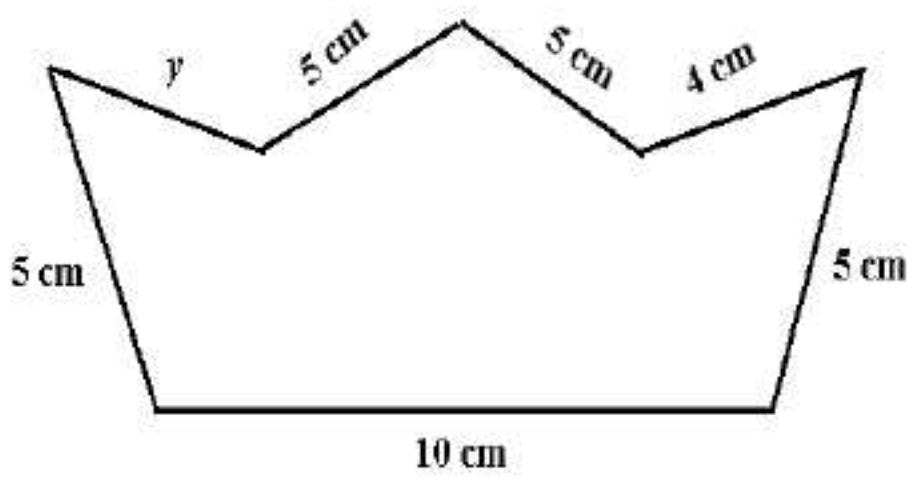
16. What will be the length of rectangular wooden strip required to frame a picture whose length is 4 m 25 cm and width 65 cm?

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 y, if perimeter of the figure is 38 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. Each table in a classroom is 80 cm long and 50 cm wide. There are 15 tables in a classroom. Find the total area of tables.

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?

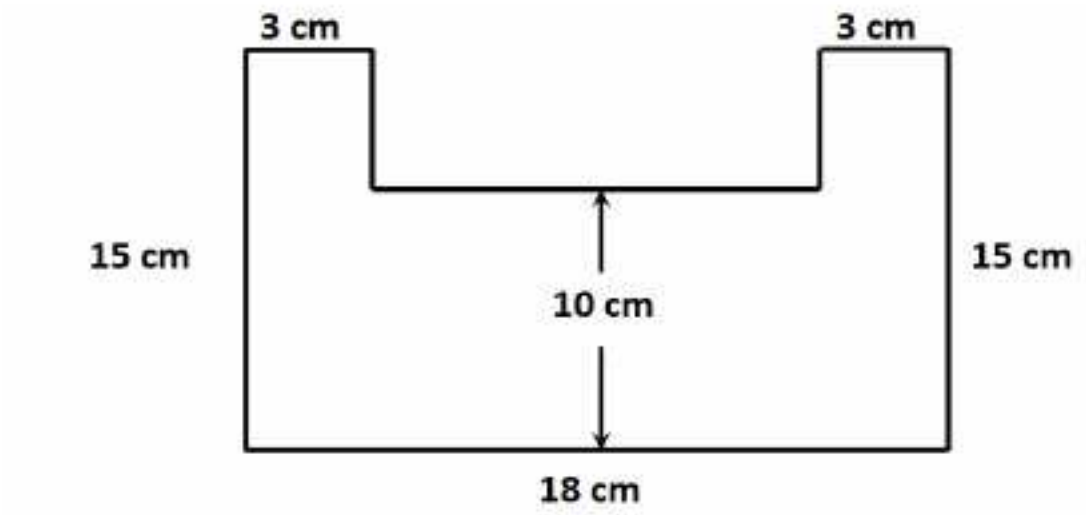
25. Measurement of a curtain for Manesh's room is 8m×2m .What will be the area of window covered with this curtain?

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 twice its breadth. If its area is 128 sq. m, then what is its perimeter?

28. The screen of a TV measures 32 inches in length and its area is 640 sq inches. What is the width of the screen?

29. What is the area of the given figure?



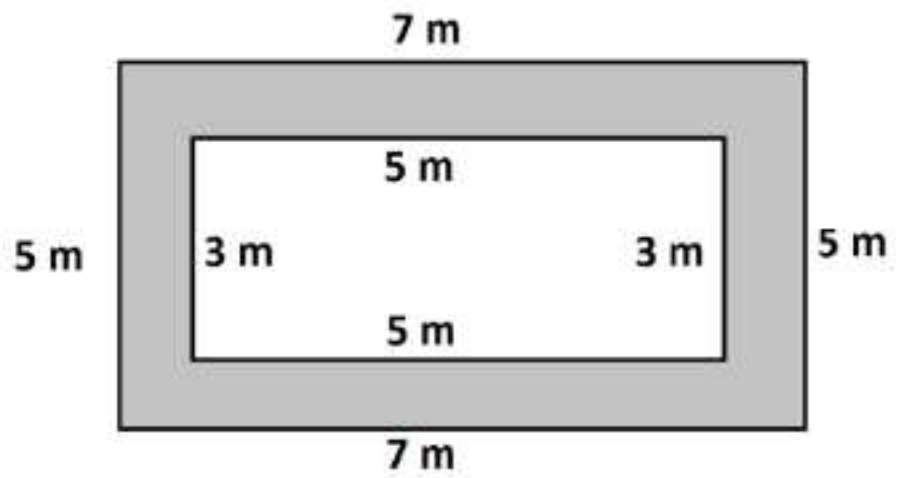
30. Mr. X wishes to carpet his room. Room is 15 ft long and 12 ft wide. How many square feet of carpet does he need to buy?

31. If length of a rectangle is 6.5 cm and its area is 2600 sq cm then, find its width in meter.

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. A pentagon has 3 sides of same length and 2 side with different length. The 3 equal sides are 8 cm long. The other 2 side are 11 cm and 6 cm long respectively. What is its perimeter?

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?

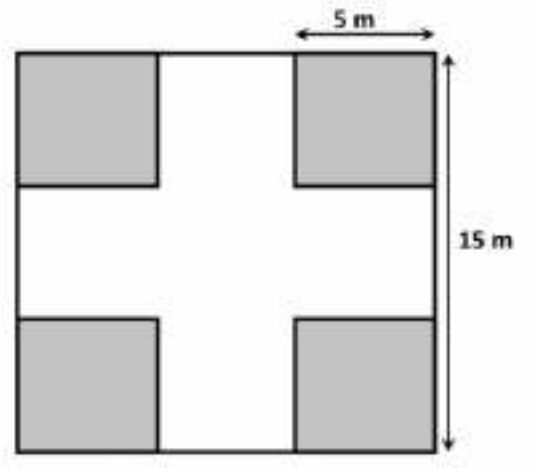
36. If the perimeter of three squares are 48 cm, 28 cm and 44 cm respectively. What will be the side of the square whose perimeter is equal to the sum of the perimeters of these three squares?

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?

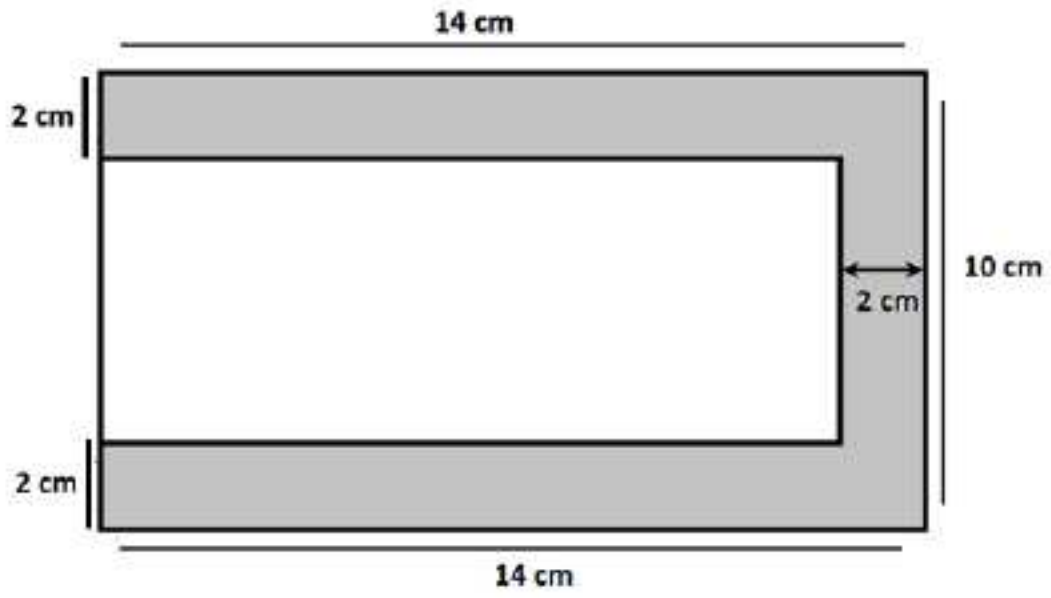
40. In a square park of side 15 m, four squared flower beds each side 5 m are to be made as shown in figure. What is the area of remaining part of the park without flower beds?



41. What is the perimeter of 10-sided regular polygon whose length of each side is 3.5 m?

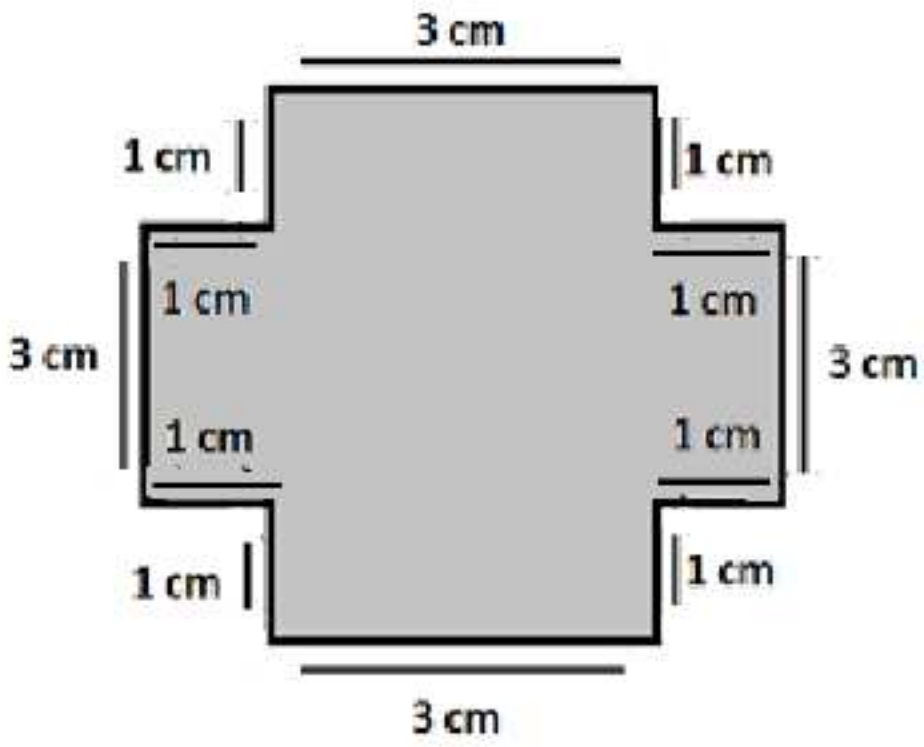
42. What is the distance travelled in taking 3 rounds of a regular pentagon of side 5 m?

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 $2\text{ m} \times 1\text{ m}$?

48. A man wants to paint walls of his room. Measurement of wall of the room is 3 m× 2 m. what is the total area to be painted? A can of paint covers 10 sq m. How many cans are needed if each wall needs 2 coats of paint?

49. Leela has a rectangular garden that measures 10 km ×12 km. she wants to plant apples in her garden. If one seed packet is enough to fill 40 sq km then, how many packets are needed for her garden?

50. A farmer planted vegetables in a rectangular garden that was 20 feet long and 45 feet wide. He used $\frac{1}{3}$ of the area for brinjals and $\frac{1}{5}$ of it for planting potatoes. How many sq feet are left for other vegetables?

Answers:

Q. No.	ANSWER	Q. No.	ANSWER	Q. No.	ANSWER
1	16 cm	18	47	35	20 cm
2	40 feet	19	4 cm	36	30 cm
3	6 sq cm	20	16.5 cm	37	361 sq. cm
4	Triangle, 15cm	21	60,000 sq. cm	38	14 cm
5	20.4 m	22	24 cm	39	20 cm
6	15 mm	23	192 sq. cm	40	125 sq. m
7	11 m	24	12 sq.cm	41	35 m
8	120 m	25	16 sq m	42	75 m
9	5250 m	26	300 sq. m	43	68 sq. cm
10	26.5 m	27	48 m	44	29 cm
11	₹ 36000	28	20 inches	45	21 sq. cm
12	1 km	29	210 sq. cm	46	48
13	₹ 2320	30	180 sq feet	47	5000
14	30 cm	31	4 m	48	24 sq m, 5 cans
15	₹ 450	32	₹ 6000	49	3 packets
16	9 m 80 cm	33	41 cm	50	420 sq feet
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 ... ... $x, y, z,$ etc. are used as variables. The variables obey all the rules and signs of addition, subtraction, multiplication and division.

$$7 \times p = 7p$$

$$3m + 8m = 11m$$
$$9x - 4x = 5x$$

$$p \times q = p\,q$$

In $7p$, we have 7 as the numerical factor and p 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., $9z, 6x - 4$ 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., $y - 4 = 11$

Questions:

1. Express perimeter of equilateral triangle with side's'.
2. Express the area of rectangle of length a cm and breadth b cm.
3. There are 8 plants in a row. What is the rule which gives the total number of plants, if the number of rows is 'x'?

4. What is the rule for finding the next number in the following series:
   I. 3, 6, 9, 12.....
   II. 2, 3, 4, 5 .....
   III. 25, 50, 75, 100 .....
5. Rita saves ₹ x daily. What will be her savings in a week?
6. Express the perimeter of regular octagon of side 'p' units.
7. One apple weighs 60 gm. Find the weight of y apples?
8. Express the perimeter of isosceles triangle whose equal sides are of 5 cm and third side of 'y' cm.
9. Sushil scores 70 runs and Nikhil scores z runs in a cricket match. What is the combined score of Sushil and Nikhil ?
10. Express the two digit number whose ten's digit is 't' and unit's digit is 'u'.

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

11. 4 taken away from p.
12. 10 added to b.
13. Product of 7 and m.
14. One third of a number x.
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. 4 times x taken away from one third of p.
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. $\frac{1}{2}x + 7$.

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. $\left(9 - \frac{x}{2}\right) + 4 = 9$

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 product of two integers is -288. If one of them is 12, 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 ₹ 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. What is the distance (in km) travelled in 'h' hours at a constant speed of 20 km per hour?

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. Sum of three consecutive even numbers is 60. Find the smallest number.

47. Find the value of y in

$$\frac{1}{5}(2y+3) = 19$$

48. Sum of two third of a number and 15 is 31, find the number.

49. Sana's present age is x years. Sushant is 5 years elder than Sana. Five years ago, sum of Sana's age and Sushant's age was 35 years. Find present age of Sana.

50. Complete the following table: -

x	2	4	6	8	10	12	14
$\frac{x}{2}-8$							

Fill in the blanks (Q No-51 – 55)

51. $a + b = b +$ _____

52. $x \times y = y \times$ _____

53. $a \times (b + c) = ab +$ _____

54. $(x + y) + z = x + (y +$ _____$)$

55. $\frac{x+4}{2} = 5$; $x =$ _____

Answers:

1	3 s units	29	$a = 5$
2	$(ab)sq\ cm$	30	$m = 8$
3	$8x\ plants$	31	$t = 1$
4	(i) $3x$ (ii) $x + 1$ (iii) $25x$	32	$p = \frac{3}{2}$
5	₹$7x$	33	8
6	$8p$ units	34	1
7	60 y gm	35	6
8	$(10 + y)\ cm$	36	10
9	$70 + z$ runs	37	30
10	$10t + u$	38	-24
11	$p - 4$	39	30^0 & 150^0
12	$b + 10$	40	240 m & 80 m
13	7m	41	₹130
14	$\frac{1}{3}^x$	42	45 years and 9 years
15	$-7a$	43	20 h km
16	$5m + 8$	44	$125 + x + y$
17	$10x - 15$	45	$(12 + 10x)\ cm$
18	$4q - 24$	46	18
19	$\frac{1}{3}p - 4x$	47	46
20	₹$(20x + 100)$	48	24
21	5 added to a	49	20 years
22	8 subtracted from y	50	$-7, -6, -5, -4, -3, -2, -1$
23	z subtracted from 8	51	a
24	Half of x added to 7	52	x
25	Half of the sum of 5 times y and 5	53	ac
26	$x = 6$	54	z
27	$m = 12$	55	6
28	$m = 24$		

CHAPTER- 12

RATIO AND PROPORTION

Points to remember:

- Ratio: A method of comparing two quantities of same kind and same unit by division. A ratio shows how many times one number contains another. or A ratio shows the relative sizes of two or more values.
- Ratio can be obtained only for quantities with same units.
- It can be expressed in its simplest form.
- Proportion: A proportion is an equality of two ratios.
- 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 2, 3, 4 and 6 are in proportion, then

$$\frac{2}{3} = \frac{4}{6} \; and \; \frac{1}{3} = \frac{4}{12}$$

- 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: If 15 chairs cost ₹ 2400, then find the cost of 70 chairs.

Cost of 15 chairs = ₹ 2400, Cost of 1 chair = ₹ $\frac{2400}{15}$ =₹ 160 (Division)

Cost of 70 chairs = 160×70 = ₹ 11200 (Multiplication).

Questions:

1. Simplify the ratio: 55: 505.
2. Find the simplest ratio of 21 minutes and 49 minutes.
3. Find the ratio of 3 weeks to 2 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 4 equivalent ratios of 2: 7.
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 16.5 kg into 8: 7.
9. Ratio of two numbers is 7: 4. If sum of the numbers is 187, then find the greater number.
10. Divide ₹ 120 into the ratio2: 1: 5 between Khushi, Muskan and Harsh.
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 greatest two-digit number and greatest four-digit number?
13. What will be the ratio between sum of prime factors of 15 and 25 respectively?
14. Divide ₹ 155 between Riya and Pawan in the ratio 4: 1.

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. 20, 80, 40, 160
22. 50, 200, 900, 1200
23. 24 kg :60kg = ₹ 72 : ₹ 180
24. 12 minutes: 15 minutes = 8km : 10km
25. 5 boxes : 35 boxes = ₹ 1200 : ₹ 8400
26. Find the value of p in the given proportion:

$$24 : p :: 120 : 30$$

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

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

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

$$m : 5 :: 126 : 45$$

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

$$\frac{}{35} = \frac{}{5}$$

33. 9, 45, 10, & 2

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

34. 32, 6, 12, & 64

$$\frac{}{12} = \frac{}{6}$$

35. 0.9, 0.4, 4, & 10

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

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 the costs of one dozen pencils is ₹ 30, then find the cost of 4 pencils.

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. Khusboo's annual salary is ₹ 1,50, 000. What will be the ratio of her annual salary to her 3 months' salary?

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. The annual income of Riya is ₹ 3,60,000 and expenditure is ₹ 2,00,000. Find the ratio of her income and savings.

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:

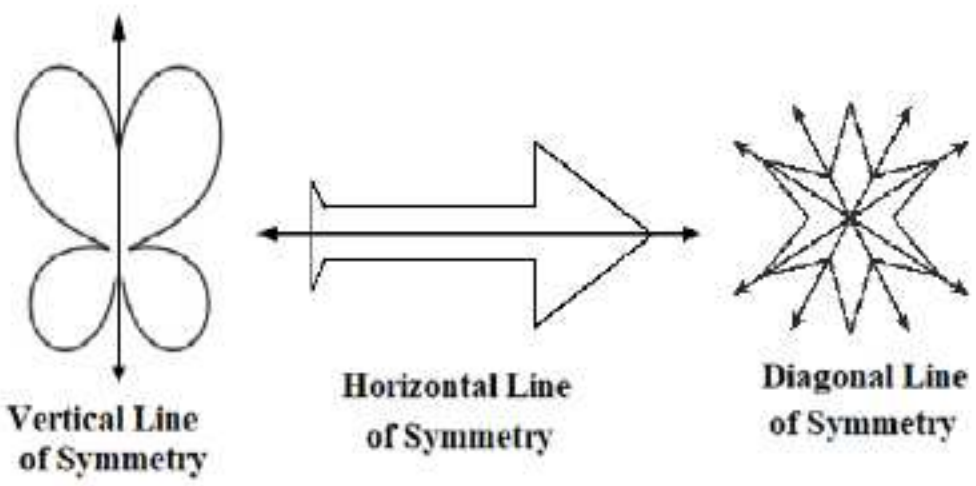
Q. No.	ANSWER	Q. No.	ANSWER
1	11 : 101	26	6
2	3 : 7	27	98
3	21 : 2	28	14
4	10 : 1	29	3
5	1 : 3	30	600
6	4 : 14, 6 : 21, 8 : 28, 10 : 35	31	$\frac{4}{5} = \frac{8}{10}$
7	4 : 5	32	$\frac{21}{35} = \frac{3}{5}$
8	8.8 kg, 7.7 kg	33	$\frac{10}{45} = \frac{2}{9}$
9	119	34	$\frac{64}{12} = \frac{32}{6}$
10	₹ 30, ₹ 15, ₹ 75	35	$\frac{0.9}{0.36} = \frac{10}{4}$
11	34 : 57	36	210
12	1 : 101	37	₹ 3,00,000 (₹ Three Lakh)
13	4 : 5	38	Navya, cheaper by ₹ 3
14	₹ 124, ₹ 31	39	Rishabh
15	1 : 5	40	₹ 6000
16	30 : 1	41	₹ 10
17	1 : 3	42	₹ 28
18	1 : 6	43	48 kg
19	2 : 3	44	₹ 2250
20	1 : 49	45	7.5 litres
21	Yes	46	10
22	No	47	4 : 1
23	Yes	48	20 kg, 40 kg
24	Yes	49	9 : 4
25	Yes	50	5 : 2

CHAPTER- 13

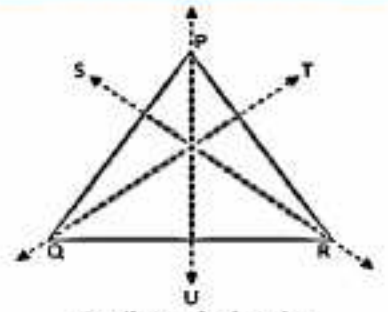
SYMMETRY

Points to remember:

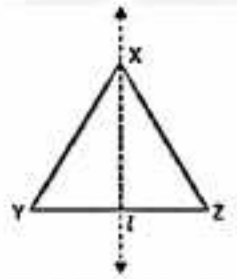
- **Symmetry**: Dividing the given figure into two identical parts.
- **Line of Symmetry**: The line along which the figure is divided into two identical parts.
- **Types of line of Symmetry**: Vertical, horizontal or diagonal.



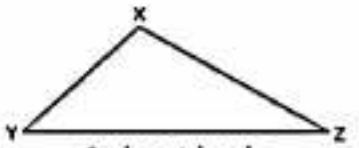
- A line has no line of symmetry.
- A regular polygon has as many lines of symmetry as the number of sides.
- An object and its image are symmetrical with reference to the mirror.
- An object can have many symmetrical lines while another object can have no symmetrical line at all. e.g. circle has infinite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



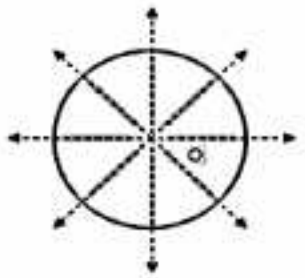
Equilateral triangle



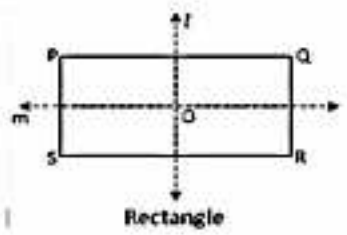
An isosceles triangle



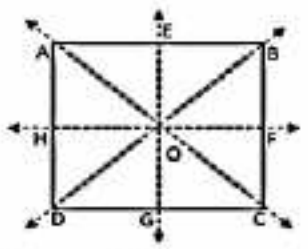
Scalene triangle



Circle



Rectangle



Square

Questions:

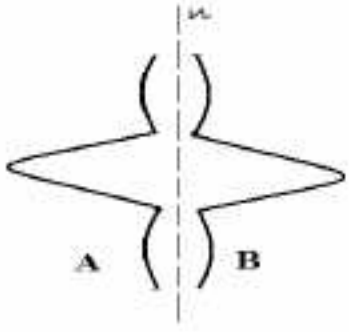
1. How many symmetrical lines does a scalene triangle has?
2. Name the shapes which have infinite number of lines of symmetry.
3. How many lines of symmetry does a kite has?
4. Which figure have horizontal lines of symmetry?

(i)  (ii)  (iii) 

5. How many symmetrical lines does a regular Octagon has?
6. Which alphabets have no lines of symmetry?

M S K O P H

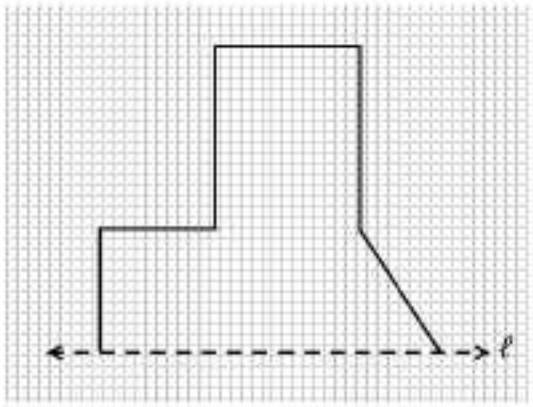
7. What is line 'n' in the following figure if B is the image of A?



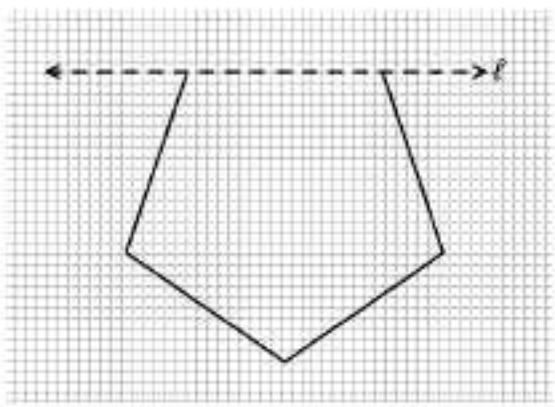
8. Which alphabets have only vertical lines of symmetry?

(i) W (ii) H (iii) G (iv) T

9. Complete the following figures such that dotted line acts as a line of symmetry.

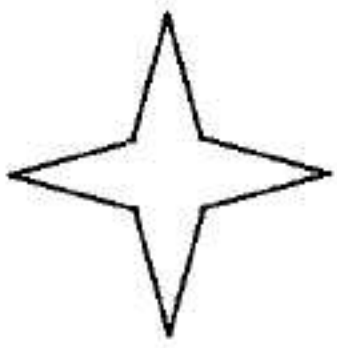


(i)

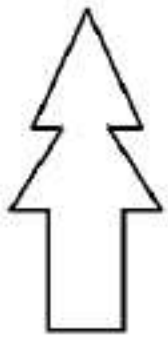


(ii)

10. Find the number of lines of symmetry in each of the following shapes.



(i)

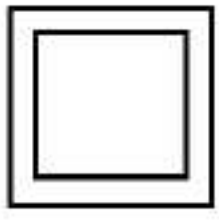


(ii)

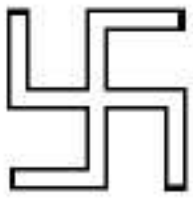
11. Write the specific names of the quadrilaterals which have only one line of symmetry.

Find the number of lines of symmetry (Q. 12 to Q. 13):

12.

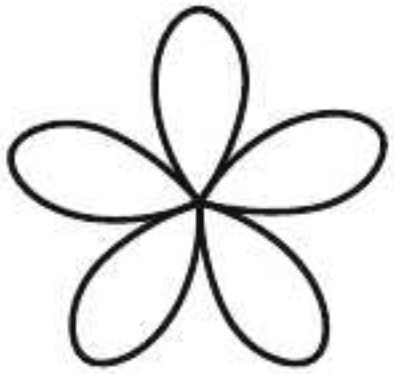


13.



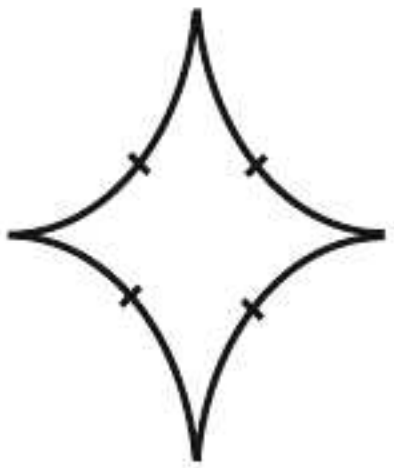
14. A regular pentagon has how many lines of symmetry?

15. Find the number of lines of symmetry of the following figure.



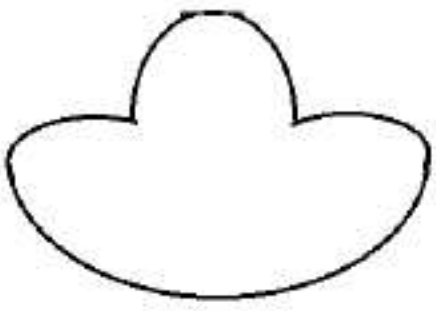
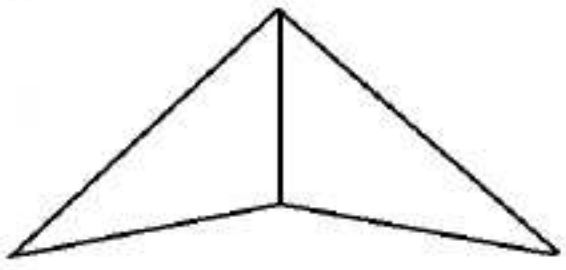
16. Circle has how many rotational symmetry?

17. Find number of rotational symmetry of the given figure.

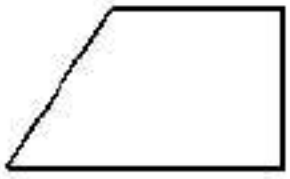


18. How many English alphabets have both vertical and horizontal lines of symmetry? Give their name.

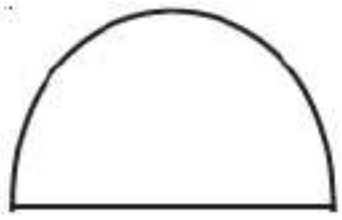
Find the number of lines of symmetry and draw them. (Q.19 to Q. 30)

19.	20.
	

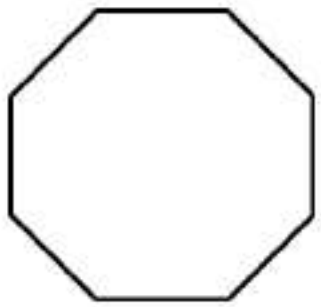
21.



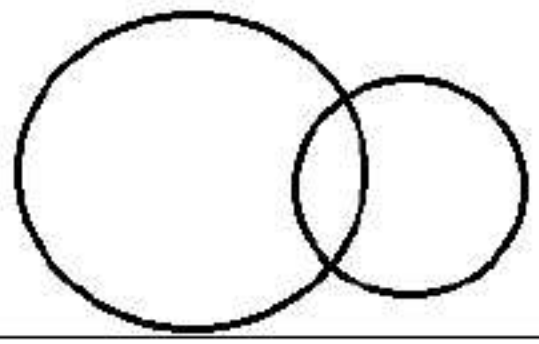
22.



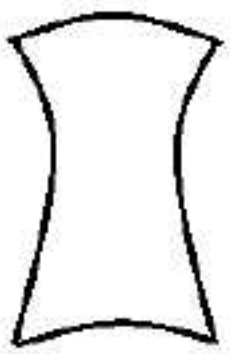
23.



24.

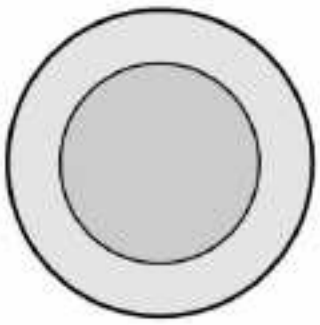


25.

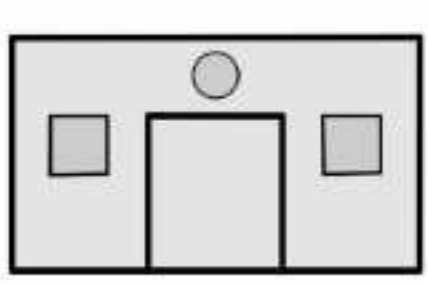


26.

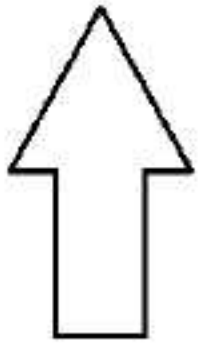
27.



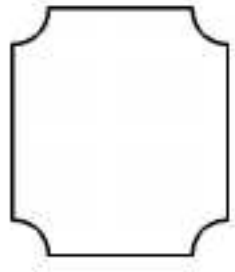
28.



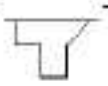
29.



30.



Answers:

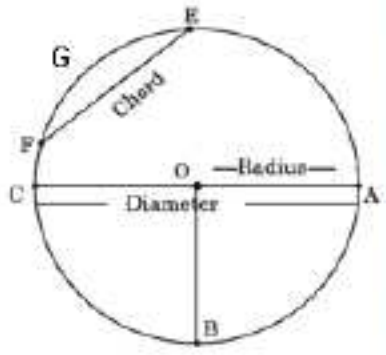
Q. No.	ANSWER	Q. No.	ANSWER
1	None	16	Infinite
2	Circle	17	4
3	1	18	4 (H, I, O, X)
4	(i), (ii)	19	One
5	8	20	One
6	S and P	21	No line of symmetry
7	Line of symmetry	22	One
8	W , T	23	Eight
9	(i)  (ii) 	24	One
10	(i) 4 (ii) 1	25	One
11	(i) Kite (ii) Isosceles Trapezium	26	One
12	Four	27	Many lines of symmetry
13	No line of symmetry	28	One
14	5	29	One
15	5	30	Two

CHAPTER- 14

PRACTICAL GEOMETRY

Points to remember:

- Circle



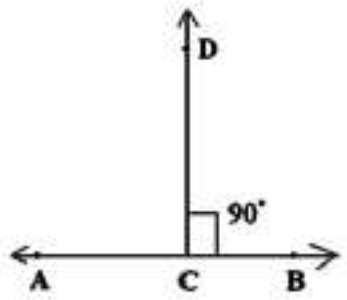
  - A Circle is the set of all those points in a plane whose distance from a fixed point remains constant.
  - Fixed point is called Centre of the circle. In figure, O is the centre.
  - Fixed distance is called radius.
    In figure, radius OA = radius OB = radius OC.
  - Line segment joining any two 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:**

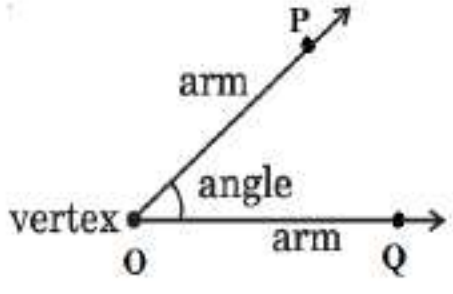


Perpendicular lines: Two lines are said to be perpendicular if they intersect each other at an angle of 90^o.

In figure, CD ⊥ AB.

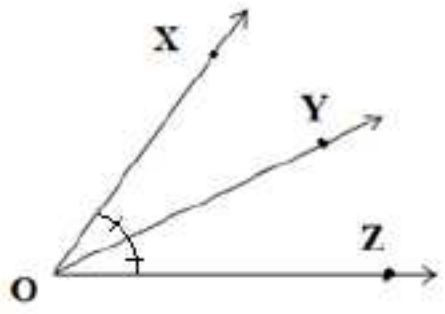
- Perpendicular to a line through a point on it can be constructed.
- Perpendicular to a line through a point outside the line can also be constructed.

- **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^o can be constructed using a compass like 15^o, 30^o , 45^o , 60^o , 75^o etc.**

- **Angle bisector:**

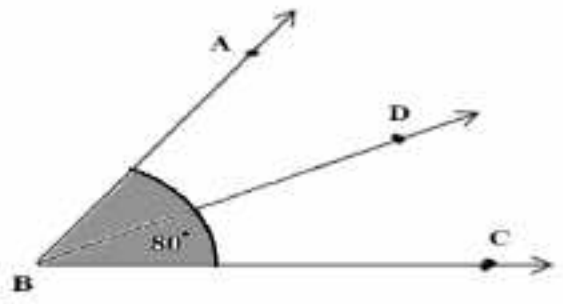


- **It is a ray which divides the angle in two equal parts.**
- **The ray OY is an angle bisector of angle XOZ.**

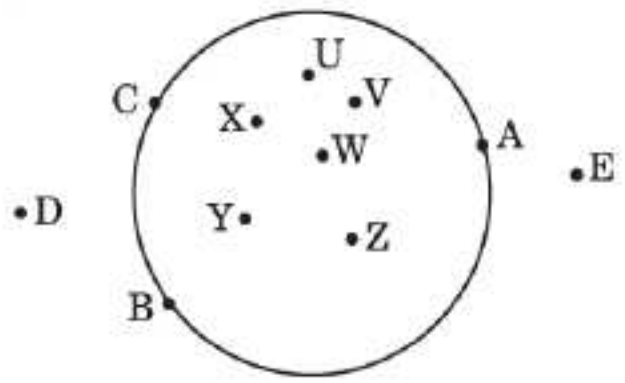
$$\angle XOY = \angle YOZ$$

Questions:

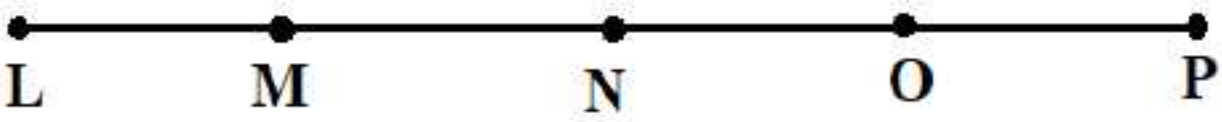
1. A part of a line with two end points is called a _____.
2. Two segments of the same length are said to be _____.
3. How many lines can be drawn which are perpendicular to a given point line outside it?
4. Which length divides the angle in two equal parts ?
5. $\angle ABC = 80^{o}$ and BD is the angle bisector. Find the measure of $\angle ABD$.



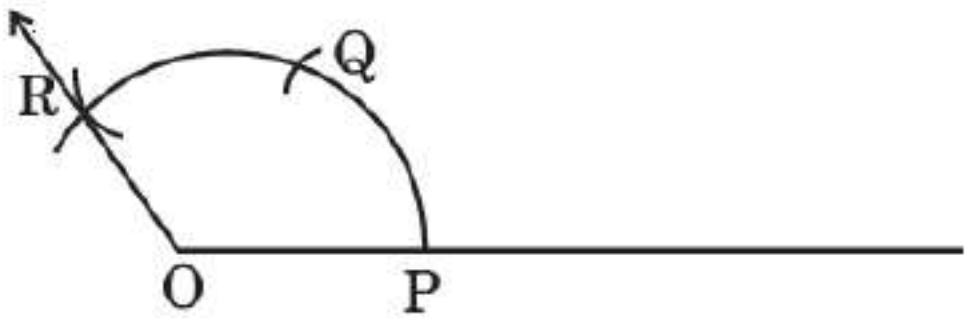
6. How many right angles are in a complete angle?
7. Name the points in the interior, exterior and on the circle from below figure:



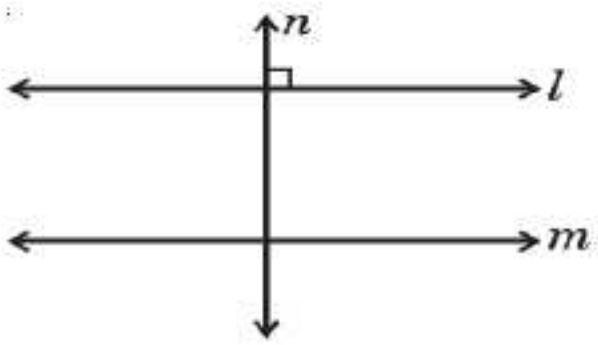
8. Tell the number of line segments in the given figure.



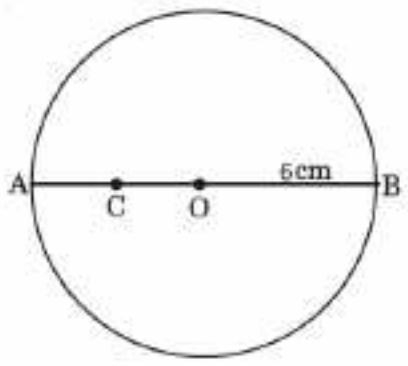
9. In the given figure if OP = PQ = QR , what will be the measure of $\angle POR$?



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?

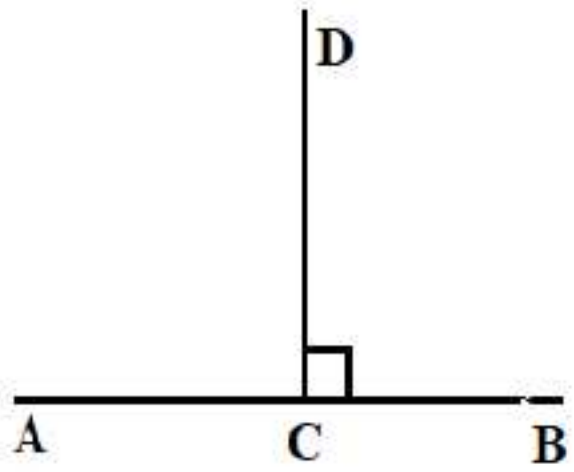


12. How many circles can be drawn through three Non- collinear points ?

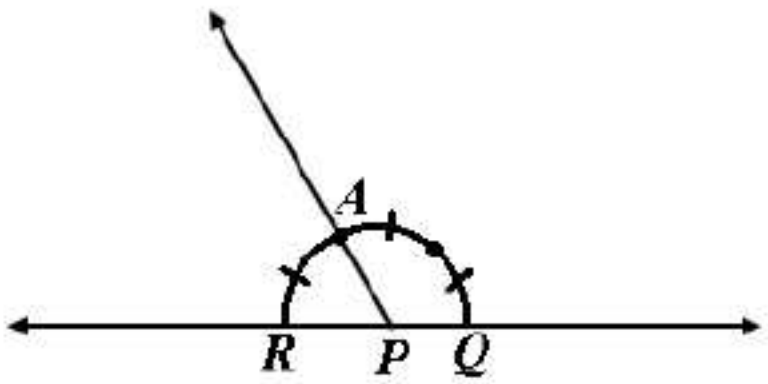
13. For dividing a line segment into four equal parts. How many perpendicular bisectors will be drawn?

14. How many straight line can be passes through two points?

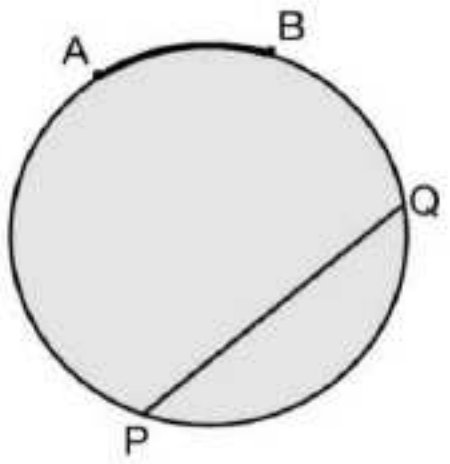
15. In the figure, AB = 9.6 cm and CD is perpendicular bisector of AB. What is the measure of AC and BC?



16. What is the $m\angle APQ$?



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 ?

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

21. What is the measure of a complimentary angle of 37° ?

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

23. An angle is equal to its complimentary angle. Find the measure of angle.

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:

Q. No.	ANSWER	Q. No.	ANSWER
1.	Line Segment	13.	3
2.	Congruent	14.	1
3.	1	15.	4.8 cm
4.	Ray	16.	120°
5.	40°	17.	AB : Minor Arc PQ : Chord
6.	4	18.	90°
7.	Interior Points: U, V, W, X, Y, Z Exterior Points: D, E Points on the Circle: A, B, C	19.	PQ = 2.8 cm, AQ = 5.6 cm and BQ = 2.8 cm
		20.	3.9 cm
8.	10	21.	53°
9.	120°	22.	Centre
10.	l is parallel to m	23.	45°
11.	BC = 9 cm and OC = 3 cm	24.	midpoint
12.	1	25.	90°

MENTAL MATHS

DIRECTORATE OF EDUCATION GOVT.OF N.C.T.OF DELHI

पढ़े चलो बढ़े चलो