

CHAPTER -1: INTEGERS

Previous Knowledge:

Integers - Integers are bigger collection of numbers which is formed by whole numbers and their negatives or we can say that all positive and negative numbers including zero are integers.

Example: -3, -2, -1, 0, 1, 2, 3...

Integers on Number Line - On a number line, when we:

- add a positive integer, we move to the right.
- add a negative integer, we move to the left.
- subtract a positive integer, we move to the left.
- subtract a negative integer, we move to the right.

Properties of Addition and Subtraction of Integers

(a) **Closure Property:** Integers are closed for addition and subtraction both, i.e. $a + b$ and $a - b$ are again integers, where a and b are any integers.

Example: For any two integers 2 and 3, we have $2 + 3 = 5$ an integer and $2 - 3 = -1$ is also an integer.

(b) **Commutative Property:** Addition is commutative for integers, i.e. $a + b = b + a$ for all integers a and b .

Example: For any two integers say 5 and 4, we have $5 + 4 = 4 + 5 = 9$, but the same does not hold for subtraction as $5 - 4 = 1$ and $4 - 5 = -1$.

(c) **Associative Property:** Addition is associative for integers, i.e., $(a + b) + c = a + (b + c)$ for all integers a , b and c .

Example: For any three integers say 6, 3 & 7 we have $(6 + 3) + 7 = 6 + (3 + 7)$
Again it does not hold under subtraction.

(d) **Additive Identity:** Integer 0 is the identity under addition

i.e. $a + 0 = 0 + a = a$ for every integer a .

Example: $3 + 0 = 0 + 3 = 3$

Multiplication of Integers

The product of a positive and a negative integer is a negative integer, whereas the product of two negative integers is a positive integer and the product of two positive integers is always a positive integer.

Example: $-2 \times 7 = -14$ and $-3 \times -8 = 24$ and $5 \times 6 = 30$.

Also we can see that the product of even number of negative integers is positive. whereas the product of odd number of negative integers is negative.

Example: $(-1) \times (-1) \times (-1) \times (-1) = 1$ but $(-1) \times (-1) \times (-1) = -1$.

Properties of Multiplication of Integers

(a) Closure Property: Integers are closed under multiplication, i.e., $a \times b$ is an integer for any two integers a and b ,

Example: $2 \times 3 = 6$, 6 is also an integer.

(b) Commutative Property: Multiplication is commutative for integers, i.e., $a \times b = b \times a$ for any integers a and b

Example: $4 \times 3 = 3 \times 4 = 12$.

(c) Associative Property: Multiplication is associative for integers, i.e., $(a \times b) \times c = a \times (b \times c)$ for any three integers a , b & c .

Example: $(2 \times 3) \times 4 = 2 \times (3 \times 4) = 24$

(d) Multiplicative Identity: The integer 1 is the identity under multiplication, i.e., $1 \times a = a \times 1 = a$ for any integer a .

Example: $1 \times 9 = 9 \times 1 = 9$

(e) Distributive Property: Under addition and multiplication, integers show a property called distributive property i.e., $a \times (b + c) = (a \times b) + (a \times c)$ for any three integers a , b and c .

Examples:

i) $16 \times 12 = 16 \times (10 + 2) = (16 \times 10) + (16 \times 2) = 160 + 32 = 192$

ii) $-23 \times 48 = -23 \times (50 - 2) = (-23 \times 50) + (-23 \times 2) = -1150 + (-46)$
 $= -1150 - 46 = -1196$

iii) $52 \times (-8) + (-52) \times 2 = [52 \times (-8)] + [52 \times (-2)] = 52 \times [(-8 - 2)] = 52 \times (-10) = -520$.

Properties of Division of Integers

(a) When a positive integer is divided by a negative integer, the quotient obtained is a negative integer and vice-versa.

Example: $\frac{2}{-3} = -\frac{2}{3}$

(b) Division of a negative integer by another negative integer gives a positive integer as quotient.

Example: $\frac{-5}{-6} = \frac{5}{6}$

Other Properties of Integer: For any integer a , we have (i) $a \div 0$ is not defined and

(ii) $a \div 1 = a$. Example: $4 \div 0$ is not defined and $6 \div 1 = 6$

Summarization of properties of Integers

Properties Of Integers				
Property	Operations on Integers			
Name	Addition	Subtraction	Multiplication	Division*
Closure	$a + b \in Z$	$a - b \in Z$	$a \times b \in Z$	$a \div b \notin Z$
Commutative	$a + b = b + a$	$a - b \neq b - a$	$a \times b = b \times a$	$a \div b \neq b \div a$
Associative	$(a + b) + c = a + (b + c)$	$(a - b) - c \neq a - (b - c)$	$(a \times b) \times c = a \times (b \times c)$	$(a \div b) \div c \neq a \div (b \div c)$
Distributive	$a \times (b + c) = ab + ac$	$a \times (b - c) = ab - ac$	Not applicable	Not applicable
where $a, b, c \in Z$			*b is a non-zero integer	

SOLVED EXAMPLES

MCQ

Q1. The integer whose product with (-1) gives 1 is

- a) 1 b) -1 c)) d) None of these

(Ans: b) -1)

Q2. $10 \div (-5) =$

- a) 2 b) 5 c) -5 d) -2

(Ans: d) -2)

Q3. If $x \div 1 = -8$ then $x =$

- a) 8 b) 1 c) -8 d) 8

(Ans: c) -8)

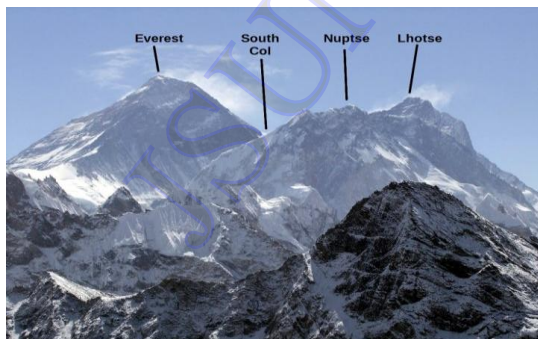
Q4. The additive identity for integers is

- a) 1 b) -1 c) 0 d) None of these

(Ans c) 0)

CASE STUDY BASED QUESTIONS

Q1. The temperature decreases due to increase in altitude at the rate of 6°C per 900 m on Mount Everest



i) If the temperature on Mt Everest at 8100 m above ground level is -24°C , then the temperature at 2400m is :

- a) 14°C b) -2°C c) 10°C d) -4°C (Ans: 10°C)

ii) At which height will the temperature be -18°C

a) 4000 m b) 4500m c) 7000m d) 7200m

(Ans: 7200m)

SHORT ANSWER TYPE QUESTIONS

Q1. Find : $(-49) \times 18$ using distributive property

Solution: $(-49) \times 18$

$$= (-49) \times (10+8)$$

$$= (-49 \times 10) + (-49) \times 8$$

$$= -490 - 392 = -882 \text{ Ans}$$

Q2. Solve the following:

$$(-15) \times 8 + (-15) \times 4$$

Solution:

$$(-15) \times 8 + (-15) \times 4$$

$$= (-15) \times [8 + 4]$$

$$= (-15) \times 12 = -180$$

Q3. Solve

$$[32 + 2 \times 17 + (-6)] \div 15$$

Solution:

$$[32 + 2 \times 17 + (-6)] \div 15$$

$$= [32 + 34 - 6] \div 15$$

$$= [66 - 6] \div 15$$

$$= 60 \div 15 = 4$$

LONG ANSWER TYPE QUESTIONS

1) A shop owner earns a profit of Rs 280 on the sale of a pair of footwear and incurs a loss of Rs 165 on the sale of a purse. In a particular week, he incurs a loss of Rs 300. If he sold 6 pairs of footwear in that week, then how many purses did the shop owner sell in that particular week?

Solution:

Profit of 280/- on footwear

Loss of 165/- on purse

Net Loss = 300/-

Profit on 6 footwears = $6 \times 280 = 1680$ /-

Loss $1680 + 300 = 1980$ /-

Hence no. of purse sold = $1980 \div 165 = 12$

Ans: 12 purse was sold

Q2 In a class test containing 20 questions, 5 marks are awarded for each correct answer and 2 marks is deducted for each wrong answer. If Riya get 15 correct answers out of all the questions attempted. What is her total score?

Solution

Number of questions = 20

Marks awarded for corrected answer = 5

Marks awarded for wrong answer = -2

Number questions attempted correctly = 15

Number questions not attempted correctly = 5

Her total score = $(15 \times 5) + (-2 \times 5) = 75 - 10 = 65$

PRACTICE QUESTIONS

MCQ

Q1. Write the additive inverse of -34.

- a) 34 b) -34 c) -3 d) 4

Q2. Closure property does not hold good in integers for

- a) addition (b) multiplication (c) subtraction (d) division

Q3. Which of the following is true?

- (a) $(-8) + (-4) > (-8) - (-4)$ (b) $(-8) + (-4) < (-8) - (-4)$
(c) $(-8) + (-4) = (-8) - (-4)$ (d) None of these

Q4. The multiplicative identity for integers is

- (a) 1 (b) -1 (c) 0 (d) 1 and -1

Q5. Product of two integers is 256, if one of the integers is (-8), then the other is

- (a) 32 (b) -32 (c) 248 (d) -264

Q6. The value of $(-27) \times (-16) + (-27) \times (-14)$ is

- (a) 1110 (b) -810 (c) 810 (d) 1110

Q7. When 0 divided by (-10), we get

- (a) -10 (b) 10 (c) 1 (d) 0

Q8. The smallest positive integer is 0

- a) True b) False

Q9. $(-9) + (-4) \square (-9) - (-4)$ Fill in the blanks.

- (a) $>$ (b) $<$ (c) $=$ d) \leq

Q10. Evaluate $-50 \div 5 = ?$

- (a) 15 (b) -25 (c) -10 (d) +10

Short Answer Type

Q1. Evaluate using a suitable property:

- (a) $22 \times 45 + 22 \times 55$
(b) $63 \times (-15) + (-63) \times 85$

Q2. Put $>$, $<$ or $=$ sign in the given blank:

- (a) $(-2) + 5 + (-7)$ _____ $(-9) + (-2) + 10$
(b) $39 + (-23) - 16$ _____ $36 + (-22) - (-20)$

Q3. Find the product:

- (a) $6 \times (32 - 2)$
(b) $(-81) \times 104$
(c) $(-27) \times 19 - 27$
(d) $(-8) \times (-3) \times (2) \times (-1)$
(e) $32 \times 0 \times (-29)$

Q4. Evaluate:

- (a) $(-40) \div 10$
(b) $(-61) \div [(-60) + (-1)]$

Long Answer Type Questions

Q1. A grocer had a profit of Rs 47 on Monday, a loss of Rs12 on Tuesday and loss of Rs8 on Wednesday. Find his net profit or loss for 3 days

Q2. Temperature of a room is 22°C . If the temperature decreases at 4°C every hour. What will be the temperature of the room after 8 hours?

Q3. In a quiz containing 10 questions, for every correct answer 3 marks are given and for every incorrect answer (-1) is given. Sonia attempts all the questions. She gives 7 correct and 3 incorrect answers. Find her final score

Q4. Q5. Verify $a-(-b) = a+b$ for $a = 59, b = 23$

Q5. A plane is flying at the height of 5000 m above the sea level. At a particular point, it is exactly above a submarine floating 1200 m below the sea level. What is the vertical distance between them?

Q6. In a quiz, team A scored $-40, 10, 0$ and team B scored $10, 0, -30$ in three successive rounds. Which team scored more? Can we say that we can add integers in any order?

Case Study Questions

Q1. An elevator descends at the rate of 4 m/min. If the elevator starts descending 25 m above the ground level, how long will it take to descend 20 m?



Q2. An air conditioner cools a room by $4^{\circ}\text{C}/\text{min}$. If the temperature of the room is 45°C before switching on the air conditioner. Find temperature of the room after switching on the air conditioner for 6 min.



ANSWERS

MCQ		Short Ques	Answer	Long Ques	Answer
Q1	a)	1a)	2200	1	Loss of Rs27
Q2	d)	1b)	-6300	2	-10°C
Q3	b)	2a)	<	3	18
Q4	a)	2b)	<	4	82
Q5	b)	3a)	180	5	6200m
Q6	c)	3b)	-8424	6	Team B Yes
Q7	d)	3c)	-540		
Q8	b)	3d)	-48		
Q9	b)	3e)	0		
Q10	c)	4a)	-4		
		4b)	-1		

PRACTICE TEST-1

Mathematics

Class-VII

General Instructions: Section-A contains 4 questions of 1 mark each. Section –B contains 3 questions of 2 marks each. Section-C contains 2 questions of 3 marks each. Section-D contains 1 question of 4 mark

M.Marks:20

Time: 45 min

SECTION-A

Q1	Evaluate: $(-49) \div (-7)$ a) 14 b) 7 c) -7 d) 42	1
Q2	$a \times (5 + c) = a \times 5 + a \times c$ is called a) commutative property b) associative property c) distributive property d) closure property	1
Q3	If $(-50) \div x = 1$, then x is equal to a) 1 b) 50 c) -50 d) 100	1
Q4	Find the value of $6 - (-3)$: a) 3 b) -3 c) 9 d) -9	1

SECTION-B

Q5	Find the product : $(-8) \times (-3) \times (2) \times (-1)$	2
Q6	Use the sign of $>$, $<$ or $=$ in the box to make the statements true. $(-8) + (-4)$ <input type="text"/> $(-8) - (-4)$	2
Q7	Suppose we represent the distance above the ground by a positive integer and that below the ground by a negative integer, then answer the following: (i) An elevator descends into a mine shaft at the rate of 5 metre per minute. What will be its position after one hour? (ii) If it begins to descend from 15 m above the ground, what will be its position after 45 minutes?	2

SECTION-C

Q8	Find the product, using suitable properties: $26 \times (-48) + (-48) \times (-36)$	3
Q9	In a quiz, team A scored -30, 10 and team B scored 5, -30 in two successive rounds. Which team scored more?	3

SECTION-D

Q10. The average monthly temperature of

	Jan	Feb	March	April	May	June
Avg. Temp. In Drass($^{\circ}$ c)	-32	-20	-6	2	14	21
Avg. Temp. In Churu($^{\circ}$ c)	22	25	32	35	40	44

- i) Show the increase in temperature in Drass from March to April on the number line below.



Find the difference in temperature between Churu and Drass in January

PRACTICE TEST-2

Mathematics

Class-VII

General Instructions: Section-A contains 5 questions of 1 mark each. Section –B contains 6 questions of 2 marks each. Section-C contains 3 questions of 3 marks each. Section-D contains 1 question of 4 marks

M.Marks:30

Time: 90 min

SECTION-A

Q1	Evaluate: $(-10) + 3 =$ b) 14 b) 7 c)-7 d) 42	1
Q2	Write the additive inverse of -34 a) -1 b) $\frac{1}{-34}$ c) 34 d) $\frac{1}{34}$	1
Q3	If $(-5) \div x = 5$, then x is equal to b) 1 b)50 c) - 50 d) -1	1
Q4	Find the value of $6 - (-13)$: a) 3 b) -13 c) 19 d) -19	1
Q5	$a \times (-b) = (-a) \times b$ e) commutative property f) associative property g) distributive property h) closure property	E)

SECTION-B

Q6	Find the product : $(-10) \times (-3) \times (-2) \times (-1)$	2
Q7	Use the sign of $>$, $<$ or $=$ in the box to make the statements true. $(-18) + (-4)$ <input type="text"/> $(-8) - (-14)$	2
Q8	A grocer had a profit of 47 on Monday, a loss of 12 on Tuesday and loss of 8 on Wednesday. Find his net profit or loss for 3 days.	2
Q9	Find the product, using suitable properties: $16 \times (-4) + (-4) \times (-36)$	2
Q10	Evaluate: $(-61) \div [(-60) + (-1)]$	2
Q11	Find the product : $6 \times (30 - 2)$	2

SECTION-C

Q12	Verify $a - (-b) = a + b$ for $a = 59$, $b = 23$	3
Q13	Evaluate using a suitable property: (a) $22 \times 45 + 19 \times 55$ (b) $63 \times (-15) + (-63) \times 85$	3
Q14	Temperature of a room is 22°C . If the temperature decreases at 4°C every hour. What will be the temperature of the room after 8 hours?	3

SECTION-D

Q15		4
<p>i) By observing the above number line, state which of the following statements is true?</p> <p>(a) B is 2 (b) A is -4 (c) B is -13 (d) B is -4</p> <p>ii) By observing the above number line, state which of the following statements is not true?</p> <p>(a) B is greater than -10 (b) A is greater than 0 (c) B is greater than A (d) 6 is smaller than</p> <p>iii) Next three consecutive numbers in the pattern 11, 8, 5, 2, _____, _____, _____ are (a) 0, -3, -6 (b) -1, -5, -8 (c) -2, -5, -8 (d) -1, -4, -7</p> <p>iv) B represents which integer ?</p>		

--	--	--

CHAPTER 2: FRACTIONS AND DECIMALS

I. IMPORTANT CONCEPTS:

- Proper fraction
- Improper fraction
- Multiplication of fractions
- Multiplication of a Fraction by a Whole Number
- Fraction as an operator 'of'
- Multiplication of a Fraction by a Fraction
- Division of Fractions
- Division of the Whole Number by a Fraction
- Reciprocal of a fraction
- Division of a Fraction by a Whole Number
- Division of a Fraction by Another Fraction
- Multiplication of Decimal Numbers
- Multiplication of Decimal Numbers by 10, 100 and 1000
- Division of a Decimal Number by a Whole Number
- Division of a Decimal Number by another Decimal Number

II. ILLUSTRATIONS/EXAMPLES:

A) MCQ-TYPE QUESTIONS:

(a) $\frac{2}{7} \times 3 =$

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

(ii) $\frac{4}{7}$

(iii) $\frac{2}{21}$

(iv) $\frac{5}{7}$

Ans. (i)

(b) What is $\frac{1}{2} \times 10$?

- (ii) 1 (ii) 6 (iii) 5 (iv) 3

Ans. (iii)

(c) $1.8 \times 1.2 =$

- (i) 0.216 (ii) 2.16 (iii) 21.6 (iv) 216

Ans. (ii)

(d) $235.4 \div 100 =$

- (i) 23500 (ii) 23.54 (iii) 2.354 (iv) 0.2354

Ans. (iii)

B) CASE STUDY QUESTION:

An online game has 50 levels. A gamer is in the Gold team until he crosses $\frac{3}{4}$ of the total levels. After that, he is in the Platinum team.

This table shows the rewards unlocked after completing various levels.

LEVELS COMPLETED	REWARDS
More than or equal to $\frac{4}{5}$ levels	Jeep
More than $\frac{3}{5}$ levels but less than $\frac{4}{5}$ levels	Dress
More than $\frac{2}{5}$ levels but less than $\frac{3}{5}$ levels	Face mask
More than $\frac{1}{5}$ levels but less than $\frac{2}{5}$ levels	Badge

Mita completed 37 levels. Which reward she would get? Justify your answer.

Solution: Dress as 37 lies between 30 and 40.

$$\frac{3}{5} \times 50 = 30$$

$$\frac{4}{5} \times 50 = 40$$

C) SHORT ANSWER TYPES QUESTIONS:

- (i) Savita is dividing $1\frac{3}{4}$ kg of sweets equally among her seven friends. How much does each friend receive?

Ans. Each friend will get

$$1\frac{3}{4} \div 7 = 1\frac{3}{4} \times \frac{1}{7} = \frac{7}{4} \times \frac{1}{7} = \frac{1}{4}$$

- (ii) Harmeet purchased 3.5 kg of potatoes at the rate of Rs. 13.75 per kg. How much money should he pay?

Ans. 1 kg potato cost – Rs. 13.75

$$3.5 \text{ kg potatoes cost} - \text{Rs. } 13.75 \times 3.5 = \text{Rs. } 48.125$$

Harmeet will pay Rs. 48.125.

- (iii) Three boys earned a total of Rs. 235.50. What was the average amount earned per boy?

Ans. Each boy on average earns = $\text{Rs. } 235.50 \div 3 = \text{Rs. } 78.50$

D) LONG ANSWER TYPE OF QUESTIONS:

- (i) If the cost of a notebook is Rs. $8\frac{3}{4}$, how many notebooks can be purchased for Rs. $131\frac{1}{4}$?

Ans. Number of notebooks purchased =

$$\text{Rs. } 131\frac{1}{4} \div \text{Rs. } 8\frac{3}{4}$$

$$= \frac{525}{4} \div \frac{35}{4}$$

$$= \frac{525}{4} \times \frac{4}{35} = 15$$

- (ii) The length of the rectangle is 7.1 cm and its breadth is 2.5 cm. what is the perimeter of the rectangle?

Ans. Perimeter of rectangle = $2 \times (l + b) = 2 \times (7.1 + 2.5)$
 $= 2 \times (9.6) = 19.2 \text{ cm}$

III. QUESTIONS FOR PRACTICE:

(A) MCQ Type Questions:

- (i) The product of a rational number and its reciprocal is always equal to

(a) 0 (b) 1 (c) -1 (d) None of these

- (ii) $3\frac{1}{8} \times 3 =$

(a) $\frac{45}{8}$ (b) $\frac{75}{8}$ (c) $\frac{54}{8}$ (d) $\frac{62}{8}$

(iii) What is $\frac{1}{4}$ of 16?

- a) 3 b) 4 c) 2 d) 5

(iv) $\frac{2}{3} \times \frac{4}{5} =$

- a) $\frac{8}{15}$ b) $\frac{10}{12}$ c) $\frac{6}{8}$ d) $\frac{2}{15}$

(v) $\frac{12}{5} \div \frac{3}{5} =$

- a) 1 b) 2 c) 3 d) 4

(vi) $67.8 \times 1.2 =$

- (a) 81.36 b) 8.136 c) 0.8136 d) 813.6

(vii) $74.55 \times 100 =$

- (a) 745.5 b) 7455 c) 74.55 d) 7.455

(viii) $70.5 \div 1.5 =$

- (a) 47 b) 4.7 c) 470 d) 0.47

(ix) $547.8 \div 1000 =$

- (a) 54.78 b) 5.478 c) 5478 d) 0.5478

(x) $7\text{m } 4\text{ cm} =$

- (a) 74 cm b) 740 cm c) 7400 cm d) 704 cm

(B) SHORT ANSWER TYPE QUESTIONS:

(i) Find: $\frac{1}{2} \times 2\frac{3}{4}$

(ii) Which is greater?

$\frac{1}{2}$ of $\frac{6}{7}$ or $\frac{2}{3}$ of $\frac{3}{7}$

- (iii) The side of a regular hexagon is 3.2 cm. find its perimeter.
- (iv) A two-wheeler covers 54.8m in 1 litre of petrol. How much distance will it cover in 10 litres of petrol?
- (v) Find the average of 4.2, 3.6 and 7.8.
- (vi) Each side of a polygon is 3.5 cm and its perimeter is 17.5cm. How many sides does the polygon have?
- (vii) (i) Provide the number in the box \square , such \square t
- $$\frac{3}{5} \times \square \frac{24}{30}$$
- (ii) The simplest form of the number obtained in \square s
_____.
- (viii) A car travels 44.4 km in 1.2hours. What is the average distance covered in 1 hour?
- (ix) Find the area of the rectangle of length 6.3cm and breadth 3.7cm.
- (x) Distance between two adjacent saplings is $\frac{2}{3}$ m. There are seven saplings in a row. Find the distance between the first and the last sapling?

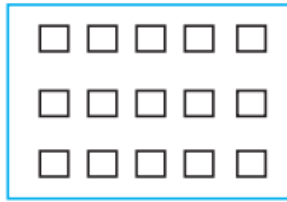
(C) LONG ANSWER TYPE QUESTIONS:

(i) Shade:

(a) $\frac{2}{3}$ of the triangles.



(b) $\frac{3}{5}$ of the squares.



- (ii) Ronit and Seema went for a picnic. Their mother gave them water bottle contained 6 litres of water. Ronit consumed $\frac{2}{3}$ of water. Seema consumed the remaining water.
- (a) How much water did Ronit drink?
(b) What fraction of the total quantity of water did Seema drink?
- (iii) Lipika reads a book for $\frac{3}{4}$ hours everyday. She reads the entire book in 6 days. How many hours in all were required by her to read the book?
- (iv) A vehicle covers a distance of 43.2 km in 2.4 litres of petrol. How much distance will it cover in one litre of petrol?
- (v) For the celebrating children's students of Class VII bought sweets for Rs.740.25 and cold drink for Rs.70. If 35 students contributed equally what amount was contributed by each student?
- (vi) Kajol has Rs. 75. This $\frac{3}{8}$ of the amount she earned. How much did she earn?

(D) CASE BASED QUESTIONS:

- (i) SAVE TREES:

It takes 17 full specific type of trees to make one tonne of paper. If there are 221 such trees in a forest, then what fraction of forest will be used to make;



- (a) 5 tonnes of paper.

(b) To save $\frac{7}{13}$ part of the forest how much of paper we have to save.

(ii) TAKING CARE OF ANIMALS:

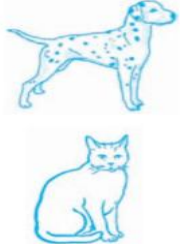
The label on a bottle of pet vitamins lists dosage guidelines.

What dosage would you give to each of these animals?

- (a) 18 kg adult dog?
 (b) A 6 kg cat?

Do Good Pet Vitamins

- Adult dogs:
 $\frac{1}{2}$ tsp (tea spoon full) per 9kg body weight
- Puppies, pregnant dogs, or nursing dogs:
 $\frac{1}{2}$ tsp per 4.5kg body weight
- Cats:
 $\frac{1}{4}$ tsp per 1kg body weight



IV. ANSWERS:

A. MCQ-TYPE QUESTIONS:

- (i) b ii) b iii) b iv) a v) d vi) a vii) b viii) a ix) d x) d

B. SHORT ANSWER TYPE QUESTIONS:

- (i) $\frac{11}{8}$ ii) $\frac{2}{7}$ iii) 19.2cm iv) 548 m v) 5.2 vi) 5
 vii) $\frac{4}{3}$ viii) 37 km ix) 23.31 sq.cm x) 4 m

C. LONG ANSWER TYPE QUESTIONS:

- (i) (a) 6 triangles (b) 9 squares
 (ii) (a) 4 litres (b) $\frac{1}{3}$
 (iii) 4.5 hours iv) 18 km
 v) Rs. 23.15 vi) 200

D. CASE BASED QUESTIONS:

- (i) SAVE TREES:

- (a) $\frac{5}{13}$ (b) 119

- (ii) TAKING CARE OF ANIMALS:

(a) 1 tea spoon

(b) $1\frac{1}{2}$ tea spoons

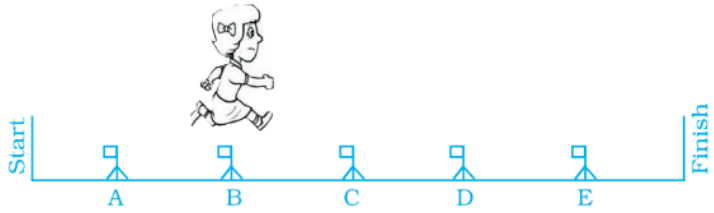
CLASS TEST-1

(CHAPTER 2: FRACTIONS AND DECIMALS)

CLASS: VII

MARKS: 20

SNO	QUESTION	MARKS
	SECTION-A	1X 4=4
1.	The decimal expression for 8 rupees 8 paise (in Rupees) is (a) 8.8 (b) 8.08 (c) 8.008 (d) 88.0	1
2.	Fraction which is reciprocal of $\frac{2}{3}$ is (a) $\frac{-2}{3}$ (b) 1 (c) 0 (d) $\frac{3}{2}$	1
3.	$2.4 \times 1000 = \underline{\hspace{2cm}}$. (a) 24 (b) 240 (c) 2400 (d) 2.004	1
4.	If $\frac{3}{4}$ of a number is 12, the number is (a) 9 (b) 16 (c) 18 (d) 32	1
	SECTION-B	2X2=4
5.	Find: $\frac{3}{4}$ of $7\frac{4}{5}$	2
6.	Find: 1.3×3.1	2
	SECTION-C	2X3=6
7.	Find: (a) $3\frac{1}{5} \div 4\frac{5}{6}$ (b) $\frac{4}{7} \times \frac{2}{9}$	2 1
8.	The time taken by Rohan in five different races to run a distance of 500 m was 3.20 minutes, 3.37 minutes, 3.29 minutes, 3.17 minutes and 3.32 minutes. Find the average time taken by him in the races.	3

SECTION-D		3X2= 6
HURDLE RACE		
9.	<p>In a hurdle race, Nidhi is over hurdle B and $\frac{2}{6}$ of the way through the race, as shown in figure.</p>  <p>Then, answer the following:</p> <p>(a) Where will Nidhi be, when she is $\frac{4}{6}$ of the way through the race?</p> <p>(b) Where will Nidhi be when she is $\frac{5}{6}$ of the way through the race?</p> <p>(c) Give two fractions to tell what part of the race Nidhi has finished when she is over hurdle C.</p>	<p>2</p> <p>2</p> <p>2</p>

ANSWER KEY(TEST-1)

1)b 2) d 3)c 4)b 5) $\frac{117}{20}$ 6)4.03 7)(a) $\frac{96}{145}$ (b) $\frac{8}{63}$ 8) 3.27 minutes

9) (a) D (b) E (c) $\frac{3}{6}, \frac{1}{2}$

CLASS TEST-2

(CHAPTER 2: FRACTIONS AND DECIMALS)


SNO	QUESTION	MARKS
-----	----------	-------

CLASS:

VII

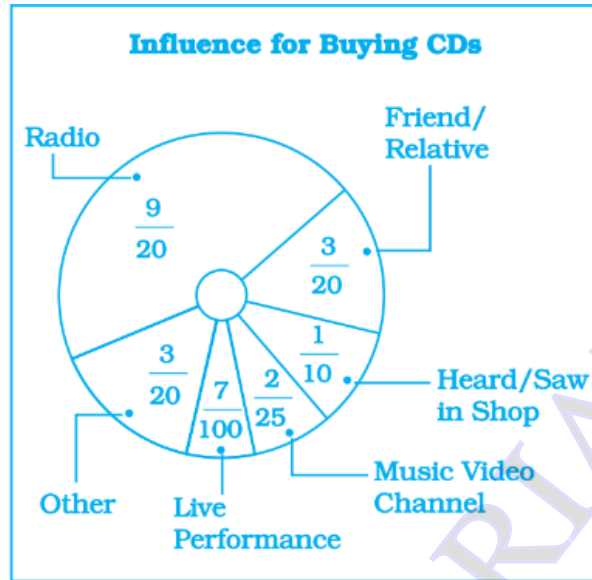
JSUNIL TUTORIAL

MARKS: 30

	SECTION A(MCQ)	1X10=10
1.	2.5 ÷ 1000 is equal to (a) 0.025 (b) 0.0025 (c) 0.2500 (d) 25000	1
2.	The product of 0.03 × 0.9 is: (a) 2.7 (b) 0.27 (c) 0.027 (d) 0.0027	1
3.	Which of the following represents $\frac{1}{3}$ of $\frac{1}{6}$? (a) $\frac{1}{3} + \frac{1}{6}$ (c) $\frac{1}{3} \times \frac{1}{6}$ (b) $\frac{1}{3} - \frac{1}{6}$ (d) $\frac{1}{3} \div \frac{1}{6}$	1
4.	The picture interprets  (a) $\frac{1}{4} \div 3$ (b) $3 \times \frac{1}{4}$ (c) $\frac{3}{4} \times 3$ (d) $3 \div \frac{1}{4}$	1
5.	8.4 ÷ _____ = 2.1 (a) 2 (b) 3 (c) 1 (d) 4	1
6.	$3\frac{3}{4} \div \frac{3}{4} =$ (a) 3 (b) 4 (c) 5 (d) $\frac{45}{16}$	1
7.	$\frac{2}{5} \times 25 =$ (a) 10 (b) 12 (c) 20 (d) 25	1
8.	3456 ml = _____ litres (a) 34.56 (b) 3.456 (c) 0.3456 (d) 345.6	1
9.	52.7 ÷ _____ = 0.527 (a) 10 (b) 100 (c) 1000 (d) 1	1

10.	$2 \frac{5}{3} = \frac{10}{3}$ (a) × (b) ÷ (c) + (d) –	1
	SECTION-B	2×4=8
11.	How many $\frac{2}{3}$ kg pieces can be cut from a cake of weight 4 kg?	2
12.	A two-wheeler covers a distance of 55.3 km in one litre of petrol. How much distance will it cover in 10 litres of petrol?	2
13.	Find the average of 4.2, 3.8 and 7.6.	2
14.	A car covers a distance of 89.1 km in 2.2 hours. What is the average distance covered by it in 1 hour?	2
	SECTION-C	3×2=6
15.	The weight of an object on moon is $\frac{1}{6}$ its weight on Earth. If an object $5\frac{3}{5}$ kg on Earth, how much would it weigh on the moon?	3
16.	When 0.02964 is divided by 0.004, what will be the quotient?	3
	SECTION-D	3×2=6
	INFLUENCING FOR BUYING CD'S	

17. In a survey, 200 students were asked what influenced them most to buy their latest CD. The results are shown in the circle graph.



(a) How many students said radio influenced them most?

2

(b) How many more students were influenced by radio than by a music video

2

channel?

(c) How many said a friend or relative influenced them or they heard the CD in a shop?

2

ANSWERS (TEST-2)

1. B 2) c 3)c 4)b 5)d 6)c 7)a 8)b 9)b 10)a

11)6 12)553 km 13)5.2 14)40.5 15) $\frac{14}{15}$ kg 14)7.41 15)(a) 90 (b) 74 (c) 50

DATA HANDLING

2. I. Important Concepts / Results

3. In our day to day life, we come across many statements that involve the term “Average”. Average is a number indicating the representative of central value of a group of observations or data. This representative value or central value is known as Measure of Central Tendency.
4. a) Range = Maximum value of given data - Minimum value of given data
5. a) Arithmetic Mean or Average or Mean = Sum of all observations / Total number of observations
6. b) Mode : The mode of a set observations is the observation that occurs most often
7. c) Median : The middle most observation of the data arranged in ascending or descending order
8. d) Graphical representation of data : Bar graph and double bar graph

Examples

i) MCQ

1) The Marks of 11 students of a class are as given below : 78, 11, 99, 63, 94, 6, 78, 36, 30, 55, 22 is

- a) 90 b) 91 c) 92 d) 93

Ans :- d) 93

2) The median of the data 20, 30, 40, 10, 15, 25, 35 is

- a) 20 b) 25 c) 30 d) 40

Ans: - b) 25

3) The mode of the data 13, 16, 12, 14, 19, 12, 14, 13, 14 is

- a) 12 b) 13 c) 14 d) 16

Ans: - c) 14

4) The mean of first five natural number is

- a) 4 b) 3 c) 0 d) 2

Ans: - b) 3

ii) Case Study Based Questions:-

Mode of Transport

A survey was conducted for the students studying in class VII of Zedland New school for the different modes of transport available for them to travel. Sanju and Manju started from their house to go to school .They had four different options of Mode of transport available for them to travel

Mode of Transport	Distance Covered (in Km)	Time Taken (in hours)
Walking	40	10
Cycle	100	20

Car	600	10
Bus	500	25

Read the table and answer the questions:

a) Find the Speed of the bus in Km/h is

Ans: Speed of the bus is Distance / Time = $500 / 25 = 20$ km/hr

b) What is the ratio of speed of the car and the cycle?

Ans: Speed of the car is $600 / 10 = 60$ km/hr

Speed of the cycle is $100 / 20 = 5$ km /hr

Required Ratio is $60 / 5 = 12:1$

c) In the above given information, which mode of the transport has the fastest speed?

Ans: - Car

Short Answer type Questions:-

1) A cricketer scores the following runs in eight innings : 58, 76, 40, 35, 46, 45, 0, 100.

Find the mean score.

Solution: Mean Score = $\frac{\text{Sum of all observations}}{\text{Total number of observations}} = \frac{58+76+40+35+46+45+0+100}{8} = \frac{400}{8} =$

50.

2) Find the mode of 7, 6, 5, 3, 0, 3, 4, 8, 2, 4, 5, 2, 4

Solution :Arranging the same numbers together, we get 0, 2,2, 3, 3, 4, 4, 4, 5, 5, 6, 7, 8

Mode is 4 because it occurs most frequently than other observations.

3) Find the median of the data: 24, 36, 46, 17, 18, 25, 35

Solution: We arrange the data in ascending order, we get 17, 18, 24, 25, 35, 36, 46

Median is the middle observation. Therefore 25 is the median.

Long Answer type Questions

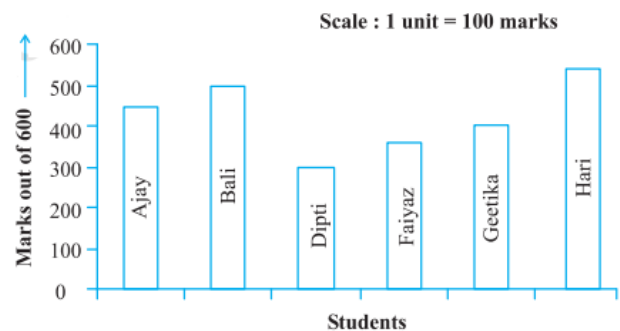
1) Following data gives total marks (out of 600) obtained by six children of a particular class.

Students	Ajay	Bali	Dipti	Faiyaz	Geetika	Hari
Marks	450	500	300	360	400	540

Represent the data on a bar graph.

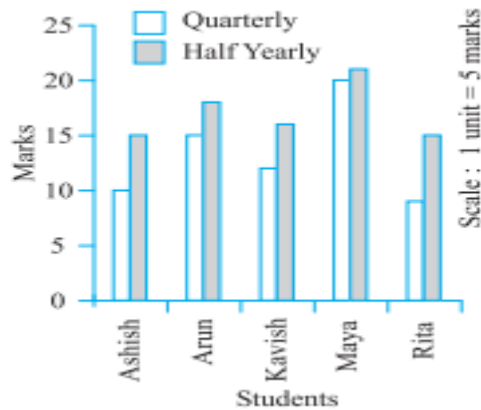
Solution:

2) A mathematics teacher wants to see, whether the new technique of teaching she applied after quarterly test was effective or not. She takes the scores of the 5 weakest children in the quarterly test (out of 25) and



in the half yearly test (out of 25): Draw double bar for the following data

Solution



III. Questions for Practice

i) MCQ

1. A batsman scored the following number of runs in six innings: 35, 30, 45, 65, 39 and 20 .The mean runs scored by him in an inning is

- a) 39 b) 38 c) 37 d) 40

2. The marks of 11 students of a class are as given below:

78,11,99,63,94, 6, 78, 36, 30, 55, 22

3. The range of marks is

4. a) 90 b) 91 c) 92 d) 93

5. 3. The mode of the distribution 3, 5, 7, 4, 2, 1, 4, 3, 4 is

6. a) 7 b) 4 c)3 d) 1

7.

8. 4. The median of the distribution 2, 3, 4, 7, 5, 1, 6 is

9. a) 1 b) 2 c) 3 d) 4

10. Number of children in six different classes are given below

Class	Number of children
6	400
7	350
8	320
9	280
10	225
11	200

11. Answer the following related questions (5 to 11)
12. 5. In which class is the number of Children maximum?
13. a) 6 b) 7 c) 8 d) 9
14. 6. In which class is the number of children minimum?
15. a) 8 b) 9 c) 10 d) 11
16. 7. The difference between the maximum and minimum number of children is
17. a) 100 b) 200 c) 300 d) 400
18. 8. In how many classes is the number of children less than 500?
19. a) 2 b) 4 c) 5 d) 6
20. 9. In how many classes is the number of children more than 100?
21. a) 6 b) 4 c) 3 d) 1
22. 10. The ratio of the number of children of class 6 and 11 is
23. a) 3:1 b) 2:1 c) 2:3 d) 1:4
24. 11. The total number of children is
25. a) 1775 b) 1675 c) 1575 d) 1785

26. ii) Short Answer Type Questions:-

27. 1. The scores in mathematics test (out of 25) of 15 students is as follows:
28. 19, 25, 23, 20, 9, 20, 15, 10, 5, 16, 25, 20, 24, 12, 20
29. Find the mode and median of this data. Are they same?
30. 2. The weights (in kg.) of 15 students of a class are:
31. 38, 42, 35, 37, 45, 50, 32, 43, 43, 40, 36, 38, 43, 38, 47
32. (i) Find the mode and median of this data. (ii) Is there more than one mode?
33. 3. Find the mode and median of the data: 13, 16, 12, 14, 19, 12, 14, 13, 14
34. 4. Organise the following marks in a class assessment, in a tabular form.
35. 4, 6, 7, 5, 3, 5, 4, 5, 2, 6, 2, 5, 1, 9, 6, 5, 8, 4, 6, 7
36. (i) Which number is the highest? (ii) Which number is the lowest?
37. (iii) What is the range of the data? (iv) Find the arithmetic mean.
38. 5. Find the mean of the first five whole numbers.
39. 6. A cricketer scores the following runs in eight innings:
40. 58, 76, 40, 35, 46, 45, 0, 100.
41. Find the mean score.
42. 7. The enrolment in a school during six consecutive years was as follows:
43. 1555, 1670, 1750, 2013, 2540, 2820
44. Find the mean enrolment of the school for this period.
45. 8. The heights of 10 boys were measured in cm and the results are as follows:
46. 142, 158, 135, 140, 154, 142, 147, 149, 142, 140.
47. Find the median and mode of the above data
48. 9. A cricketer scores the following runs in eight innings: 85, 67, 40, 53, 64, 45, 0, 100.
Find the median score.
49. 10. Heights (in cm) of 25 children are given below:
50. 168, 165, 163, 160, 163, 161, 162, 164, 163, 162, 164, 163, 160, 163, 160, 165, 163, 162,
163, 164, 163, 160, 165, 163, 162

51. What is the mode of their heights? What do we understand by mode here?

52. Long Answer type Questions:-

53. 1. The rainfall (in mm) in a city on 7 days of a certain week was recorded as follows:

Day	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
Rain fall (in mm)	0.0	12.2	2.1	0.0	20.5	5.5	1.0

54. (i) Find the range of the rainfall in the above data. (ii) Find the mean rainfall for the week.

55. (iii) On how many days was the rainfall less than the mean rainfall.

56. 2. Consider this data collected from a survey of a colony.

Favourite Sport	Cricket	Basket Ball	Swimming	Hockey	Athletics
Watching	1240	470	510	430	250
Participating	620	320	320	250	105

57. (i) Draw a double bar graph choosing an appropriate scale. What do you infer from the bar graph?

58. (ii) Which sport is most popular?

59. (iii) Which is more preferred, watching or participating in sports?

60. 3. The performance of a student in 1st Term and 2nd Term is given. Draw a double bar graph choosing appropriate scale and answer the following:

61. (i) In which subject, has the child improved his performance the most?

62. (ii) In which subject is the improvement the least?

63. (iii) Has the performance gone down in any subject?

Subject	English	Hindi	Maths	Science	S. Science
1 st Term (M.M. 100)	67	72	88	81	73
2 nd Term (M.M. 100)	70	65	95	85	75

64. 4. Number of children in six different classes are given below. Represent the data on a bar graph.

Class	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
Number of Children	135	120	95	100	90	80

65. (a) How would you choose a scale?

66. (b) Answer the following questions:

67. (i) Which class has the maximum number of children? And the minimum?

68. (ii) Find the ratio of students of class sixth to the students of class eight.

69. 5. The heights of 10 girls were measured in cm and the results are as follows

70. 135, 150, 139, 128, 151, 132, 146, 149, 143, 141

71. i) What is the height of the tallest girl?

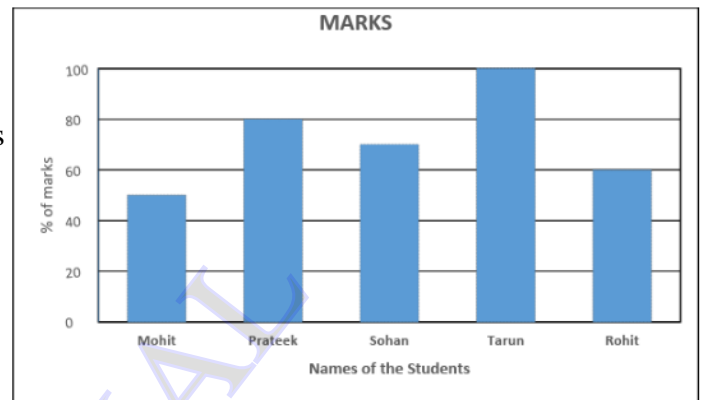
72. ii) What is the height of the shortest girl?

73. iii) What is the Range of the data?
 74. iv) Find the mean of the data?
 75. 6. Find the mean, median and mode of the following data :
 76. 85, 76, 90, 85, 39, 48, 56, 95, 81, 75

77. Case Study Based Questions:-

78. 1. HIGH SCHOOL

79. Given below is a bar graph representing the
 80. percentage of marks obtained by five students
 81. in a test studying in high school.

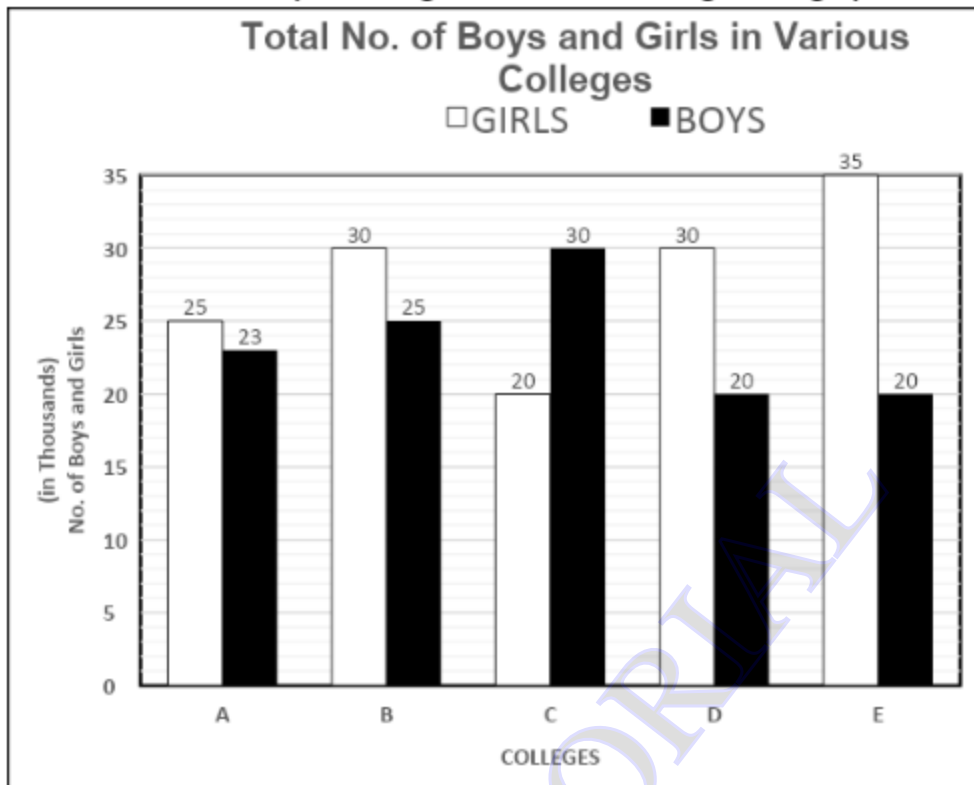


Answer the following questions based on the graph.

- a) What is the average percentage of marks obtained by the 5 pupils in the test?
 b) Name the pupil whose marks are $\frac{3}{4}$ of Prateek's Marks?
 c) Who got minimum marks?
 d) What is the Range of Marks of 5 students?

2. GENDER DISTRIBUTION

Study the given graph showing the gender distribution in a few colleges in Zedland .Answer the questions given below according to the graph :



- a) The total number of girls in colleges D and E together are approximately what percent of the total number of girls in colleges A, B and C together?
- b) What is the respective ratio of the number of boys in college D to the number of boys in college B?
- c) What is the ratio of total number of boys in all the colleges to that of total number of girls?
- d) Among the college which college has the best gender equality?

Answers for Questions for Practice

MCQ

1	a	6	d	11	a
2	d	7	b		
3	b	8	d		
4	d	9	a		
5	a	10	b		

Short Answers

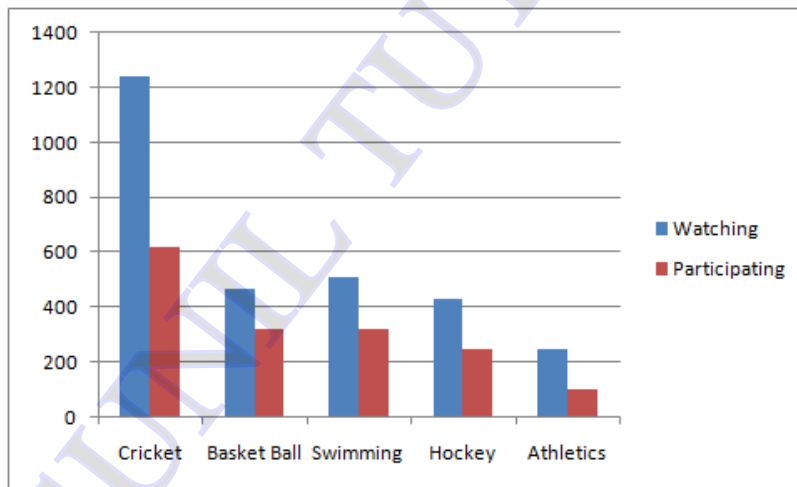
1	Mode = median = 20, yes they are same
2	Median = 40 kg, Mode = 38 kg and 43 kg Yes, there are 2 modes (more than one mode)
3	Median = 14 and Mode = 14

4	<table border="1"> <tr><td>1</td><td>1</td></tr> <tr><td>2</td><td>2</td></tr> <tr><td>3</td><td>1</td></tr> <tr><td>4</td><td>3</td></tr> <tr><td>5</td><td>5</td></tr> <tr><td>6</td><td>4</td></tr> <tr><td>7</td><td>2</td></tr> <tr><td>8</td><td>1</td></tr> <tr><td>9</td><td>1</td></tr> </table> <p>i) 9 ii) 1 iii) 8 iv) 5</p>	1	1	2	2	3	1	4	3	5	5	6	4	7	2	8	1	9	1
1	1																		
2	2																		
3	1																		
4	3																		
5	5																		
6	4																		
7	2																		
8	1																		
9	1																		
5	3																		
6	50																		
7	2058																		
8	Median = Mode = 142																		
9	58.5																		
10	14																		

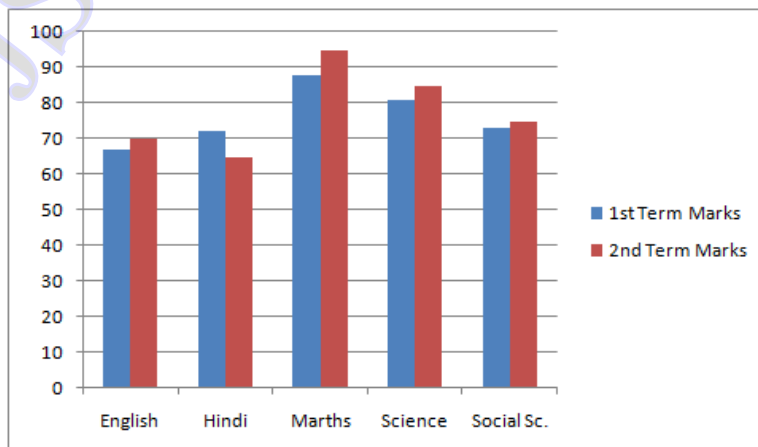
Long Answers

1. i) 20.5 m ii) 5.9 m iii) 5 days (Mon, Wed, Thu, Sat and Sun)

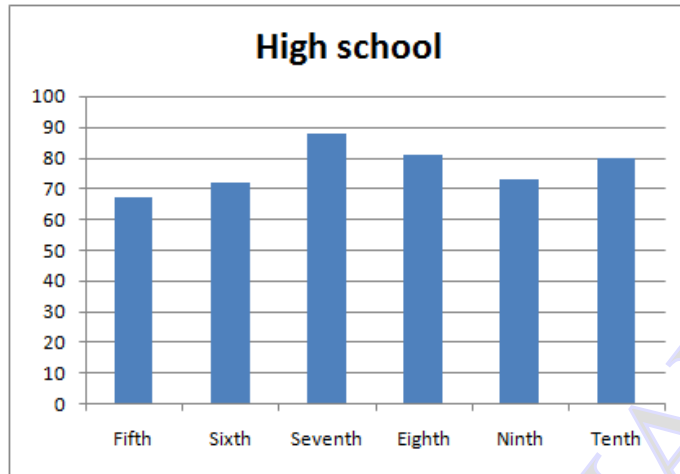
2.



3.



4.



5.i) 151cm ii) 128cm, iii) 23cm iv) 141.4 cm v) 5 (143, 146, 149, 150, 151)

6. mean = 73, Median = 78.5 and Mode = 85

Case Study Based Questions

- 1) a) 72 b) Rohit c) Mohit d) 50
 2) a) 87% b) 4:5 c) 59: 70 d) A

Chapter Test

Class 7

Marks : 20

I Choose the correct answer:-

2 x 1 =2 marks

1. A batsman scored the following number of runs in six innings: 35, 30, 45, 65, 39 and 20 . The mean runs scored by him in an inning is
 a) 39 b) 38 c) 37 d) 40
2. The median of the distribution 2, 3, 4, 7, 5, 1, 6 is
 a) 1 b) 2 c) 3 d) 4

II. Answer the following :

3 X 2 = 6 Marks

3. The heights of 10 boys were measured in cm and the results are as follows: 142, 158, 135, 140, 154, 142, 147, 149, 142, 140.
 Find the median and mode of the above data
4. Find the mean of the first five whole numbers.
5. A cricketer scores the following runs in eight innings: 58, 76, 40, 35, 46, 45, 0, 100. Find the mean score.

III. Answer the following:-

3 x 4 = 12 Marks

6. The performance of a student in 1st Term and 2nd Term is given. Draw a double bar graph choosing appropriate scale and answer the following:

Subject	English	Hindi	Maths	Science	S. Science
1 st Term (M.M. 100)	67	72	88	81	73
2 nd Term (M.M. 100)	70	65	95	85	75

(i) In which subject, has the child improved his performance the most?

(ii) In which subject is the improvement the least?

7. Number of children in six different classes are given below. Represent the data on a bar graph.

Class	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
Number of Children	135	120	95	100	90	80

(i) Which class has the maximum number of children? And the minimum?

(ii) Find the ratio of students of class sixth to the students of class eight.

8. The heights of 10 girls were measured in cm and the results are as follows

135, 150, 139, 128, 151, 132, 146, 149, 143, 141

i) What is the height of the tallest girl?

ii) What is the height of the shortest girl?

iii) What is the Range of the data?

iv) Find the mean of the data?

Chapter Test Data Handling

Marks : 30

I Choose the correct answer:-

4 x 1 = 4 marks

1) The Marks of 11 students of a class are as given below : 78, 11, 99, 63, 94, 6, 78, 36, 30, 55, 22 is

a) 90 b) 91 c) 92 d) 93

2) The median of the data 20, 30, 40, 10, 15, 25, 35 is

a) 20 b) 25 c) 30 d) 40

3) The mode of the data 13, 16, 12, 14, 19, 12, 14, 13, 14 is

a) 12 b) 13 c) 14 d) 16

4) The mean of first five natural number is

a) 4 b) 3 c) 0 d) 2

II. Answer the following :

3 x 2 = 6 Marks

5. Find the mean of first five prime numbers,

6. Find the mode of 7, 6, 5, 3, 0, 3, 4, 8, 2, 4, 5, 2, 4

7. Find the median of the data: 24, 36, 46, 17, 18, 25, 35

III. Answer the following:-3 x 4 = 12Marks

8. The rainfall (in mm) in a city on 7 days of a certain week was recorded as follows:

Day	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
Rain fall (in mm)	0.0	12.2	2.1	0.0	20.5	5.5	1.0

(i) Find the range of the rainfall in the above data. (ii) Find the mean rainfall for the week.

(iii) On how many days was the rainfall less than the mean rainfall.

9. . Consider this data collected from a survey of a colony.

Favourite Sport	Cricket	Basket Ball	Swimming	Hockey	Athletics
Watching	1240	470	510	430	250
Participating	620	320	320	250	105

(i) Draw a double bar graph choosing an appropriate scale. What do you infer from the bar graph?

(ii) Which sport is most popular?

(iii) Which is more preferred, watching or participating in sports?

10. Number of children in six different classes are given below. Represent the data on a bar graph.

Class	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
Number of Children	135	120	95	100	90	80

(a) How would you choose a scale?

(b) Answer the following questions:

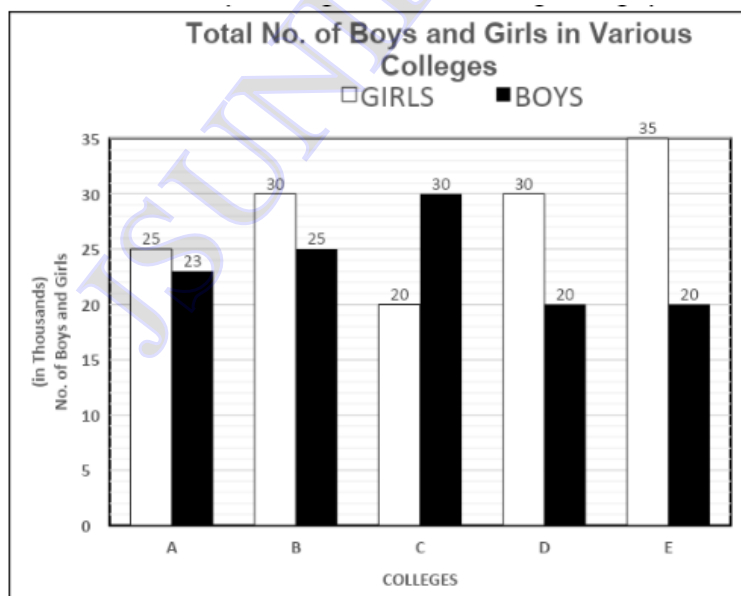
(i) Which class has the maximum number of children? And the minimum?

(ii) Find the ratio of students of class sixth to the students of class eight.

Case Study Based Questions :- $2 \times 4 = 8$ marks

11. GENDER DISTRIBUTION

Study the given graph showing the gender distribution in a few colleges in Zedland .Answer the questions given below according to the graph :

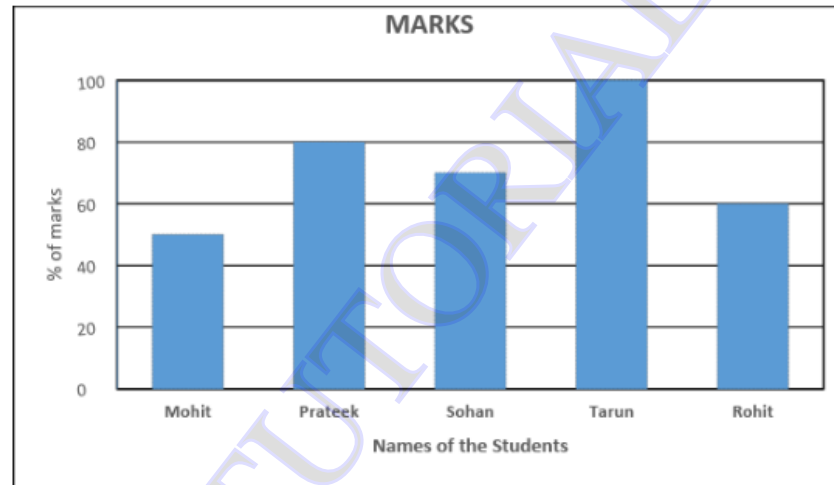


- The total number of girls in colleges D and E together are approximately what percent of the total number of girls in colleges A, B and C together?
- What is the respective ratio of the number of boys in college D to the number of boys in college B?
- What is the ratio of total number of boys in all the colleges to that of total number of girls?
- Among the college which college has the best gender equality?

12. HIGH SCHOOL

Given below is a bar graph representing the percentage of marks obtained by five students in a test studying in high school.

Scale : I unit = 10% of marks



Answer the following questions based on the graph.

- What is the average percentage of marks obtained by the 5 pupils in the test?
- Name the pupil whose marks are $\frac{3}{4}$ of Prateek's Marks?
- Who got minimum marks?
- What is the Range of Marks of 5 students?

SIMPLE EQUATIONS

I. Important Concepts / Results

An equation is a condition on a variable. A variable is something that can vary. It assumes different numerical values; its value is not fixed. These are usually denoted by letters of the English alphabet, such as x , y , z , l , m , n , p , etc. From variables, we form expression by performing operation like addition, subtraction, multiplication and division on them.

What Equation Is?

An equation is a condition on a variable. The condition is that two expressions should have equal value. Note at least one of the two expressions must contain the variable.

An equation remains the same when the expressions on the left and on the right are interchanged. This property is often useful in solving equations.

Solving an Equation

For any balanced numerical equation, if we either:

- add the same number to both sides,
- or subtract the same number from both sides,
- or multiply by the same number to both sides,
- or divide by the same number both its sides, the balance is undisturbed.

Examples

i) MCQ

1) Write the Simple equation of the statement “ The sum of three times x and 10 is 13”

- a) $3x + 10 = 13$ b) $3x - 10 = 13$ c) $3x + 13 = 10$ d) None

Ans :- a) $3x + 10 = 13$

2) Write the Simple equation of the statement “ Taking away 5 from x gives 10”

- a) $x + 5 = 10$ b) $x - 10 = 5$ c) $x - 5 = 10$ d) None

Ans: - c) $x - 5 = 10$

3) Write the Simple equation of the statement “ Add 1 to three times p to get 7”

- a) $1 + p = 7$ b) $3 + p = 7$ c) $7 + p = 3$ d) $1 + 3p = 7$

Ans: - d) $1 + 3p = 7$

4) The solution of the equation $x + 3 = 0$ is

- a) 3 b) - 3 c) 0 d) 1

Ans: - b) -3

5) The solution of the equation $7n + 5 = 12$ is

- a) 0 b) -1 c) 1 d) 5

Ans :c) 1

ii) Case Study Based Questions:-

NUMBER GAME

1. I am a number. If you multiply me by 3 and subtract 2 from me, I become 10 more than my double. What is my value?

- (a) 4 (b) 8 (c) 10 (d) 12

Ans: d) 12

2. What minimum positive integral value must be added to the number obtained in question 1 to make it a perfect cube.

- (a) 15 (b) 4 (c) 3 (d) 13

Ans: a) 15

3. If 6 is added, only to the right hand side of the equation obtained in question 1, will the value of the number also increase by 6. Justify your answer.

Ans: - Yes, Justification: $3x-2=2x+10+6 \Rightarrow x=18=12+6$

Short Answer type Questions:-

1) Write the following statements in the form of equations:

- (i) The sum of three times x and 11 is 32.
(ii) If you subtract 5 from 6 times a number, you get 7.

Solution:

(i) Three times x is $3x$. Sum of $3x$ and 11 is $3x + 11$. The sum is 32.

The equation is $3x + 11 = 32$.

(ii) Let us say the number is z ; z multiplied by 6 is $6z$. Subtracting 5 from $6z$, one gets $6z - 5$.

The result is 7. The equation is $6z - 5 = 7$

2) Convert the following equations in statement form: (i) $x - 5 = 9$ (ii) $5p = 20$

- Solution: (i) Taking away 5 from x gives 9.
(ii) Five times a number p is 20.

3) Solve : $x + 5 = 7$

Solution: add -5 on both sides, we get $x + 5 - 5 = 7 - 5$
 $x = 2$

Long Answer type Questions

1) Find a number, such that one-fourth of the number is 3 more than 7.

Solution :

Let us take the unknown number to be y ; one-fourth of y is $\frac{y}{4}$

This number $\frac{y}{4}$ is more than 7 by 3.

Hence we get the equation for y as $\frac{y}{4} - 7 = 3$

To solve this equation, first transpose 7 to RHS We get, $\frac{y}{4} = 3 + 7 = 10$.

We then multiply both sides of the equation by 4, to get

$\frac{y}{4} \times 4 = 10 \times 4$ or $y = 40$ (the required number)

2) Raju's father's age is 5 years more than three times Raju's age. Find Raju's age, if his father is 44 years old.

Solution :

The equation that gives Raju's age is $3y + 5 = 44$

To solve it, we first transpose 5, to get $3y = 44 - 5 = 39$

Dividing both sides by 3, we get $y = 13$

Hence Raju's age is 13 years.

III. Questions for Practice

i) MCQ

1. Write the following statement in the form of equation one eight of x is 5 more than 3.

(a) $x/8 + 5 = 3$ (b) $x/8 - 3 = 5$ (c) $3/x - 8 = 5$ (d) $x/8 - 5 = 3$

2. Add 9 to three times P to get 100.

(a) $3P + 9 = 100$ (b) $3P - 100 = 9$ (c) $3P + 100 = 9$ (d) $3P - 9 = 100$

3. Shweta's mother's age is 7 years more than four times of shweta's age. Shweta's mother's age is 55 years old. Set up an equation to find shweta's age.

(a) $4m + 7 = 55$ (b) $4m - 7 = 55$ (c) $4m + 55 = 7$ (d) $4m - 55 = 7$

4. the sum of three times x and 13 is 34.

(a) $3x - 13 = 34$ (b) $3x + 13 = 34$ (c) $3x - 34 = 3$ (d) $3x + 13 = 34$

5. Choose the correct value of variable which satisfy following equation.

$$4n + 17 = 25$$

(a) 1(b) 2(c) 3(d) 4

6. Write the following equation in statement forms. $7x + 8 = 53$

(a) Seven times of x plus 8 gives 53(b) 8 times of y plus + 7 gives = 53

(c) Seven times of x plus 9 gives 63(d) 8 times of x minus 7 gives 53

7. Solve $3P - 6 = 18$ and find the value of P?

(a) 4(b) 2(c) 8(d) 3

8. Solve $m/5 + 20 = 45$ find the value of m?

(a) $m = 45$ (b) $m = 20$ (c) $m = 120$ (d) $m = 125$

9. Solve the following equation $2(x + 5) = 14$

(a) 3(b) 4(c) 2(d) 1

10. Solve the equation $x/7 + 20 = 34$

(a) 98(b) 72(c) 84(d) 70

ii) Short Answer Type Questions:-

1. Solve the following equation.

Add 6 to four times a number you get 62.

2. Solve the equation $x/7 + 20 = 34$

3. In an isosceles triangle, the base angles are equal. The vertex angle is 80° . What are the base angles of the triangle?

4. If $k + 7 = 10$, find the value of $9k - 50$.

5. If 5 is added to twice a number, the result is 29. Find the number.

6. Write the following statements in the form of equations.

One-fourth of a number is 2 more than 5.

7. Convert the following equations in statement form:

(a) $5x = 20$

(b) $3y + 7 = 1$

Long Answer type Questions:-

1. The sum of three consecutive multiples of 2 is 18. Find the numbers.

2. Each of the 2 equal sides of an isosceles triangle is twice as large as the third side. If the perimeter of the triangle is 30 cm, find the length of each side of the triangle.

3. A man travelled two-fifth of his journey by train, one-third by bus, one-fourth by car and the remaining 3 km on foot. What is the length of his total journey?

4. The length of a rectangle is twice its breadth. If its perimeter is 60 cm, find the length and the breadth of the rectangle.

5. Solve $4(m + 3) = 18$

6. Set up the equation and solve the following statement

Anwar thinks of a number. If he takes away 7 from $\frac{5}{2}$ of the number, the result is 23

Case Study Based Questions:-

1. BANANAS

A school was celebrating Republic day. On that day, school decided to give some refreshment to the students after all the events. They decided to give 2 bananas per student. But, on the celebration day, 300 students were absent. As a result, each student got 1 extra banana.

a) Find the minimum number of bananas school has to bring for total 's' number of students.

b) Find total number of students in the school.

c) Suppose on that day 600 students were absent then how many extra bananas will each student get?

d) School funded Rs3000 for the bananas. The cost of one banana is Rs2. After some discount, seller got ready to give the minimum number of bananas required by the school for Rs 3000. Find the cost of one banana.

2. SPORTS CLUB

Rajeev pays Rs225 in advance on his account at a sports club. Each time, he visits the club, Rs 9 is deducted from the account.

a) Which of the following equations represent the balance "x" left in his account after "t" number of days?

(a) $t=225+9x$ (b) $x=9+225t$ (c) $x=225-9t$ (d) $t= 225-9x$

b) How much balance (in Rs) is left in Rajeev’s account after 20 visits?

- (a) 54 (b) 45 (c) 36 (d) 60

c) After how many days, Rajeev have to recharge his account?

Answers for III. Questions for Practice

MCQ	<u>S.A</u>	<u>L.A</u>	Case Study Based Questions
1) b	1) 14	1) 4, 6, 8	1) a) $2x$
2) a	2) 98	2) 6, 12, 12	b) $2x / (x-300)$
3) a	3) 50	3) 180 km	c) 4
4) d	4) $k = -23$	4) 10 , 20	d) 1.66 approx
5) b	5) 12	5) $3/2$	
6) a	6) $\frac{1}{4} x = 7$	6) 23	2) a) c
7) c	7) (a) Five times a number x gives 20. (b) Add 7 to three times a number y gives 1.		b) b
8) d			c) 25 days
9) c			
10) a			

Chapter Test Marks : 20

I Choose the correct answer:-

2 x 1 =2 marks

1. Add 9 to three times P to get 100.

- (a) $3P + 9 = 100$ (b) $3P - 100 = 9$ (c) $3P + 100 = 9$ (d) $3P - 9 = 100$

3. Shweta’s mother’s age is 7 years more than four times of shweta’s age. Shweta’s mother’s age is 55 years old. Set up an equation to find shweta’s age.

- (a) $4m + 7 = 55$ (b) $4m - 7 = 55$ (c) $4m + 55 = 7$ (d) $4m - 55 = 7$

II. Answer the following :

3 X 2 = 6 Marks

3. If $k + 7 = 10$, find the value of $9k - 50$.

4. If 5 is added to twice a number, the result is 29. Find the number.

5. Write the following statements in the form of equations.

One-fourth of a number is 2 more than 5.

III. Answer the following:-

3 x 4 = 12 Marks

6. A man travelled two-fifth of his journey by train, one-third by bus, one-fourth by car and the remaining 3 km on foot. What is the length of his total journey?

7. The length of a rectangle is twice its breadth. If its perimeter is 60 cm, find the length and the breadth of the rectangle.

8. Solve $4(m + 3) = 18$

I Choose the correct answer:-**4 x 1 =4 marks**

- 1)) Write the Simple equation of the statement “ The sum of three times x and 10 is 13”
 a) $3x + 10 = 13$ b) $3x - 10 = 13$ c) $3x + 13 = 10$ d) None
- 2) Write the Simple equation of the statement “ Taking away 5 from x gives 10”
 a) $x + 5 = 10$ b) $x - 10 = 5$ c) $x - 5 = 10$ d) None
- 3) Write the Simple equation of the statement “ Add 1 to three times p to get 7”
 a) $1 + p = 7$ b) $3 + p = 7$ c) $7 + p = 3$ d) $1 + 3p = 7$
- 4) The solution of the equation $x + 3 = 0$ is
 a) 3 b) - 3 c) 0 d) 1

II. Answer the following :**3 X 2 = 6 Marks**

5. Solve the following equation.

Add 6 to four times a number you get 62.

6. Solve the equation $x/7 + 20 = 34$ 7. In an isosceles triangle, the base angle are equal. The vertex angle is 80° . What are the base angles of the triangle?**III. Answer the following:-3x 4 = 12Marks**

8. The sum of three consecutive multiples of 2 is 18. Find the numbers.

9. Set up the equation and solve the following statement

Anwar thinks of a number. If he takes away 7 from $\frac{5}{2}$ of the number, the result is 23

10. Raju's father's age is 5 years more than three times Raju's age. Find Raju's age, if his father is 44 years old.

Case Study Based Questions :-**2 x 4 = 8 marks****11. BANANAS**

A school was celebrating Republic day. On that day, school decided to give some refreshment to the students after all the events. They decided to give 2 bananas per student. But, on the celebration day, 300 students were absent. As a result, each student got 1 extra banana.

- a) Find the minimum number of bananas school has to bring for total 's' number of students.
 b) Find total number of students in the school.
 c) Suppose on that day 600 students were absent then how many extra bananas will each student get?
 d) School funded Rs3000 for the bananas. The cost of one banana is Rs2. After some discount, seller got ready to give the minimum number of bananas required by the school for Rs 3000. Find the cost of one banana.

12. SPORTS CLUB

Rajeev pays Rs225 in advance on his account at a sports club. Each time, he visits the club, Rs 9 is deducted from the account.

- a) Which of the following equations represent the balance “x” left in his account after “t” number of days?
 (a) $t=225+9x$ (b) $x=9+225t$ (c) $x=225-9t$ (d) $t= 225-9x$
- b) How much balance (in Rs) is left in Rajeev's account after 20 visits?
 (a) 54 (b) 45 (c) 36 (d) 60
- c) After how many days, Rajeev have to recharge his account?

LINE AND ANGLES

INTRODUCTION – In earlier classes we have learnt about lines, line segments, rays, angles, acute, obtuse, right and reflex angles. We shall learn about complementary angles, supplementary angles, pair of lines, intersecting lines, parallel lines and transversal.

We shall also learn about angle made by a transversal with parallel lines & non-parallel lines

Complementary Angles: When the sum of the measures of two angles is 90° , the angles are complementary angles. Each angle is said to be complement of the other angle.

Supplementary Angles: When the sum of the measures of two angles is 180° , then the angles are supplementary angles. Each angle is said to be supplement of the other angle.

Angles made by Transversal to Two Parallel Lines

Property 1: Pairs of alternate (interior/exterior) angles are equal.

Alternate Interior Angles: $\angle 3 = \angle 6$ $\angle 4 = \angle 5$

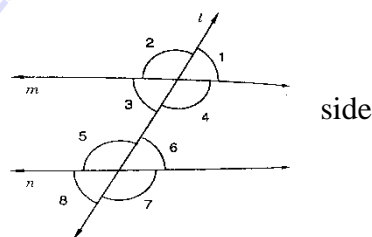
Alternate Exterior Angles: $\angle 1 = \angle 8$ $\angle 2 = \angle 7$

Property 2: Pairs of Corresponding Angles are equal.

$\angle 1 = \angle 5$ $\angle 2 = \angle 6$ $\angle 3 = \angle 7$ $\angle 4 = \angle 8$

Property 3: The sum of the interior angles on the same side of the transversal is 180° or Supplementary.

$\angle 3 + \angle 5 = \angle 4 + \angle 6 = 180^\circ$



II SOME EXAMPLES WITH SOLUTIONS:

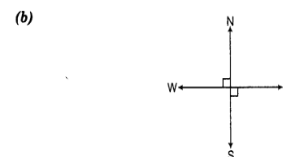
M.C.Q

- The angles between North and West and South and East are
 (a) complementary (b) supplementary
 (c) both are acute (d) both are obtuse

Answer: From the above figure, it is clear that the angle between North and West is 90° and South and East is 90° .

\therefore Sum of these two angles = $90^\circ + 90^\circ = 180^\circ$

Hence, the two angles are supplementary, as their sum is 180° .



- If the complement of an angle is 79° , then the angle will be of
 (a) 1° (b) 11°
 (c) 79° (d) 101°

Answer: (b) Let the angle be x° . Then, the complement of x will be $(90 - x)^\circ$.
 Given, complement of x° is 79° .

\therefore $(90 - x)^\circ = 79^\circ$

\Rightarrow $x^\circ = 90^\circ - 79^\circ = 11^\circ$

Therefore, the required angle is 11° .

Note Sum of the complementary angles is 90° .

3. The angles $x - 10^\circ$ and $190^\circ - x$ are
 (a) interior angles on the same side of the transversal
 (b) making a linear pair
 (c) complementary
 (d) supplementary

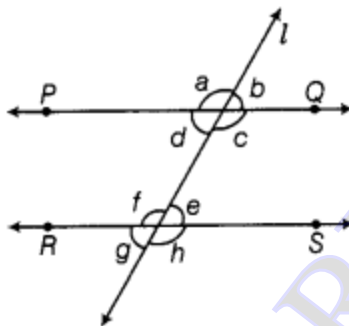
Answer:(d) Sum of the given angles

$$= (x - 10^\circ) + (190^\circ - x) = x - 10^\circ + 190^\circ - x$$

$$= (x-x) + (190^\circ - 10^\circ) = 0 + 180^\circ = 180^\circ$$

Since, the sum of given angles is 180° , Hence, they are supplementary.

4. In the given figure, $PQ \parallel RS$ and $a : b = 3 : 2$. Then, f is equal to



(a) 36°

(c) 72°

(b) 108°

(d) 144°

Answer: (b) We have, $a:b = 3:2$

Let $a = 3x$ and $b = 2x$

Since, a and b form a linear pair.

$$\therefore a + b = 180^\circ$$

$$\Rightarrow 3x + 2x = 180^\circ$$

$$\Rightarrow 5x = 180^\circ$$

$$\Rightarrow x = \frac{180^\circ}{5}$$

$$\Rightarrow x = 36^\circ$$

$$\therefore a = 3x \Rightarrow a = 3 \times 36^\circ = 108^\circ$$

$$\text{Now, } f = a$$

$$\Rightarrow f = 108^\circ$$

[\because sum of linear pair of angles is 180°]

[corresponding angles]

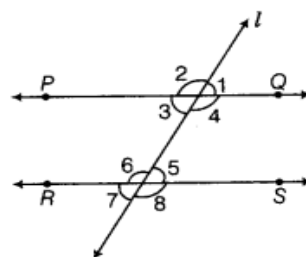
Short-Answer Type Questions:

- If two supplementary angles have equal measures. What is the measure of each angle?
 Ans : $90^\circ, 90^\circ$
- If two complementary angles have equal measures. What is the measure of each angle?
 Ans : $45^\circ, 45^\circ$
- If two supplementary angles in the ratio of 1:2. Find the angles.

Ans : $60^\circ, 120^\circ$

Long-Answer Type Questions:

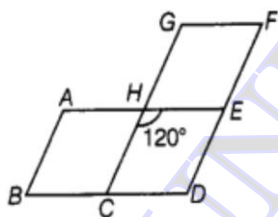
1. In the given figure, $PQ \parallel RS$. If $\angle 1 = (2a + b)^\circ$ and $\angle 6 = (3a - b)^\circ$, then the measure of $\angle 2$ in terms of b is



Solution:

(c) From the given figure, $\angle 1 = \angle 5$ [corresponding angles]
 $\Rightarrow \angle 5 = (2a + b)^\circ$ [$\because \angle 1 = (2a + b)^\circ$, given]
 Also, $\angle 5 + \angle 6 = 180^\circ$ [linear pair]
 $\Rightarrow (2a + b)^\circ + (3a - b)^\circ = 180^\circ$ [$\because \angle 6 = (3a - b)^\circ$, given]
 $\Rightarrow (2a + 3a) + (b - b) = 180^\circ$
 $\Rightarrow 5a = 180^\circ$
 $\Rightarrow a = \frac{180^\circ}{5}$
 $\Rightarrow a = 36^\circ$
 Now, $\angle 1 + \angle 2 = 180^\circ$ [linear pair]
 $\Rightarrow \angle 2 = 180^\circ - \angle 1$
 $\Rightarrow \angle 2 = 180^\circ - (2a + b)^\circ$ [$\because \angle 1 = (2a + b)^\circ$, given]
 $\Rightarrow \angle 2 = 180^\circ - 2a - b$
 $\Rightarrow \angle 2 = 180^\circ - 2 \times 36^\circ - b$ [$\because a = 36^\circ$]
 $\Rightarrow \angle 2 = 180^\circ - 72^\circ - b$
 $\Rightarrow \angle 2 = (108 - b)^\circ$

2. In the given figure, $AE \parallel GF \parallel BD$, $AB \parallel CG \parallel DF$ and $\angle CHE = 120^\circ$. Find $\angle ABC$ and $\angle CDE$.



Solution:

Since, $BD \parallel AE$ and CG is transversal.

Therefore, $\angle BCH = \angle EHC$ [alternate interior angles]

$\Rightarrow \angle BCH = 120^\circ$

Again, $CG \parallel DF$ and BD is transversal.

Therefore, $\angle BCH = \angle CDE$ [corresponding angles]

$\Rightarrow \angle CDE = 120^\circ$

Also, $AB \parallel CG$ and BC is transversal.

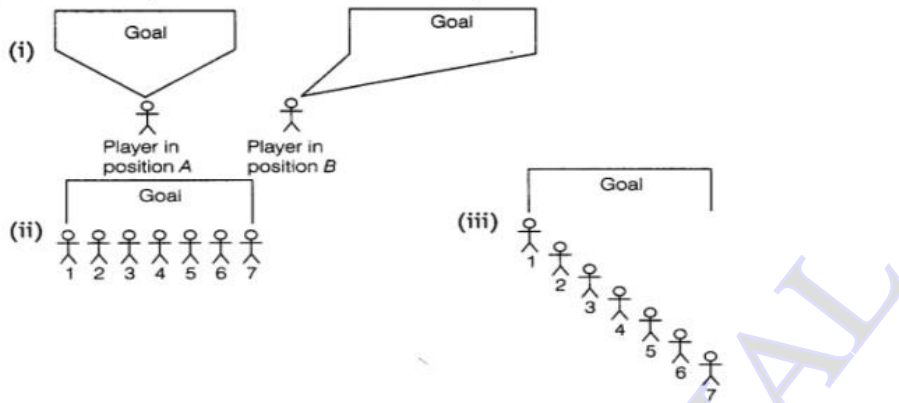
Therefore, $\angle ABC + \angle BCH = 180^\circ$ [consecutive angles]

$\Rightarrow \angle ABC = 180^\circ - 120^\circ$

$\Rightarrow \angle ABC = 60^\circ$

Case Study Based

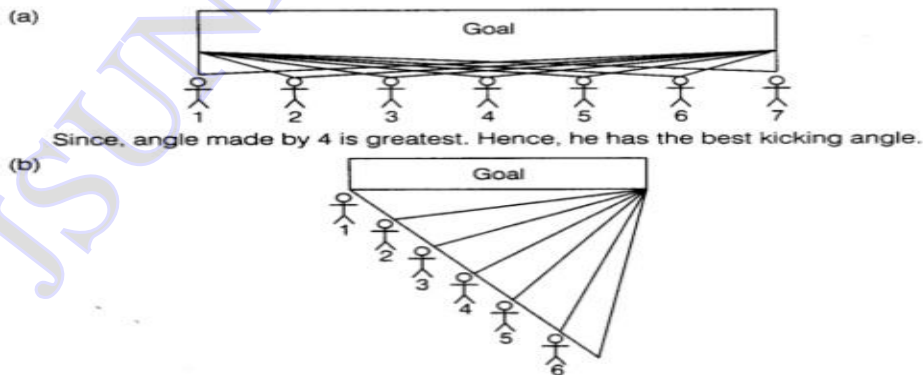
1. The drawings below (figure), show angles formed by the goalposts at different positions of a football player. The greater the angle, the better chance the player has of scoring a goal. e.g. The player has a better chance of scoring a goal from position A than from position B.



In parts (a) and (b) given below, it may help to trace the diagrams and draw and measure angles.

- (a) Seven football players are practicing their kicks. They are lined up in a straight line in front of the goalpost [figure (ii)]. Which player has the best (the greatest) kicking angle?
- (b) Now the players are lined up as shown in figure (iii). Which player has the best kicking angle?
- (c) Estimate atleast two situations, such that the angles formed by different positions of two players are complement to each other.

Solution:



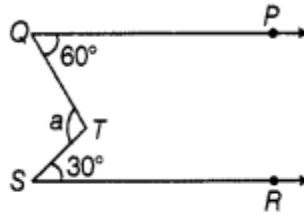
From the above figure, we can say that player 4 has the best kicking angle, as it is greatest.

- (c) Since, the angles are complementary. Hence, two situations are $45^\circ, 45^\circ$ and $30^\circ, 60^\circ$.

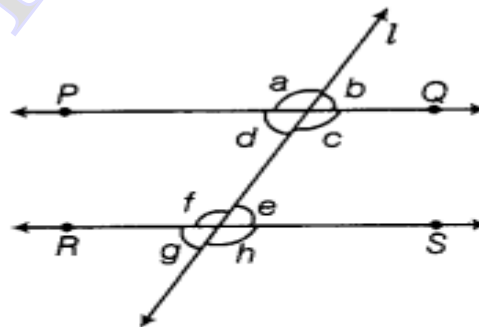
III Questions For Practice

MCQ Based Questions:

1. In the given figure, if $QP \parallel SR$, the value of a is

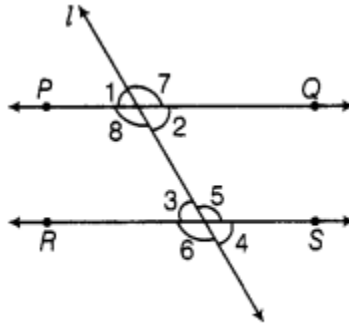


- (a) 40° (b) 30° (c) 90° (d) 80°
2. The angles $x - 10^\circ$ and $190^\circ - x$ are
 (a) interior angles on the same side of the transversal
 (b) making a linear pair
 (c) complementary
 (d) supplementary
3. The angles x and $90^\circ - x$ are
 (a) supplementary (b) complementary
 (c) vertically opposite (d) making a linear pair
4. If the complement of an angle is 79° , then the angle will be of
 (a) 1° (b) 11°
 (c) 79° (d) 101°
5. Angles between South and West and South and East are
 (a) vertically opposite angles (b) complementary angles
 (c) making a linear pair (d) adjacent but not supplementary
6. In the given figure, $PQ \parallel RS$ and $a : b = 3 : 2$. Then, f is equal to

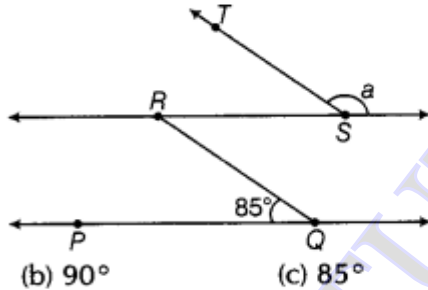


- (a) 36° (b) 108°
 (c) 72° (d) 144°

7. In the given figure, line l intersects two parallel lines PQ and RS . Then, which one of the following is not true?



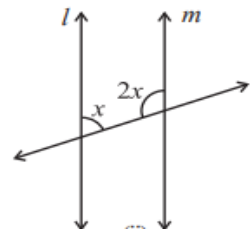
- (a) $\angle 1 = \angle 3$ (b) $\angle 2 = \angle 4$ (c) $\angle 6 = \angle 7$ (d) $\angle 4 = \angle 8$
8. In the above figure (Q. No. 7), which one of the following is not true?
 (a) $\angle 1 + \angle 5 = 180^\circ$ (b) $\angle 2 + \angle 5 = 180^\circ$
 (c) $\angle 3 + \angle 8 = 180^\circ$ (d) $\angle 2 + \angle 3 = 180^\circ$
9. In the above figure (Q.No. 7), which of the following is true?
 (a) $\angle 1 = \angle 5$ (b) $\angle 4 = \angle 8$ (c) $\angle 5 = \angle 8$ (d) $\angle 3 = \angle 7$
10. In the given figure, if $PQ \parallel RS$ and $QR \parallel TS$, then the value of a is



- (b) 90° (c) 85° (d) 75°

Short Answer Type Questions

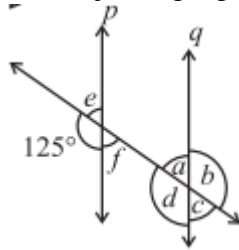
- Can two acute angles be complement to each other?
- Can two obtuse angles be complement to each other?
- Can two right angles be complement to each other?
- The difference in the measures of two complementary angles is 12° . Find the measures of the angles?
- Find at least two examples from your surroundings where lines intersect at right angles?
- Suppose two lines are given. How many transversals can you draw for these lines?
- If a line is transversal to three lines, how many points of intersection are there?
- If two lines intersect, do they always intersects at right angles?
- Find the value of x in each of the following figures if $l \parallel m$.



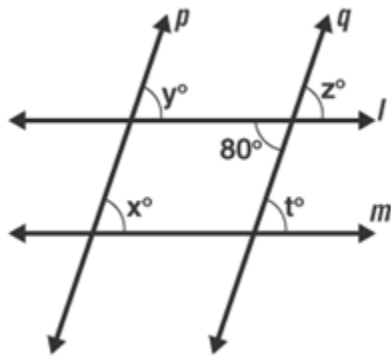
10. What will be the measure of the supplement of the angle 169°

Long Answer Type Questions

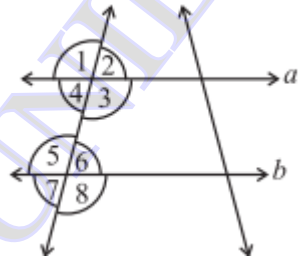
1. In the adjoining figure, $p \parallel q$. Find the unknown angles.



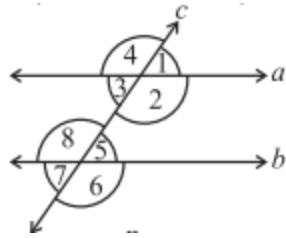
2. Draw any rectangle and find the measures of angles at the four vertices made by the intersecting lines.
3. $l \parallel m$ and $p \parallel q$. Find the values of x , y , z , t .



4. Among two supplementary angles, the measure of the larger angle is 44° more than the measure of the smaller. Find their measures?
5. State the property that is used in each of the following statements?
- If $a \parallel b$, then $\angle 1 = \angle 5$.
 - If $\angle 4 = \angle 6$, then $a \parallel b$.
 - If $\angle 4 + \angle 5 = 180^\circ$, then $a \parallel b$.



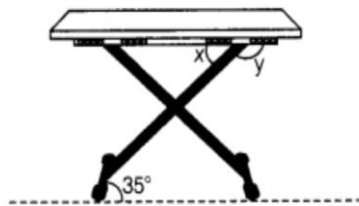
6. In the adjoining figure, identify
- the pairs of corresponding angles.
 - the pairs of alternate interior angles.
 - the pairs of interior angles on the same side of the transversal



Case Study Based Questions

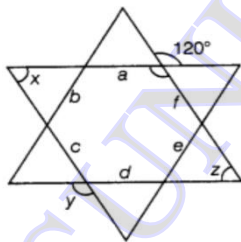
1. The legs of a stool make an angle of 35° with the floor, as shown in the given figure. Answer the following questions :

- (i) Find the angle value of x .
- (ii) Find the angle value of y .



2. Amisha makes a star with the help of line segments a, b, c, d, e and f , in which $a \parallel d, b \parallel e$ and $c \parallel f$. Chhaya marks an angle as 120° as shown in the given figure and Amisha to find the

- (i) Value of x
- (ii) Value of y
- (iii) Value of z



ANSWERS :

III Questions For Practice

MCQ Based Questions: Answers

1 (c) 2 (d) 3 (b) 4 (b) 5 (c) 6 (b) 7 (d) 8 (d) 9 (c) 10 (a)

Short Answer Type Questions

- 1 Yes 2 No 3 No 4 51° & 39° 5 Student Desk, Edges of geometry box
 6 Infinite 7 Three points of intersection 8 No 9 60° 10 11°

Long Answer Type Questions

- 1 $a = 55^{\circ}$, $b = 125^{\circ}$, $c = 55^{\circ}$, $d = 125^{\circ}$, $e = 55^{\circ}$, $f = 55^{\circ}$
 2 Each angle is 90° 3 $x = y = z = t = 80^{\circ}$ 4 68° , 112°
 5 (i) Yes, Pair of corresponding angles
 (ii) Yes, If pair of alternate interior angles are equal then the lines are parallel.
 (iii) Yes, If the angle sum on the same side of the transversal is 180° then the lines are parallel.
 6 (i) $\angle 1$ & $\angle 5$, $\angle 4$ & $\angle 8$, $\angle 3$ & $\angle 7$, $\angle 2$ & $\angle 6$ (ii) $\angle 3$ & $\angle 5$, $\angle 2$ & $\angle 8$,
 (iii) $\angle 2$ & $\angle 5$, $\angle 3$ & $\angle 8$,

Case Study Based Questions

- 1 (i) $x = 35^{\circ}$ (ii) $Y = 145^{\circ}$ 2 (i) $x = 60^{\circ}$ (ii) $Y = 145^{\circ}$ (iii) $Z = 60^{\circ}$

CHAPTER TEST 1- LINES AND ANGLES

Time : 30 min

Class : VII

M.M:20

SECTION – A

(1 × 4 = 4)

- The measure of supplement of the angle 135° is
 (a) 47° (b) 45° (c) 90° (d) 55°
- The measure of complement of the angle 89° is
 (a) 11° (b) 10° (c) 1° (d) 2°
- If two lines are parallel and a transversal intersect to them then each pair of corresponding angles are
 (a) 90° (b) 180° (c) equal (d) none of these
- If two supplementary angles are in the ratio 3 : 7. Then the smaller angle value is
 (a) 126° (b) 18° (c) 54° (d) 10°

SECTION – B

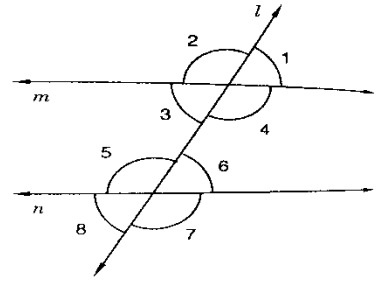
(2 × 3 = 6)

- Find the angle which is equal to its complement.
- Find the angle which is equal to its supplement.
- If a transversal intersects two lines at distinct points then how many pairs of alternate exterior angles formed.

SECTION – C

(3 × 2 = 6)

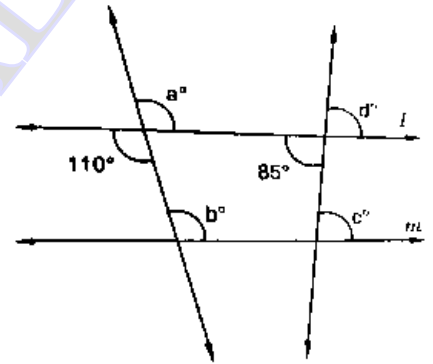
- An angle is equal to five times its complement. Determine its measure.
- In figure lines l and m and $\angle 1 = 65^{\circ}$. Find $\angle 5$ and $\angle 8$.



SECTION – D

(4 × 1 = 4)

10. In figure line $l \parallel m$. Find the values of a, b, c, d. Give reasons



CHAPTER TEST 2- LINES AND ANGLES

Time : 45 min

M.M:30

SECTION – A

(1 × 6 = 6)

- Find the measure of the angle which is double of its complementary angle?
(a) 60° (b) 30° (c) 45° (d) 120°
- Find the measure of the angle which is half of its supplementary angle?
(a) 60° (b) 120° (c) 90° (d) 45°
- The measure of the supplement of the angle 179° is
(a) 1° (b) 2° (c) 3° (d) 4°
- The measure of the compliment of the angle 10° is
(a) 20° (b) 40° (c) 60° (d) 70°
- In the following figure, which pair of angles are not the corresponding angles
(a) $\angle 1, \angle 5$ (b) $\angle 3, \angle 7$ (c) $\angle 2, \angle 6$ (d) $\angle 3, \angle 5$
- In the above figure which pair of angles are alternate interior angles?
(a) $\angle 1, \angle 5$ (b) $\angle 2, \angle 6$ (c) $\angle 3, \angle 7$ (d) $\angle 3, \angle 5$

SECTION – B

(2 × 5 = 10)

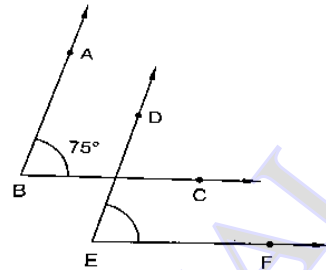
- If two supplementary angles have equal measures. what is the measure of each angle.
- If two complementary angles have equal measures what is the measure of each angle.
- An angle is equal to four times its compliment. Determine its measure.
- Line $l \parallel$ line m, n is a transversal and $\angle 1 = 40^\circ$. Find all the other angles form between transversal and lines.

11. Measures (in degree) of two supplementary angles are consecutive odd integers, Find the angles value.

SECTION – C

(3 × 3 = 9)

12. Find the measure of an angle which is compliment of itself.
13. Two supplementary angles differ by 34° . Find the angles.
14. In fig., the corresponding arms of $\angle ABC$ and $\angle DEF$ are parallel. If $\angle ABC = 75^\circ$, find $\angle DEF$.

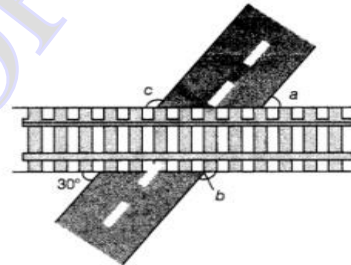


SECTION – D

(2 + 1 + 2)

15. A road crosses a railway line at an angle of 30° as shown in figure

- (i) Find the value of a.
(ii) Find the value of b
(iii) Find the value of c



THE TRIANGLE AND ITS PROPERTIES

I. Important Concepts/ Result

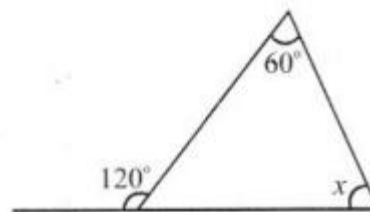
1. The six elements of a triangle are its three angles and the three sides.
2. The line segment joining a vertex of a triangle to the mid point of its opposite side is called a median of the triangle. A triangle has 3 medians.
3. The perpendicular line segment from a vertex of a triangle to its opposite side is called an altitude of the triangle. A triangle has 3 altitudes.
4. An exterior angle of a triangle is formed, when a side of a triangle is produced. At each vertex, you have two ways of forming an exterior angle.
5. A property of exterior angles: The measure of any exterior angle of a triangle is equal to the sum of the measures of its interior opposite angles.
6. The angle sum property of a triangle: The total measure of the three angles of a triangle is 180° .
7. A triangle is said to be equilateral, if each one of its sides has the same length. In an equilateral triangle, each angle has measure 60° .
8. A triangle is said to be isosceles, if atleast any two of its sides are of same length. The non-equal side of an isosceles triangle is called its base; the base angles of an isosceles triangle have equal measure.
9. Property of the lengths of sides of a triangle:
10. The sum of the lengths of any two sides of a triangle is greater than the length of the third side. The difference between the lengths of any two sides is smaller than the length of the third side.

II Some illustrations/Examples

(i) MCQs

1. How many medians can a triangle have?
(a) 2 (b) 1 (c) 3 (d) 0
Answer: (c) 3
2. Which is the longest side of a right triangle?
(a) Perpendicular (b) Base (c) Hypotenuse (d) none of these.
Answer: (c) hypotenuse

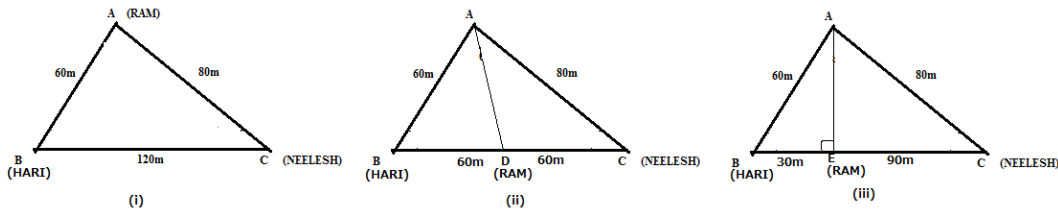
3. Find the value of x in given figure.
(a) 180° (b) 55° (c) 90° (d) 60°
Solution: Sum of interior opposite angles = Exterior angle or $60^\circ + x = 120^\circ$ or $x = 60^\circ$



4. Which of the following are the angles of an isosceles right-angled triangle.
a) $60^\circ, 60^\circ, 60^\circ$ b) $45^\circ, 45^\circ, 90^\circ$
c) $50^\circ, 50^\circ, 80^\circ$ d) $30^\circ, 30^\circ, 120^\circ$

ii) Case study

Triangles: Three friends Ram, Hari & Neelesh are standing at position A, B & C respectively as shown in figure (i). Ram wants to join the line through Hari & Neelesh. Hari suggest Ram to move along AD & take the position at D as in figure (ii). Neelesh suggest Ram to move along AE & take the position at E as in figure (iii).



- i. In figure (ii) AD is _____ (median/altitude).
- ii. In figure (iii) AE is _____ (median/altitude).
- iii. If Ram wants to join line BC soon, then whose suggestion is fair & why?
- iv. Following statements are true or false-

S.No.	Statement	True/False
1	ΔABD is isosceles	
2	$BE=EC$	
3	ΔABC is right angled	

(ii) **Short answer type questions**

1. Find the value of x in given figure.

Solution: By angle sum property of a triangle,
 $\angle U + 30^\circ + 122^\circ = 180^\circ$
 $\angle U = 180^\circ - 152^\circ = 28^\circ$

2. The lengths of two sides of a triangle are 6 cm and 8 cm. Between which two numbers can length of the third side fall?
3. **Solution:** We know that the sum of two sides of a triangle is always greater than the third.

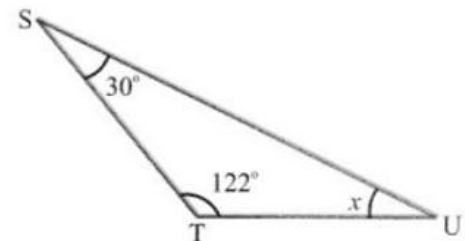
Therefore, third side has to be less than the sum of the two sides. The third side is thus, less than $8 + 6 = 14$ cm. The side cannot be less than the difference of the two sides. Thus, the third side has to be more than $8 - 6 = 2$ cm. The length of the third side could be any length greater than 2 and less than 14 cm.

4. State if these numbers 5, 7, 9 could possibly be the lengths of the sides of a triangle:

Solution: Yes, these numbers can be the lengths of the sides of a triangle because the sum of any two sides of a triangle is always greater than the third side.

Here, $5 + 7 > 9$, $5 + 9 > 7$, $9 + 7 > 5$

5. If the sides of a triangle are 3 cm, 4 cm and 6 cm long, determine whether the triangle is right-angled triangle.



Solution: In the given triangle, the largest side is 6 cm.

We know that in a right angled triangle, the sum of the squares of the smaller sides should be equal to the square of the largest side.

$$\text{Therefore, } 3^2 + 4^2 = 9 + 16 = 25$$

$$\text{But, } 6^2 = 36$$

$$3^2 + 4^2 = 25 \text{ which is not equal to } 6^2$$

Hence, the given triangle is not a right angled triangle.

6. If the angles of a triangle are in the ratio 1: 2: 3, determine three angles.

Solution: Given angles of the triangle are in the ratio 1: 2: 3

So take first angle as x , second angle as $2x$ and third angle as $3x$

We know that sum of all the angles of a triangle = 180°

$$x + 2x + 3x = 180^\circ$$

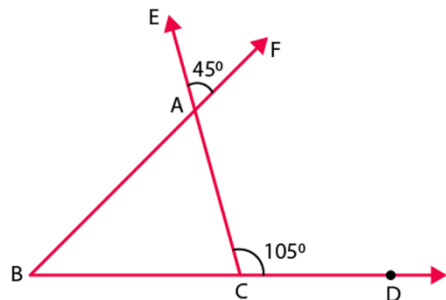
$$6x = 180^\circ$$

$$x = 30^\circ$$

$$2x = 30^\circ \times 2 = 60^\circ \quad 3x = 30^\circ \times 3 = 90^\circ$$

Therefore the first angle is 30° , second angle is 60° and third angle is 90° .

7. In the given figure, the sides BC, CA and BA of a $\triangle ABC$ are produced to D, E and F respectively. If $\angle ACD = 105^\circ$ and $\angle EAF = 45^\circ$; find all the angles of the $\triangle ABC$.



Solution: In a $\triangle ABC$, $\angle BAC$ and $\angle EAF$ are vertically opposite angles.

$$\text{Hence, } \angle BAC = \angle EAF = 45^\circ$$

Considering the exterior angle property, we have $\angle BAC + \angle ABC = \angle ACD = 105^\circ$

$$\text{On rearranging we get } \angle ABC = 105^\circ - 45^\circ = 60^\circ$$

We know that the sum of angles in a triangle is 180°

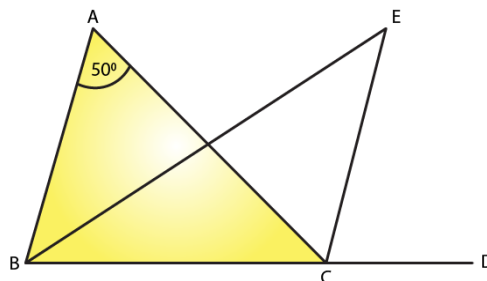
$$\angle ABC + \angle ACB + \angle BAC = 180^\circ$$

$$\angle ACB = 75^\circ$$

Therefore, the angles are 45° , 60° and 75°

8. In $\triangle ABC$, $\angle A = 50^\circ$ and BC is produced to a point D. The bisectors of $\angle ABC$ and $\angle ACD$ meet at E. Find $\angle E$.

Solution: In the given triangle,



$\angle ACD = \angle A + \angle B$. (Exterior angle is equal to the sum of two opposite interior angles.)

We know that the sum of all three angles of a triangle is 180° .

Therefore, for the given triangle, we know that the sum of the angles = 180°

$$\angle ABC + \angle BCA + \angle CAB = 180^\circ$$

$$\angle A + \angle B + \angle BCA = 180^\circ$$

$$\angle BCA = 180^\circ - (\angle A + \angle B)$$

But we know that EC bisects $\angle ACD$

$$\text{Therefore } \angle ECA = \angle ACD/2$$

$$\angle ECA = (\angle A + \angle B)/2 \text{ [}\angle ACD = (\angle A + \angle B)\text{]}$$

But EB bisects $\angle ABC$

$$\angle EBC = \angle ABC/2 = \angle B/2$$

$$\angle EBC = \angle ECA + \angle BCA$$

$$\angle EBC = (\angle A + \angle B)/2 + 180^\circ - (\angle A + \angle B)$$

Similarly, in $\triangle EBC$, we get,

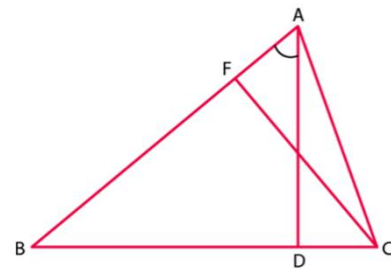
$$\angle B/2 + (\angle A + \angle B)/2 + 180^\circ - (\angle A + \angle B) + \angle BEC = 180^\circ$$

$$\angle BEC = \angle A + \angle B - (\angle A + \angle B)/2 - \angle B/2$$

$$\angle BEC = \angle A/2$$

$$\angle BEC = 50^\circ/2 = 25^\circ$$

9. In Fig.39, AD and CF are respectively perpendiculars to sides BC and AB of $\triangle ABC$. If $\angle FCD = 50^\circ$, find $\angle BAD$



Solution: We know that the sum of all angles of a triangle is 180°

Therefore, for the given $\triangle FCB$, we have

$$\angle FCB + \angle CBF + \angle BFC = 180^\circ$$

$$50^\circ + \angle CBF + 90^\circ = 180^\circ$$

$$\angle CBF = 180^\circ - 50^\circ - 90^\circ = 40^\circ$$

Using the above steps for $\triangle ABD$, we can say that:

$$\angle ABD + \angle BDA + \angle BAD = 180^\circ$$

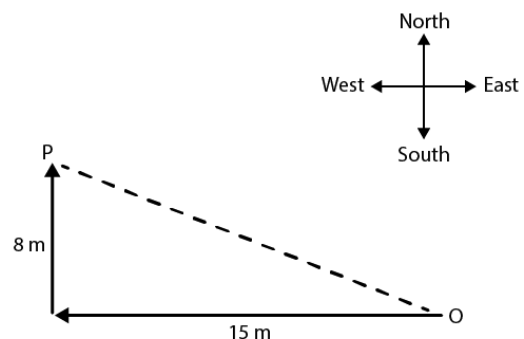
$$\angle BAD = 180^\circ - 90^\circ - 40^\circ = 50^\circ$$

10. A man goes 15 m due west and then 8 m due north. How far is he from the starting point?

Solution: Given a man goes 15 m due west and then 8 m due north. Let O be the starting point and P be the final point.

Then OP becomes the hypotenuse in the triangle.

So by using the Pythagoras theorem, we can find the distance OP.



$$OP^2 = 15^2 + 8^2$$

$$OP^2 = 225 + 64$$

$$OP^2 = 289$$

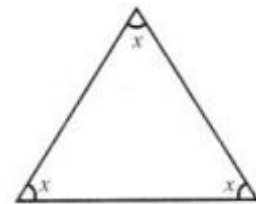
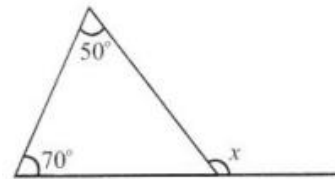
$$OP = 17$$

Hence, the required distance is 17 m.

III .Questions for Practice:

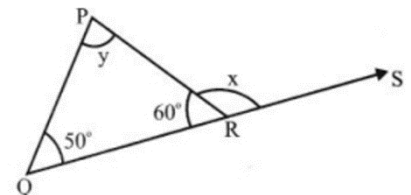
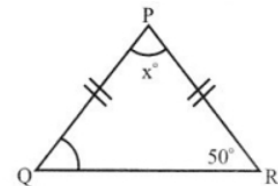
MCQs

- How many altitudes can a triangle have?
(a) 1 (b) 2 (c) 3 (d) 4
- A/an connects a vertex of a triangle to the midpoint of the opposite side.
(a) altitude (b) median (c) vertex (d) none of these
- Find the value of x in the adjoining figure.
(a) 50° (b) 70° (c) 120° (d) 180°
- In the Pythagoras property, the triangle must be
(a) acute angled (b) right angled
(c) obtuse angled (d) none of these
- Find the value of x in this figure.
(a) 40° (b) 60° (c) 35° (d) 180°
- ΔPQR is right angled at P. If $PQ = 3$ cm and $PR = 4$ cm, find QR.
(a) 7 cm (b) 5 cm (c) 2 cm (d) none of these.
- Which is the longest side in ΔPQR right angled at P?
(a) PQ (b) QR (c) PR (d) none of these.
- The hypotenuse of a right triangle is 17 cm long. If one of the remaining two sides is 8 cm in length, then the length of the other side is:
(a) 15 cm (b) 12 cm (c) 13 cm (d) none of these.
- How many acute angles can a right triangle have?
(a) 1 (b) 2 (c) 3 (d) 0
- The acute angles of right triangle are in the ratio 2 : 1. Find the measure of each of these angles.
(a) 55° and 35° (b) 60° and 30° (c) 50° and 40° (d) 45° and 45°
- One of the angles of a triangle is 100° and the other two angles are equal. Find the measure of each of these equal angles.
(a) 45° (b) 40° (c) 41° (d) 42°

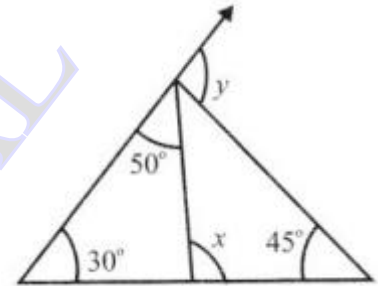
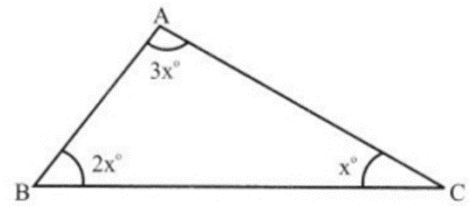


ii) Short answer type questions

- One of the exterior angles of a triangle is 120° , and the interior opposite angles are equal to each other. What is the measure of these two angles?
- Find the value of x in given figure.

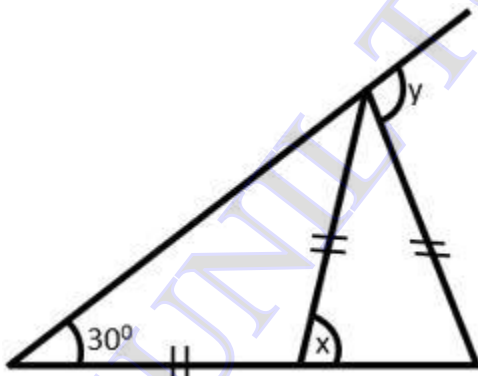


- Determine whether the triangle whose lengths of sides are 3 cm, 4 cm, 5 cm is a right-angled triangle.
- If the measures of the angles of a triangle are $(2p)^\circ$, $(3p - 15)^\circ$ and $(4p - 12)^\circ$. Find the value of p .
- Find the value of x and y in the figure.
- In the isosceles triangle, the vertical angle is 30° more than each of its base angles. Find all the angles of the triangle.
- Find the value of x in the figure
- If one angle of a triangle is 60° and the other two angles are in the ratio 1 : 2, then find the angles.
- Mohini walks 1200m due East and then 500m due North. How far is she from her starting point?
- Find the value of ' x ' and ' y ' in the given figure.
- In a $\triangle ABC$, AD is the altitude from A such that $AD = 12$ cm. $BD = 9$ cm and $DC = 16$ cm. Examine if $\triangle ABC$ is right angled at A .
- A student when asked to measure two exterior angles of $\triangle ABC$ observed that the exterior angles at A and B are of 103° and 74° respectively. Is this triangle possible? Why or why not?

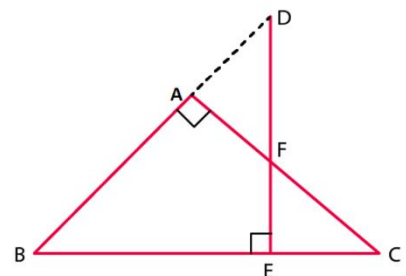


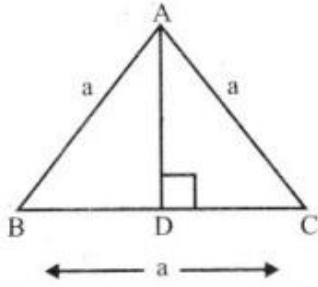
iii) Long answer type questions

- Find the value of ' x ' and ' y ' in the below given figure.

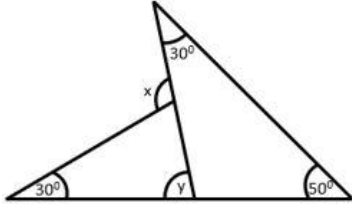


- Two poles of heights 6 m and 11 m stand on a plane ground. If the distance between their feet is 12 m. Find the distance between their tops.
- In the figure ABC is a right triangle right angled at A . D lies on BA produced and DE perpendicular to BC intersecting AC at F . If $\angle AFE = 130^\circ$, find
 - $\angle BDE$
 - $\angle BCA$
 - $\angle ABC$
- ABC is an equilateral triangle with side a . AD is an altitude. Find the value of AD^2 .

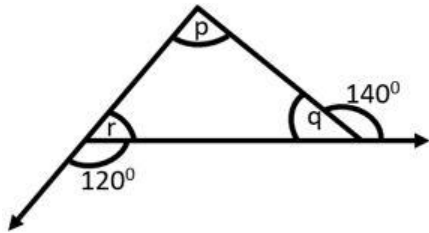




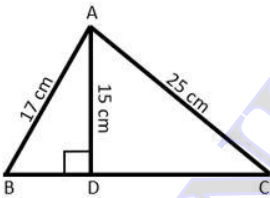
5. Find the value of 'x' and 'y' in the below given figure.



6. Find the value of 'p', 'q', and 'r' in the below given figure.



7. In the below given figure, $\angle ADB = 90^\circ$, $AB = 17$ cm, $AC = 25$ cm and $AD = 15$ cm. Find the value of BD .



8. A ladder 50 dm long when set against the wall of a house just reaches a window at a height of 48 dm. How far is the lower end of the ladder from the base of the wall?

iv) Case study:

Case study 1: BRIDGE

During an educational excursion, the Mathematics teacher observed triangles in a bridge over a river and showed them to the students. To emphasise the relatedness of math in daily life he just drew its simplified figure (side view) as shown here with following description:

$AD=AE=BE=BF=CF=CG=10$ m.

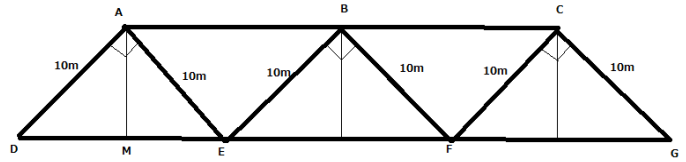


and $\angle A = \angle B = \angle C = 90^\circ$.

- (i) Count the no. of isosceles triangles in figure. A student Raman said that $\triangle ADE$, $\triangle BEF$ & $\triangle CFG$ are congruent.

Is his statement true?

- (ii) Value of $\angle D$ is
 (iii) Find the length of DE^2 .
 (iv) State following statements are true or false-



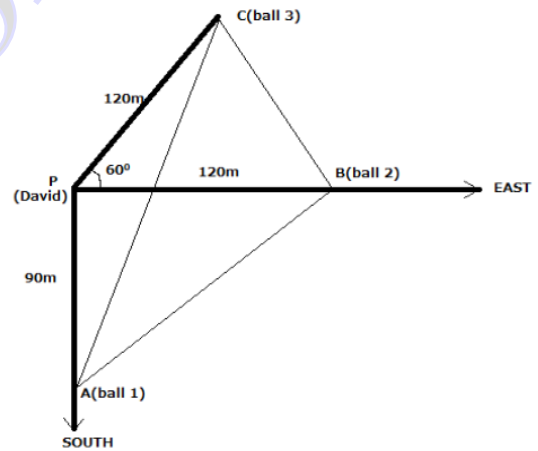
S.No.	Statement	True/False
1	Arun said : AM is altitude of $\triangle ADE$	
2	Deksha said : $DF = AC$	
3	Rakesh said : $AC = 20$ cm.	

Case study 2: GOLF HITS

A golfer David hits three balls from same point P one by one in different directions as shown in figure:

First hit towards south with range $PA = 90$ m.
 Second hit towards east with range $PB = 120$ m.
 Third hit towards 60° north of east with range $PC = 120$ m.

- (i) Type of $\triangle PBC$ is _____ (isosceles/equilateral)
 (ii) Name the right angle in figure (if any).
 (iii) How far is ball 1 from ball 2 ?
 (iv) How far is ball 2 from ball 3 ?
 (v) Use the appropriate sign in statement AC _____ $AB + BC$.



- (a) > (b) < (c) = (d) +

ANSWERS:

MCQs

1. (c) 3 2. (b) median 3. (c) 120° 4. (b) right angled 5. (b) 60°
 6. (b) 5 cm 7. (a) 15 cm 8. (b) 2 9. (b) 60° and 30° 10. (b) 40°

ii) Short answer type questions

1. 30° 2. 80° 3. Yes the triangle whose lengths of sides are 3 cm, 4 cm, 5 cm is a right-angled triangle.
 4. $p = 23$ 5. $x = 120^\circ$, $y = 70^\circ$ 6. 50° , 50° and 80° 7. 30° , 60° and 90°
 8. 40° and 80° 9. 1300 m 10. $x = 80^\circ$, $y = 75^\circ$

11. Yes $\triangle ABC$ is right angled at A.

12. No this triangle is not possible because then the two interior angles will be 77° and 106° and the sum of interior angles in a triangle is equal to 180°

iii) Long answer type questions

1. $x = 60^\circ, y = 90^\circ$

2. the distance between their tops is 13 m.

3. (i) $\angle BDE = 40^\circ$ (ii) $\angle BCA = 40^\circ$ (iii) $\angle ABC = 50^\circ$

4. $AD^2 = 3 a^2/4$

5. $x = 110^\circ, y = 80^\circ$

6. $q = 40^\circ, r = 60^\circ, p = 80^\circ$

7. $BD = 8$ cm

8. Distance of the ladder from the base of the wall is 14 dm

iv) Case study:

Case study 1

(i) no. of isosceles triangles in figure is 5. Yes $\triangle ADE, \triangle BEF$ & $\triangle CFG$ are congruent

(ii) Value of $\angle D$ is 45°

(iii) length of $DE = 200$ m

(iv)

S.No.	Statement	True/False
1	Arun said : AM is altitude of $\triangle ADE$	True
2	Deksha said : $DF = AC$	True
3	Rakesh said : $AC = 20$ cm.	False

Case study 2

GOLF HITS

(i) $\triangle PBC$ is isosceles triangle (ii) Angle APB is the right angle

(ii) Distance of ball 1 from ball 2 = 150 m

(iii) How far Distance of ball 2 from ball 3 = 120 m iv) $AC < AB + BC$.

Chapter Test

Time Allowed 1 hour.


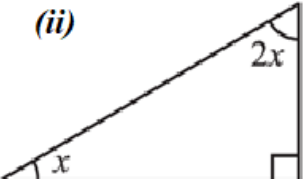
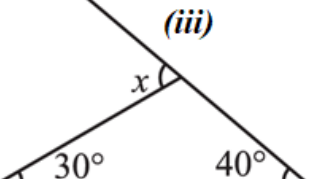
Maximum Marks: 20

General Instructions:

1. This Question Paper has 4 Sections A - D.
2. Section A has 4 MCQs carrying 1 mark each
3. Section B has 4 questions carrying 02 marks each.
5. Section C has 1 question carrying 04 marks.
6. Section D has 1 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory.
8. Draw neat figures wherever required.

SECTION A		
Q	Section A consists of 4 questions of 1 mark each.	M
1	How many altitudes can a triangle have? (a) 1 (b) 2 (c) 3 (d) 4	1
2	In right $\triangle ABC$, right angled at B, BA = 8 cm and BC = 15 cm. Find the length of the hypotenuse AC (a) 7 cm (b) 17 cm (c) 23 cm (d) 20 cm	1
3	In each of the following, there are three positive numbers. Which of these pairs could possibly be the lengths of the sides of a triangle: (a) 5, 7, 9 (b) 2, 10, 15 (c) 2, 5, 7 (d) 5, 8, 20	1
4	In each of the following, the measures of three angles are given. State in which case the angles can possibly be those of a triangle: (a) $63^\circ, 37^\circ, 80^\circ$ (b) $45^\circ, 61^\circ, 73^\circ$ (c) $59^\circ, 72^\circ, 61^\circ$ (d) $30^\circ, 20^\circ, 125^\circ$	1

SECTION B		
5	In $\triangle ABC$, $\angle A = 100^\circ$, AD bisects $\angle A$ and $AD \perp BC$. Find $\angle B$	2
6	$\angle CBX$ is an exterior angle of $\triangle ABC$ at B. Name (i) The interior adjacent angle (ii) The interior opposite angles to exterior $\angle CBX$ Also, name the interior opposite angles to an exterior angle at A.	2
7	One of the exterior angles of a triangle is 80° , and the interior opposite angles are equal to each other. What is the measure of each of these two angles?	2
8	The angles of a triangle are arranged in ascending order of magnitude. If the difference between two consecutive angles is 10° . Find the three angles.	2

SECTION C		
9	(a) Find the unknown length x in the following figure 1. (b) Find the values of the unknown angles x in figure 2 and figure 3:	4
	<div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;"> <p>(i)</p>  <p>3cm</p> <p>4cm</p> <p><i>fig 1</i></p> </div> <div style="text-align: center;"> <p>(ii)</p>  <p>$2x$</p> <p>x</p> <p><i>fig 2</i></p> </div> <div style="text-align: center;"> <p>(iii)</p>  <p>x</p> <p>30° 40°</p> <p><i>fig 3</i></p> </div> </div>	

SECTION D		
-----------	--	--

10

CASE STUDY : Golden Triangle

A golden triangle is an isosceles triangle in which the ratio of the longer side to the smaller side is 1.618(approximately)

ΔABC is a golden triangle. $AB = 4\text{cm}$. CD is a median of the triangle.

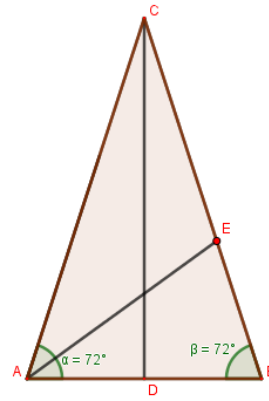
Q 1. Find the length of AD and AC approximately

Q2 What are the values of the three angles of a golden triangle?

Q3 Is ΔADC a right triangle? Give reason.

OR

AE is bisector of angle BAC . Is ΔABE a golden triangle? Give reason



JSUNIL TUTORIAL

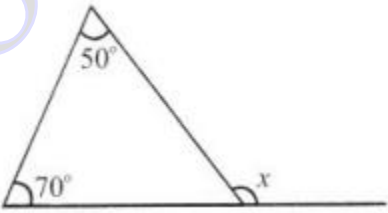
CHAPTER TEST

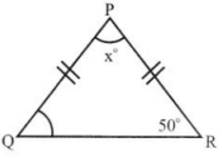
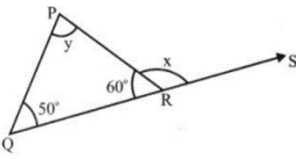
Time Allowed 1 ½ Hrs.

Maximum Marks: 30

General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section A has 5 MCQs carrying 1 mark each
3. Section B has 4 questions carrying 02 marks each.
4. Section C has 3 questions carrying 03 marks each.
5. Section D has 1 questions carrying 04 mark.
6. Section E has 1 case based integrated unit of assessment (04 marks) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory.
8. Draw neat figures wherever required.

SECTION A		
Q No	Section A consists of 5 questions of 1 mark each.	M ks
1	Measures of each of the angles of an equilateral triangle is (a) 90° (b) 30° (c) 60° (d) 45°	1
2	The acute angles of right triangle are in the ratio 2: 1. Which of the following is the measure of each of these angles. (a) 55° and 35° (b) 60° and 30° (c) 50° and 40° (d) 45° and 45°	1
3	Find the value of x in the adjoining figure. (a) 50° (b) 70° (c) 120° (d) 180°	1
		
4	Which is the longest side in the triangle PQR right angled at P? (a) PQ (b) QR (c) PR (d) none of these.	1
5	PQR is a triangle right angled at P. If PQ = 3 cm and PR = 4 cm, find QR. (a) 7 cm (b) 5 cm (c) 1 cm (d) 25 cm	1

SECTION B		
Section B consists of 4 questions of 2 marks each.		
6	Find the value of x in given figure.	2
		
7	Find the value of x and y:	2
		
8	The lengths of two sides of a triangle are 6 cm and 8 cm. Between which two numbers can length of the third side fall?	2
9	Determine whether the triangle whose lengths of sides are 6 cm, 8 cm, 10 cm is a right-angled triangle.	2

SECTION C		
Section C consists of 3 questions of 3 marks each.		
10	Find the value of 'p' and 'q' in the adjoining figure.	3
11	In the isosceles triangle, the vertical angle is 30° more than each of its base angles. Find all the angles.	3
12	In a $\triangle ABC$, AD is the altitude from A such that $AD = 12$ cm. $BD = 9$ cm and $DC = 16$ cm. Examine if $\triangle ABC$ is right angled at A.	3

SECTION D		
Section D consists of 1 question of 4 mark.		
13	The foot of a ladder is 6 m away from a wall and its top reaches a window 8 m above the ground. If the ladder is shifted in such a way that its foot is 8 m away from the wall, to what height does its top reach?	4

SECTION E		
14	<p>CASE STUDY</p> <p>Length of a pond Mr. Pillai has a triangular field as shown in the picture. $AB+BC = 34$m. On side AC there is a pond.</p> <p>Q1. What is the measure of angle A?</p> <p>Q2. What is the length of the side AC?</p> <p>Q3. How can he find the length of the pond without going into the water? What is the length of the pond?</p>	3

COMPARING QUANTITIES

I. Concept and Result

(i) Ratio \rightarrow Ratio compares two or more things of the same kind. Suppose when comparing of two quantities of the same kind like height of Raju is 120 cm and that of monu is 80 cm. If we want to compare it by division then

$$\frac{\text{Raju's height}}{\text{Monu's height}} = \frac{120\text{cm}}{80\text{cm}} = \frac{3}{2} = 3 : 2$$

$$\text{Raju's height} = \frac{3}{2} \times \text{Monu's height}$$

So ratio of two quantities of same kind and in the same measurement (units) is a fraction that shows how many times the one quantity of the others. It is denoted by (:)

e.g. Ratio of two quantities a and b is written as a : b. It has no unit.

Percentage \rightarrow Percent as the name suggests the amount or part of anything out of 100 parts or per 100 or for every 100 and it is denoted by sign%. $5\% = \frac{5}{100} = \frac{1}{20}$

Profit or Loss \rightarrow In daily life we come across situation where we either purchase or sell something .

Cost Price (CP) \rightarrow Price at which object is bought or cost of shopkeeper in purchasing article including fair, repair, etc.

Selling Price (S.P.) \rightarrow The price at which the article is sold to the customer.

Three conditions arises/during the selling/buying processes

(i) $SP > CP$ i.e. $S.P. - C.P. > \text{zero}$ i.e. profit

$$\text{Profit} = S.P. - C.P., \text{ profit \%} = \frac{\text{Profit}}{C.P.} \times 100$$

(ii) $C.P. > S.P.$ i.e. $C.P. - S.P. > 0$ i.e. i.oss

$$\text{Loss} = C.P. - S.P., \text{ Loss\%} = \frac{\text{Loss}}{C.P.} \times 100$$

(III) $S.P. = C.P.$ i.e. $S.P. - C.P. = 0$

No profit no loss.

MRP means maximum retail price or marked of the article.

$$S.P. = \left(\frac{100 + \text{profit}}{100} \right) \times C.P. \text{ Or } \left(\frac{100 - \text{loss}}{100} \right) \times C.P.$$

$$C.P. = \left(\frac{100}{100 + \text{profit}} \right) \times S.P. \text{ OR } \left(\frac{100}{100 - \text{loss}} \right) \times S.P.$$

Simple Interest \rightarrow It is used in lending/ borrowing money from either money lender or any financial institution.

Three things are important

Principal \rightarrow It is the amount lent/ borrowed by a lender/ or from borrower. It is denoted by P.

Time \rightarrow The duration for which money lent/ borrowed. It is denoted by t.

Rate \rightarrow Rate of interest on which money is lent / borrowed. it is denoted by r and in the form of percentage

$$\text{Simple Interest} = \frac{PRT}{100}, \text{ Amount (A)} = P + S.I.$$

(MCQs – 4 Questions)

Q1 Find the ratio of 9m to 27cm.

(a)100:3 (b) 3:1100 (c) 3:100 (d) 30:10

Q2 Convert the given fractional numbers to percent $\frac{1}{8}$.

(a)125% (b) 1.25%(c) 12.5%(d) 1250%

Q3 Find the whole quantity if 40% of it is 500 km.

(a)1200km (b) 1250km (c)1500km (d) 1000km

Q4 The population of a city decreased from 25,000 to 24,500. Find the percentage decrease.

(a)3% (b) 4% (c) 5%(d) 2%

(Case Based Question)

Read the paragraph carefully and answer the questions

For Diwali celebration Mayank needs to buy various kinds of sweets to gift his friends and relatives. The rate list is as follows

Kaju Burfi (**400 g**) - Rs 600

Milk Cake (**400 g**) - Rs 450

Gulab Jamun (1 kg) - Rs 250

Kaju Roll (**400 g**) - Rs 900 (Do any four)

Q1. Mayank's friend gifted him 1 kg milk cake ,if he want to gift him Kaju Burfi of equal price ,then approximately how much kg of Kaju Burfi he have to gift? what is the ratio of price of milk cake and Kaju Burfi?

A. 1kg, 450:700 B. 750 g,450:750 C. 850 g,450:850 D. 725 g,450:650

Q 2. Approximately how many kg of Gulab Jamun can be purchased in the price of 400 g Kaju Roll ?

A. 4 kg B. 3 kg C. 2 kg D. 5 kg

Q 3. If Mayank purchased 400 g Kaju Roll and 1.5 kg Gulab Jamun ? Howmuch money he has to pay to sweet seller ?

A. Rs 1225 B. Rs 1275 C. Rs 1245 D. Rs 1250

Q 4. Is the cost of 1 kg Gulab Jamun and 300g Kaju Roll together less than the cost of 250 g Kaju Burfi and 400g Milk Cake together? Write both the prices in the ratio?

A. NO, 925:825 B. Yes, 900:800 C. Both are equal, 905:805D. Can't say,950:850

Q 5. The ratio of cost of 1 kg milk cake to 1kg Kaju Barfi. *

A. 1100: 1000 B. 1025 : 1100 C. 1125 : 1500 D. 900 : 1100

(Short answer type question:3)

Q1 Convert the given decimal fractions to percents 0.65.

Q2 Find 75% of 1kg (gm)

Q3 25 ml is ----- per cent of 5 liters.

(Long answer type question:2)

Q1 If x and y shared Rs 1100 in the ratio 1:10 , how much did x get?

Q2 In what time will Rs 4000 give an interest of Rs500 at 5% p.a.?

(Questions for Practice)

(i)MCQs

Q1 Convert the given decimal fractions to percents 0.02.

(a)3% (b) 4% (c) 5% (d) 2%

Q2 Find 1% of 1hour (minutes)

(a) $\frac{3}{5}$ (b) $\frac{4}{5}$ (c) $\frac{6}{5}$ (d) $\frac{7}{5}$

Q3 15kg is -----% of 50kg.

(a)20% (b) 40% (c) 50% (d) 30%

Q4 The interest on Rs 30,000 for 3 years at the rate of 15% per annum is

(a)Rs 4,500 (b) Rs 9,000 (c)Rs 18,000 (d) Rs 13,500

Q5 The ratio 3:8 is equal to

(a)3.75% (b) 37.5% (c) 0.375% (d) 0.0375%

Q6 225% is equal to

(a)9:4 (b) 4:9 (c) 3:2 (d) 2:3

Q7 I bought a T.V. for Rs 10,000 and sold it at a profit of 20%.How much money did I get for it ?

(a)Rs20,000 (b)Rs 11,000 (c) Rs 15,000 (d) Rs 12,000

Q8 What sum of money earned Rs 90 as simple interest in 4 years at the rate of 5% ?

(a)Rs350 (b) Rs450 (c) Rs 550 (d) Rs 650

Q9 Amina buys a book for Rs 275 and sells it at a loss of 15% . How much does she sell it for.

(a)Rs233.25 (b) Rs233.50 (c) Rs233.75 (d) Rs233.35

Q10 Express $33\frac{1}{3}$ % as a ratio in the lowest form.

(a)1:3 (b) 3:1 (c) 33:1 (d) 1:33

(ii) Short answer type questions

Q1 Find ratio of 30 days to 36 hours.

Q2 Convert the given fractional numbers to percent 2.1.

Q3 Find the whole quantity if 70% of it is 14 minutes.

Q4 Meeta saves Rs 400 from her salary. If this is 10% of her salary. What is her salary?

Q5 A skirt bought for Rs250 and sold at Rs150 Find profit or loss percent.

Q6 At what rate will Rs840 yield an interest of Rs210 in 3 years?

Q7 90% of x is 315 km, the value of x is

Q8 Savitri obtained 440marks out of 500 in an examination . She secured -----% marks in the examination.

Q9 0.018 is equivalent to

Q10 $\frac{4}{5}$ when expressed as a percent is

Long answer type questions

Q1 In how many years a sum of money will become 4 times at 6% simple interest per annum.

Q2 Convert each part of the ratio to percentage

2:3:5

Q3 A dealer buys a wrist watch for Rs225 and spends Rs15 on its repairs. If he sells the same for Rs 300, find his profit percent.

Q4 What is the rate of annual simple interest at which a sum of money would double itself in 25 years?

Q5 Solve $\frac{25\% \text{ of } 50\% \text{ of } 100\%}{25 \times 50}$

Q6 800kg of mortar consist of 55% sand, 33% cement and rest lime. What is the mass of lime in mortar?

Case Based Questions

Q1 In a quarterly examination ,a student secured 30% marks and failed by 12 marks .In the same examination another student secured 40% marks and got 28 more bare minimum marks to pass. Find

(i) the maximum marks (ii) the pass percentage

Q2 Chalk contains calcium, carbon and oxygen in the ratio 10:3:12 .

(i) Find the percentage of carbon in chalk.

(ii)) Find the percentage of calcium in chalk.

(iii)) Find the percentage of oxygen in chalk.

(iv) If in a stick of chalk , carbon is 3gm, what is the weight of the chalk stick?

CHAPTER TEST 1 (20 Marks)

Section A (4 MCQs,1mark each)

Q1 Find the ratio of 9m to 27cm.

(a)100:3 (b) 3:1100 (c) 3:100 (d) 30:10

Q2 Convert the given fractional numbers to percent $\frac{1}{8}$.

(a)125% (b) 1.25%(c) 12.5%(d) 1250%

Q3 Find the whole quantity if 40% of it is 500 km.

(a)1200km (b) 1250km (c)1500km (d) 1000km

Q4 The population of a city decreased from 25,000 to 24,500. Find the percentage decrease.

(a)3% (b) 4% (c) 5%(d) 2%

Section B (5 Questios 2Marks each)

Q1 Convert the given decimal fractions to percents 0.65.

Q2 Find 75% of1kg (gm)

Q3 25 ml is ----- per cent of 5 liters.

Q4 In a city 30% are females ,40% are males and remaining are children . What percent are children.

Q5 If $x\%$ of $\frac{25}{2}$ is 150, find the value of x .

Section C (2 Questions 3 Marks each)

Q1 If 20% of x is same as 30% of y , what percentage of x is y ?

Q2 What is the rate of annual simple interest at which a sum of money would double itself in 25 years?

Test 2 (30 Marks)

Section A (6 MCQ,s , 1 Mark each)

Q1 Find ratio of 30 days to 36 hours

(a) 20:1 (b) 200:1 (c) 200:10 (d) 200:100

Q2 Convert the given fractional numbers to percent $\frac{5}{4}$.

(a)125% (b) 1.25%(c) 12.5%(d) 1250%

Q3 Find the whole quantity if 70% of it is 14 minutes.

(a)23 minutes (b) 20 minutes (c)25 minutes (d) 26 minutes

Q4 Meeta saves Rs 400 from her salary. If this is 10% of her salary. What is her salary?

a)Rs 400 (b) Rs 40 (c)Rs40,000 (d) Rs 4,000

Q5 A skirt bought for Rs250 and sold at Rs150 Find profit or loss percent.

(a)25% (b) 40%(c) 45%(d) 12%

Q6 At what rate will Rs840 yield an interest of Rs210 in 3 years?

(a)5.33% (b) 1.33%(c) 8.33%(d) 12.33%

Section B (6 Questios 2Marks each)

Q1 Find the whole quantity if 8% of it is 40 liters.

Q2 Out of 15,000 voters , 60% voted. Find the percentage of voters who did not vote.How many actually did not vote?

Q3 In what time will Rs 4000 give an interestof Rs500 at 5% p.a.?

Q4 : What rate gives Rs 280 as interest on a sum of Rs 56000 in 2 Years.

Q5 A bicycle is purchased for Rs 1800 and is sold at a profit of 12%. Its selling price is?

Q6 Convert 0.07 in percent?

Section C (4 Questions 3 Marks each)

Q1 In a quarterly examination ,a student secured 30% marks and failed by 12 marks .In the same examination another student secured 40% marks and got 28 more bare minimum marks to pass.Find

(i) the maximum marks (ii) the pass percentage

Q2 Convert each part of the ratio to percentage

2:3:5

Q3 A dealer buys a wrist watch for Rs225 and spends Rs15 on its repairs. If he sells the same for Rs 300, find his profit percent.

Q4 What is the rate of annual simple interest at which a sum of money would double itself in 25 years?

ANSWERS

MCQs Q1(a), Q2(c), Q3(b) Q4(d)

Case based questions Q1(B) , Q2(A) , Q3(B), Q4(A)

Short answer questions

(Q1) $0.65 \times 100\% = 65\%$, (Q2) $\frac{75}{100} \times 1000 \text{ g} = 750 \text{ gram}$, (Q3) $\frac{x}{100} \times 5000 \text{ ml} = 25 \text{ ml}$, x = 0.5%

Long answer questions

(Q1) Let share of x is Rs a , share of y = rupees (1100 - a) , a: (1100 - a) = 1:10 (given) , a = 100 , share of x is equal to rupees 100 , (Q2) $T = \frac{100 \times S.I}{P \times R} = \frac{100 \times 500}{4000 \times 5} = 2 \frac{1}{2}$ years

MCQs

Q1(d), Q2(a) , Q3(d), Q4(d) , Q5(b), Q6(a), Q7(d), Q8(b), Q9(c), Q10(a)

Short answer type questions

(Q1) $\frac{30 \times 24}{36} = 20:1$, (Q2) $2.1 \times 100\% = 210\%$, (Q3) $\frac{70 \times x}{100} = 14$ minutes , x= 20 minutes, (Q4)

Let Meeta's salary=Rs x $\frac{10 \times x}{100} = 400$, x =Rs 4000, (Q5) C.P. = Rs 250 , S.P.= Rs 15 , Loss= Rs 100, $L\% = \frac{\text{loss}}{\text{C.P.}} \times 100\% = 40\%$

(Q6) P= Rs 840 , S.I. = Rs210 , T= 3years $R = \frac{S.I \times 100}{P \times T} = \frac{210 \times 100}{840 \times 3} = 8 \frac{1}{3}\%$, (Q7) $\frac{90 \times x}{100} = 315$, x=350

(Q8) $\frac{440 \times 100\%}{500} = 88\%$, (Q9) $0.018 \times 100\% = 1.8\%$, (Q10) $\frac{4 \times 100\%}{5} = 80\%$

Long answer type questions

(Q1) Let P= Rs P, A = Rs 4P, S.I= Rs 3P, S.I. $\frac{P \times R \times T}{100}$, $3P = \frac{P \times 4P \times T}{100} = 50$ Years

(Q2) $2+3+5=10$, $\frac{2 \times 100\%}{10} = 20\%$, $\frac{3 \times 100\%}{10} = 30\%$, $\frac{5 \times 100\%}{10} = 50\%$

(Q3) C.P.= Rs 225, overhead expenses= Rs 15 , Total C.P.= Rs240, S P.= Rs 300, Profit=Rs 60

$P\% = \frac{60 \times 100\%}{240} = 25\%$, (Q4) Let P= Rs x, A= Rs2x, S.I.= $2x - x = Rs x$, T=25years , R =

$\frac{S.I \times 100}{P \times T} = 4\%$

(Q5) $\frac{25 \times 50 \times 100 \times 1}{100 \times 100 \times 100 \times 25 \times 50} = \frac{1}{10000} = 0.0001$

(Q6) Percentage of sand= 55% , Percentage of cement= 33% , Percentage of lime= 100-88= 12%

$$\text{Mass of lime in } 800\text{kg} = \frac{12 \times 800}{100} = 96\text{kg}$$

Case based questions

(Q1) Let the maximum marks be X. First student secured 30% of X = $\frac{3X}{10}$ marks, he fails by 12 marks, so pass marks = $\frac{3X}{10} + 12$, Second student secured 40% of X = $\frac{2X}{5}$ marks. Since he gets 28 marks more than pass marks, pass marks = $\frac{2X}{5} - 28$ marks, $\frac{3X}{10} + 12 = \frac{2X}{5} - 28$, Maximum marks = 400, Pass marks = 132, pass percentage = $\frac{132 \times 100}{400} = 33\%$

(Q2) Chalk contains calcium, carbon, oxygen in the ratio 10 : 3 : 12, now $10 + 3 + 12 = 25$ percentage of carbon = $\frac{3 \times 100}{25} = 12\%$ similarly percentage of calcium and oxygen 40% and 48%. Let the weight of chalk stick = X gram, 12% of X = 3, X = 25 gram

Test 1

Section A

Q1(a), Q2(c), Q3(b), Q4(d)

Section B

(Q1) $0.65 \times 100 = 65\%$, (Q2) $\frac{75}{100} \times 1000\text{g} = 750\text{g}$, (Q3) Let 25ml be x% of 5liters, $25 = \frac{x}{100} \times 5000$, X = 0.5%

(Q4) Percentage of children = $[100 - (30 + 40)] = 30\%$, (Q5) $\frac{x \times 25}{100 \times 2} = 150$, X = 1200

Section

(Q1) $\frac{20 \times x}{100} = \frac{30 \times y}{100}$, $\frac{2x}{3} = y$, Let x = 100%, Y = $\frac{200}{3}$, (Q2) Done

TEST 2 Section A

MCQs Q1 (a), Q2 (b), Q3 (b), Q4 (d), Q5 (b), Q6 (c)

Section B

Q1 $\frac{8 \times x}{100} = 40$ liters, Q2 No. of voters who did not vote = 40% of 15000 = 6000,

Q3 P = Rs 4000, S.I. = Rs 500, R = 5%, T = $\frac{S.I. \times 100}{P \times R} = \frac{500 \times 100}{4000 \times 5} = 2\frac{1}{2}$ Years

Q4 S.I. = $\frac{P \times R \times T}{100}$, $280 = \frac{56000 \times R \times 2}{100} = 0.25\%$, Q5 Profit% = $\frac{P}{C.P.} \times 100\%$, $12 = \frac{P}{1800} \times 100$,

P = Rs 216, S.P. = Rs 1800 + Rs 216 = Rs 2016, Q6 $0.07 \times 100\% = 7\%$

Section D Done earlier.

RATIONAL NUMBERS

Important Facts and Concepts:

A number that can be expressed in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$, is called a **rational number**.

All integers and fractions are **rational numbers**.

If the numerator and denominator of a rational number are multiplied or divided by a non-zero integer, we get a rational number which is said to be **equivalent to the given rational number**.

Rational numbers are classified as positive, zero or negative rational numbers. When the numerator and denominator both are positive integers or both are negative integers, it is a positive rational number. When either the numerator or the denominator is a negative integer, it is a negative rational number.

The number **0** is **neither a positive nor a negative** rational number.

There are **unlimited number of rational numbers** between two rational numbers.

A rational number is said to be in the standard form, if its denominator is a positive integer and the numerator and denominator have no common factor other than 1.

Two rational numbers with the same denominator can be added by adding their numerators, keeping with the same denominator.

Two rational numbers with different denominators are added by first taking the LCM of the two denominators and then converting both the rational numbers to their equivalent forms having the LCM as the denominator and adding them as above.

While subtracting two rational numbers, we add the additive inverse of the rational number to be subtracted to the other rational number.

- **Product of rational numbers** = $\frac{\text{Product of numerators}}{\text{Product of denominators}}$
- The **reciprocal of a non-zero rational number** $\frac{p}{q}$ **is** $\frac{q}{p}$.
- To divide one rational number by the other non-zero rational number, we multiply the first rational number by the reciprocal of the other.

EXAMPLE 1 Reduce $\frac{-45}{30}$ to the standard form.

Solution: $\frac{-45}{30} = -\frac{3 \times 3 \times 5}{2 \times 3 \times 3} = -\frac{5}{2}$

EXAMPLE 3: Do $\frac{4}{-9}$ and $-\frac{16}{36}$ represent the same rational number?

Solution: Yes, because $\frac{4}{-9} \times \frac{4}{4} = \frac{-16}{36}$, $\frac{-16}{36} \div \frac{4}{4} = -\frac{4}{9}$

EXAMPLE 3 List three rational numbers between -2 and -1 .

Solution: $-2 \times \frac{10}{10} = -\frac{20}{10}$, $-1 \times \frac{10}{10}$, Any three numbers are, $-\frac{19}{10}$, $-\frac{18}{10}$, $-\frac{17}{10}$

SHORT ANSWER QUESTIONS:

Q1. Reduce $\frac{55}{66}$ into the standard form.

Solution: $\frac{55}{66} \div \frac{11}{11} = \frac{5}{6}$

Q2. Express $\frac{3}{4}$ as a rational number with denominator as -80

Solution: $-80 \div 4 = -20$

$$\text{So, } \frac{3}{4} \times \frac{-20}{-20} = \frac{-60}{-80}$$

Q3. Find the product of $\frac{15}{22} \times \frac{11}{5}$

$$\text{Solution: } \frac{15}{22} \times \frac{11}{5} = \frac{3 \times 5}{2 \times 11} \times \frac{11}{5} = \frac{3}{2}$$

Q4. Simplify: $\frac{2}{5} - \frac{1}{2}$

Solution: LCM of 2 and 5 is 10

$$\frac{2}{5} \times \frac{2}{2} = \frac{4}{10}$$

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

$$\text{So, } \frac{4}{10} - \frac{5}{10} = \frac{4-5}{10} = -\frac{1}{10}$$

LONG ANSWER QUESTIONS:

Q1. List five rational numbers between -4 and -3 .

$$\text{Solution: } -4 \times \frac{6}{6} = -\frac{24}{6}$$

$$-3 \times \frac{6}{6} = -\frac{18}{6}$$

five rational numbers between -4 and -3 are,

$$-\frac{19}{6}, -\frac{20}{6}, -\frac{21}{6}, -\frac{22}{6}, -\frac{23}{6}$$

Q2. Solve: $\frac{29}{4} - \frac{30}{7}$

Solution: LCM of 4 and 7 is 28.

$$\frac{29}{4} \times \frac{7}{7} = \frac{203}{28}$$

$$\frac{23}{4} \times \frac{7}{7} = \frac{161}{28}$$

So,

$$\frac{203}{28} - \frac{161}{28} = \frac{203 - 161}{28} = \frac{42}{28} = \frac{2 \times 3 \times 7}{2 \times 2 \times 7} = \frac{3}{2}$$

PRACTICE QUESTIONS:

MCQ:

Q1. In the standard form of a rational number, the common factor of numerator and denominator is always:

- (a) 0 (b) 1 (c) -2 (d) 2

Q2: Which of the following rational numbers is equal to its reciprocal?

- (a) 1 (b) 2 (c) $\frac{1}{2}$ (d) 0

Q3. How many rational numbers are there between two rational numbers?

- (a) 1 (b) 0 (c) unlimited (d) 100

Q4. In the standard form of a rational number, the denominator is always a

- (a) 0 (b) negative integer (c) positive integer (d) 1

Q5. To reduce a rational number to its standard form, we divide its numerator and denominator by their

- (a) LCM (b) HCF (c) product (d) multiple

Q6. Which is greater number in the following?

- (a) $-\frac{1}{2}$ (b) 0 (c) $\frac{1}{2}$ (d) -2

Q7. Which of the following rational numbers is negative?

- (a) $-\left(\frac{-3}{7}\right)$ (b) $\frac{-5}{-8}$ (c) $\frac{9}{8}$ (d) $-\frac{3}{7}$

Q8. A rational number is defined as a number that can be expressed in the form $\frac{p}{q}$, where are integers and

- (a) $q = 0$ (b) $q = 1$ (c) $q \neq 1$ (d) $q \neq 0$

Q9. Find the odd one out of the following and give reason.

- (a) $\frac{4}{3} \times \frac{3}{4}$ (b) $\frac{-3}{2} \times \frac{-2}{3}$ (c) $2 \times \frac{1}{2}$ (d) $-\frac{1}{3} \times \frac{3}{1}$

Q10. The value of $-\frac{4}{3} - \left(\frac{-1}{3}\right)$ is

- (a) -2 (b) -3 (c) 2 (d) -1

SHORT ANSWER QUESTIONS:

Q1. Reduce the following rational number in its lowest form: $-\frac{60}{72}$.

Q2. Are the rational numbers $-\frac{8}{28}$, and $\frac{32}{-112}$ equivalent? Give reason.

Q3. Arrange the rational numbers $-\frac{7}{10}$, $\frac{5}{-8}$, $\frac{2}{-3}$, $-\frac{1}{4}$, $-\frac{3}{5}$ in ascending order.

Q4. If $-\frac{5}{7} = \frac{x}{28}$, find the value of x ?

Q5. Give two rational numbers equivalent to: $\frac{7}{8}$

Q6. What should be added to $-\frac{1}{2}$ to obtain the nearest natural number?

Q7. What's the Error? Chhaya simplified a rational number in this manner $\frac{-25}{-30} = \frac{-5}{6}$, what error did the student make?

LONG ANSWER QUESTIONS:

Q1. Find the reciprocal of the following: $\frac{1}{2} \times \frac{1}{4} + \frac{1}{2} \times 6$

Q2. Write each of the following numbers in the form $\frac{p}{q}$, where p and q are integers:

- (a) six-eighths (b) three and half (c) opposite of 1 (d) one-fourth

Q3. From a rope 68 m long, pieces of equal size are cut. If length of one piece is $4\frac{1}{4}$ m, find the number of such pieces.

Q4. 150 students are studying English, Maths or both. 62 per cent of the students are studying English and 68 per cent are studying Maths. How many students are studying both?

Q5. A body floats $\frac{2}{9}$ of its volume above the surface. What is the ratio of the body submerged volume to its exposed volume? Re-write it as a rational number.

Q6. If $x = \frac{1}{10}$ and $y = -\frac{3}{8}$, then evaluate $x + y$, $x - y$, $x \times y$ and $x \div y$.

ANSWERS:**MCQ:**

- Q1 (b) 1 Q2 (a) 1 Q3 (c) unlimited Q4 (c) positive integer
 Q5 (b) HCF Q6 (c) $\frac{1}{2}$ Q7 (d) $-\frac{3}{7}$ Q8 (d) $q \neq 0$
 Q9 (d) $-\frac{1}{3} \times \frac{3}{1}$ Q10 (d) -1

SHORT ANSWER QUESTIONS:

- Q1. $-\frac{5}{6}$ Q2. Yes, as both are equivalent rational numbers.
 Q3. $-\frac{7}{10}, \frac{2}{-3}, \frac{5}{-8}, -\frac{3}{5}, -\frac{1}{4}$ Q4. $x = -20$
 Q5. There are many possibilities. Some of them are: $\frac{14}{16}, \frac{21}{24}$
 Q6. $\frac{3}{2}$ Q7. Error is of negative sign.

LONG ANSWER QUESTIONS:

- Q1. $\frac{8}{25}$ Q2. (a) $\frac{3}{4}$ (b) $\frac{7}{2}$ (c) $-\frac{1}{1}$ (d) $\frac{1}{4}$ Q3. 16 Pieces Q4. 45
 Q5. 7:2 and $\frac{7}{2}$ Q6. $-\frac{11}{40}, \frac{19}{40}, -\frac{3}{80}, -\frac{4}{15}$

TEST-1 (20 Marks)

- Q1. Fill in the blanks to make the statements true: There are _____ number of rational numbers between two rational numbers. (1)
 Q2. Write equivalent rational numbers for $\frac{2}{3}$? (2)
 Q3. Represent the following rational numbers on a number line: $\frac{3}{8}, \frac{-7}{3}$ (2)
 Q4. List two rational numbers between $\frac{5}{7}$ and $\frac{7}{8}$. (2)
 Q5. Find the sum of $\frac{7}{3} + \frac{-4}{3}$. (2)
 Q6. Which is greater in the following? $\frac{3}{4}$ and $\frac{7}{8}$ (2)
 Q7. Find the product of: $\frac{-4}{5}$ and $\frac{-5}{12}$. (2)
 Q8. Find a rational number exactly halfway between: $\frac{1}{6}$ and $\frac{1}{9}$. (2)
 Q9. Solve : $\frac{29}{4} - \frac{30}{7}$.
 Q10. Simplify: $\frac{13}{11} \times \frac{-14}{5} + \frac{13}{11} \times \frac{-7}{5} + \frac{-13}{11} \times \frac{34}{5}$ (3)

TEST-2 (30 Marks)

Q1. Fill in the blanks to make the statements true. The rational number _____ is neither positive nor negative. (1)

Q2. Write equivalent rational number for $\frac{12}{17}$ (2)

Q3. Write four more rational numbers to complete the pattern: $-\frac{1}{3}, \frac{2}{6}, \frac{3}{9}, \dots, \dots, \dots, \dots$ (4)

Q4. Find the sum of $-4\frac{5}{6}$ and $-7\frac{3}{4}$ (3)

Q5. Find the product of $-2\frac{3}{4}$ and $5\frac{6}{7}$ (3)

Q6. If 12 shirts of equal size can be prepared from 27m cloth, what is length of cloth required for each shirt? (3)

Q7. Insert 3 equivalent rational numbers between $-\frac{1}{2}$ and $\frac{1}{5}$ (3)

Q8. Represent the following rational numbers on a number line: $-\frac{2}{5}, \frac{5}{-6}, \frac{7}{-3}$ (3)

Q9. Simplify: $\frac{6}{5} \times \frac{3}{5} - \frac{1}{5} \times \frac{3}{7}$ (3)

Q10. Match column I to column II in the following: (5)

	COLUMN-I	COLUMN-II
i.	$\frac{3}{4} \div \frac{3}{4}$	(a) -1
ii.	$\frac{1}{2} \div \frac{4}{3}$	(b) $-\frac{2}{3}$
iii.	$\frac{2}{3} \div (-1)$	(c) $\frac{3}{2}$
iv.	$\frac{3}{4} \div \frac{1}{2}$	(d) $\frac{3}{8}$
v.	$\frac{5}{7} \div \left(-\frac{5}{7}\right)$	(e) 1

PERIMETER AND AREA

I. Important concepts/Result.

1. Perimeter of a polygon is the sum of length of all sides.

2. Perimeter of a regular polygon

= number of sides \times length of one side.

Perimeter of square = $4 \times \text{side} = 4L$

Perimeter of a rectangle = $2(l + b)$

Circumference is the perimeter of a circle = $2\pi r$

Where $\pi = \frac{22}{7}$ or 3.14

3. Area of a polygon is the space occupied by the figure in a plane.

Area of square = side \times side

Area of rectangle = length \times breadth

Area of parallelogram = base \times height

Area of triangle = $\frac{1}{2}$ base \times height

Area of a circle = πr^2

II. Some illustrations/Examples.

(i) MCQ

1. The area of a parallelogram of height 4 cm and base 6cm

- (a) 4cm^2 (b) 6cm^2 (c) 12cm^2 (d)

Answer: d

2. The area of a triangle of height 4cm and base 6cm.

- (a) 4cm^2 (b) 6cm^2 (c) 12cm^2 (d) 24cm^2

Answer: C

3. The circumference of a circle of radius 7cm is.

- (a) 7cm (b) 22cm (c) 44cm (d) 28cm

Answer: C

4. The area of a circle of radius 14cm is.

- (a) 4312cm^2 (b) 616cm^2 (c) 308cm^2 (d) 2156cm^2

Answer:b

(ii)Case Study-1



Mohan is the head (mukhiya) of his village and also a social worker. In his village there is no school building so he plans to construct a school in his village. The length and breadth of the school plot are in the ratio 10:3. The perimeter of the school plot is 260m. He also gives a square plot for playground near the school. The area of square plot is same as the length of the school plot.

- (a) Form a linear equation for the perimeter of school plot
 (a) $13x = 260$ (b) $100x = 260$ (c) $26x = 260$ (d) $20x = 260$
- (b) Find the length of school plot
 (a) 10m (b) 20m (c) 30m (d) 100m
- (c) Find area of rectangular plot
 (a) 100m^2 (b) 300m^2 (c) 3000m^2 (d) 260m^2

Solution:

- (a) $p = 260\text{m}$
 let length = $10x$ & breadth = $3x$
 $2x(10x + 3x) = 260$
 $26x = 260$
- (b) $x = 10$
 Length = $10 \times 10 = 100\text{m}$
- (c) Breadth = $3 \times 10 = 30\text{m}$
 Area of rectangular plot = $100 \times 30\text{m}^2$
 = 3000m^2

(iii) Short answer type question

1. Find the height of the parallelogram whose base is 10cm area is 80cm^2

Solution: Area = base \times height
 $80\text{cm}^2 = 10\text{cm} \times h$
 $h = 8\text{cm}$

2. Find the base length of a triangle whose area is 64cm^2 and height is 8cm.

Solution: Area of triangle = $\frac{1}{2} b \times h$
 $64\text{cm}^2 = \frac{1}{2} \times b \times 8\text{cm}$
 $b = 16\text{cm}.$

3. What is the circumference of a circle of area 154cm^2

Solution: Area = $\pi r^2 = 154\text{cm}^2$
 $\frac{22}{7} \times r^2 = 154\text{cm}^2$
 $r^2 = \frac{154 \times 7\text{cm}^2}{22} = 49\text{cm}^2$
 $r = 7\text{cm}$

Circumference = $2 \pi r = 2 \times \frac{22}{7} \times 7\text{cm} = 44\text{cm}$

(iv) Long answer type question

1. In an isosceles triangle ABC, with AB = AC = 10cm and BC= 12cm, the height AD from A to BC is 8cm. Find the area of ΔABC . What Will be the height from C to AB.

Solution: area $\Delta ABC = \frac{1}{2} b \times h$

$$= \frac{1}{2} \times BC \times AD$$

$$= \frac{1}{2} \times 12\text{cm} \times 8\text{cm} = 48\text{cm}^2$$

Also, area $\Delta ABC = \frac{1}{2}bh = \frac{1}{2} AB \times CE$

$$48\text{cm}^2 = \frac{1}{2} \times 10\text{cm} \times CE$$

$$\frac{48\text{ cm}^2 \times 2}{10\text{ CM}} = CE$$

$CE = 9.6\text{cm}$

2. How many times a wheel of radius 14 cm must rotate to go 88m.

Solution: let no. of rotations = n

n \times distance covered in one rotation = total distance covered

$n \times 2 \pi r = 88\text{m}$

$n \times 2 \times \frac{22}{7} \times 14\text{m} = 88 \times 100\text{cm}$

$n = \frac{88 \times 100 \times 7\text{cm}}{2 \times 22 \times 14\text{cm}}$

$n = 100$

Required number of rotations = 100

III. Question for practice

(A) MCQ

- Find the area of a parallelogram of base 10cm and height 8cm.
 (a) 10cm^2 (b) 8cm^2 (c) 80cm^2 (d) 160cm^2
- Find the area of a triangle of base 10cm and height 8cm.
 (a) 10cm^2 (b) 8cm^2 (c) 40cm^2 (d) 80cm^2
- Find the circumference of a circle of radius 3.5cm.
 (a) 7cm (b) 22cm (c) 44cm (d) 88cm
- Find the circumference of a circle of diameter 7cm.
 (a) 7cm (b) 22cm (c) 44cm (d) 88cm
- Find the area of a circle (in cm^2) whose radius is 10cm. ($\pi=3.14$)
 (a) 3.14 (b) 31.4 (c) 314 (d) 3140
- Find the length of base of a triangle whose area is 100cm^2 and altitude is 10cm.
 (a) 20cm (b) 15cm (c) 10cm (d) 5cm
- Find the area of a circle (in cm^2) whose diameter is 20cm.
 (a) 3.14 (b) 31.4 (c) 314 (d) 3140
- Find the area of a parallelogram of height 5cm and base length 8cm.
 (a) 40cm^2 (b) 20cm^2 (c) 10cm^2 (d) 8cm^2

9. Find the area of a right triangle whose length of perpendicular sides are 8cm and 6cm respectively.
- (a) 64cm^2 (b) 48cm^2 (c) 24cm^2 (d) 12cm^2
10. Find the length of base of a parallelogram whose altitude is 11cm and area is 132cm^2 .
- (a) 11cm (b) 12cm (c) 13cm (d) 14cm

(B) Short answer type question

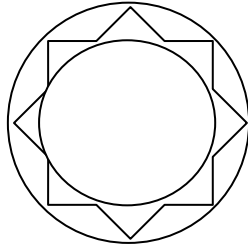
- The Area of a rectangle and area of a circle are equal. If the dimension of the rectangle are $14\text{cm} \times 11\text{cm}$, then find the radius of the circle.
- A wire is bent to form a square of side 22cm. If the wire is rebent to form a circle, find its radius.
- What will be the diameter and area of a circle whose circumference is 88cm.
- A wire is in the form of a rectangle of length 14cm and breadth 11cm. If the wire is rebent to form a circle, find its radius.
- Find area of a triangle of base 6cm and height 3.5cm.
- Find the area of a parallelogram of base 10cm and altitude 7.5 cm.
- Find the height of the parallelogram of area 14.5cm^2 and base 5.8cm.
- A wire is in the form of a parallelogram with side length 8cm and 6cm. If it is rebent into a square, what will be length of the square
- Which encloses more area, a triangle of height 10cm & base 8cm or a parallelogram of height 10cm & base 8cm.
- What is the perimeter of a semicircular disc of diameter 7cm.

(C) Long answer type question

- Find the cost of polishing a circular table top of diameter 20m. If the rate of polishing is ₹ 12 per m^2 .
- From a circular card board sheet of radius 21cm, two circles of radius 3-5cm and a rectangle of dimension $2\text{cm} \times 1\text{cm}$ are removed. Find the remaining area.
- What is the area swept by a minute hand 7cm long, of a clock, in 30 minutes.
- A farmer wants to fence his circular farm land of diameter 28m. Find the length of wire required, if he makes 3 rounds of the fence. Also find the cost of wire at the rate of ₹12 per m.
- ABCD is a parallelogram with base $AB = 20\text{cm}$ and corresponding altitude $DL = 15\text{cm}$. If $BC = 25\text{cm}$ then find the altitude BM where BM is perpendicular to AD.
- ΔABC is right angled at B. With sides $AB = 6\text{m}$, $BC = 8\text{m}$, and $CA = 10\text{m}$. Find the area of ΔABC . Also find the length of altitude BD where BD is perpendicular to AC

Case Study based Question

1.



Meenakshi is fond of collecting art pieces for decorating her house, for which she frequently visits art exhibitions. Recently she bought a beautiful circular plate, which has beautiful design carved between the inner and the outer circle. The inner circumference is 352mm and outer is 396mm.

1. Find the inner radius. (1 Mark)
2. Find the outer radius. (1 Mark)
3. Find the width of the circular region with design. (2 Mark)

2.



Mr. Sohan Kumar is a very hard-working farmer. He owns a circular land of diameter 42m in which he grows vegetables but many times some cows and goats of the village destroy his vegetable garden. So, he decides to put a barbed fence all around his farmland.

1. What will be length of wire if he installs only one round of fencing wire.
2. Find the length of fencing wire needed if he makes 3 rounds of fence
3. Find the cost of the fencing wire if 1m of it cost ₹ 15.

Answers

- | | | | |
|------|-------|------|------|
| 1. C | 2. C | 3. B | 4. B |
| 5. C | 6. A | 7. C | 8. A |
| 9. C | 10. B | | |

Short Answer Questions

- | | | | |
|------------------------|----------------------|---------------------------|--------|
| 1. 7cm | 2. 14cm | 3. 28cm, 6cm ² | 4. 7cm |
| 5. 10.5cm ² | 6. 75cm ² | 7. 2.5cm | 8. 7cm |
| 9. parallelogram | 10. 18cm | | |

Long Answer type Questions

- | | | | |
|------------|------------------------|----------------------|-----------------|
| 1. ₹ 41.58 | 2. 1307cm ² | 3. 77cm ² | 4. 264m, ₹ 3168 |
| 5. 12m | 6. 4.8m | | |

Case Study Based Question

- | | | |
|--------------|------------|---------------|
| 1. (I) 56mm | (II) 63mm | (III). 7mm |
| 2. (I) 1386m | (II) 4158m | (III) ₹62,370 |

Chapter Test-1
Perimeter and Area

Note: Q.1 to 4 are of 1 mark each.

M.M-20

Q.5 to 8 are of 2 marks each.

Q. 9 to 10 are of 4 marks each.

Q.1 The area of a parallelogram of base 7cm and height 5cm is

- (a) 70cm^2 (b) 35cm^2 (c) 50cm^2 (d) 25cm^2

Q.2 The area of a triangle of base 8cm and height 9cm is

- (a) 36cm^2 (b) 72cm^2 (c) 91cm^2 (d) 64cm^2

Q.3 The circumference of circle of radius 7cm is

- (a) 7cm (b) 22cm (c) 44cm (d) 88cm

Q.4 The area of circle of radius 7 units is

- (a) 22 (b) 44 (c) 88 (d) 154

Q.5 What is the perimeter of a circular disc of diameter 10cm. ($\pi = 3.14$)

Q.6 What is the area occupied by a circle plate of diameter 21cm.

Q.7 Calculator the height of a parallelogram whose base is 10cm and area is 85cm^2 .

Q.8 Find the height of base a triangle of height 5cm and area 15cm^2 .

Q.9 What will be the area of a circular plate of circumference 38.5cm.

Q. 10. Case Study based Question.



Meera is very good in needle work and so wants to put a lace all around a plain white table cloth which is circular in shape and of diameter 1m.

(a) Find the radius of the cloth. (1 Mark)

(b) Find the length of the lace required. (1 Mark)

(c) Find the cost of the lace if 1m of lace costs Rs. 17. (2 Mark)

Note: Q.1 to 5 are of 1 mark each. Q.6 to 8 are of 2 marks each. Q. 9 to 10 are of 3 marks each.

Q. 11 to 12 are of 4 marks each Q. 13 is of 5 Marks.

Q.1 The area of a semicircle of radius 5cm is

- (a) 78.5cm^2 (b) 39.25cm^2 (c) 25cm^2 (d) 157cm^2

Q.2 The circumference of a circle is always

- (a) More than 3 times of its diameter (b) 3 times of its diameter
(c) Less than 3 times of its diameter (d) . times of its radius

Q.3 In reference to a circle the value of π is

- (a) Area \div circumference (b) Area \div diameter
(c) Circumference \div diameter (d) Circumference \div radius

Q.4 Find the area of a parallelogram of base 4.2cm and height 10cm.

- (a) 42cm^2 (b) 10cm^2 (c) 50cm^2 (d) 25cm^2

Q.5 Find the area of triangle of base 25cm and height 10cm

- (a) 10cm^2 (b) 25cm^2 (c) 75cm^2 (d) 125cm^2

Q.6 If the radius of a circle is tripled by how many times will the area increase.

Q.7 What is the diameter is a circle whose area is 154cm^2 .

Q.8 One side of a parallelogram is 16cm and the distance of this side from the opposite side is 4.5cm.

Find the area of the parallelogram.

Q. 9 If the sides of a parallelogram are increased to twice its original lengths, how much will be the perimeter of the new parallelogram.

Q. 10 What will be the area of a circle whose is 154cm^2 .

Q. 11 The perpendicular sides of a right triangle are 3cm and 4cm. What will be the increase in the area

it these sides are doubled.

Q.12 From a circular cardboard of radius 14cm, two circles of radius 1cm each, a triangle of base 1cm and height 0.5cm and a rectangle of dimension 2cm, 1cm are removed. Find the area of the remaining sheet.

Q.13 Case Study Based Question: A circular lawn is enclosed by a circular path all around it. The radius of the circular lawn is 1m.

While the radius of the outer circle including the path is 2m.

- (a) Find the area of small circle



(1 Mark)

(b) Find the area of long of large circle

(1 Mark)

(c) Find the width of the path and also its area

(2 Mark)

JSUNIL TUTORIAL

ALGEBRAIC EXPRESSIONS

I. Important Concepts/Result

1. Algebraic expressions are formed from variables and constants using operations of addition, subtraction, multiplication and division.
2. Terms are added to make an expression.
3. A term is a product of algebraic factors.
4. The coefficient is the numerical factor in the term.
5. Sometimes any one factor in the term is called the coefficient of the remaining part of the term.
6. An expression with one term is called monomial, a two term expression is a binomial, a 3- term expression is a trinomial. Any expression with one or more terms is called polynomial.
7. Terms having same algebraic factors are like terms. Terms having different algebraic factors are unlike terms.
8. The value of an expression depends on the value of the variable in the expression.

II. Some Illustrations/Examples

(i) MCQ

1. A polynomial with one term is called
(a) Monomial (b) Binomial (c) Trinomial (d) None of the above
2. What is the coefficient of x in the expression $7x + 4y - 3z$
(a) 7 (b) 4 (c) -3 (d) 3
3. Which of the following terms is an unlike term
(a) $3x$ (b) $2x^2$ (c) $-4x$ (d) $10x$
4. Which of the following is not a monomial
(a) $3x$ (b) $12x^2$ (c) $3x + 4$ (d) $7y$

II. Case Study based Question



A Maths test was conducted in class 7 to assess the learning of the students. So the teacher made some statements and the students were asked to express it algebraically.

(i) One third of the product of x and y. (1 mark)

(ii) A number multiplied by itself. (1 mark)

(iii) Sum of two number x and y subtracted from their product. (2 marks)

Solution: (i) $\frac{1}{3} \times x \times y = \frac{xy}{3}$

(ii) $x \times x = x^2$

(iii) $x \times y - (x + y)$

$= xy - (x + y)$

III. Short Answer type Question

1. State whether the given pair of terms is like or unlike

(a) $2x$, $3y$

(b) $14xy$, $2yx$

Answer (a) Unlike (b) Like

2. Write the coefficient of y in the expression $7xy + 2x$

Answer $7x$

3. Find the value of the expression $2x + 3$ for $x = -2$

Answer: $2x + 3 = 2(-2) + 3 = -4 + 3 = -1$

IV. Long Answer Type Question

1. Simplify the expression and find the value of if $x = 2$, $y = -1$

$6x + 5(y-1)$

Solution: $6x + 5(y-1)$

$= 6x + 5y - 5$

$= 6(2) + 5(-1) - 5$

$= 12 - 5 - 5$

$= 12 - 10$

$= \underline{2}$

2. If $z = 10$ then find the value of $z^2 - 5(z-3)$

Solution $z^2 - 5(z-3)$

$= z^2 + 5z + 15$

$= 10 \times 10 - 5 \times 10 + 15$

$= 100 - 50 + 15$

$= 115 - 50 = 65$

Questions for Practice

M C Q

- How many terms are there in a trinomial
(a)1 (b)2 (c)3 (d)4
- Coefficient of Y in the expression $4X - 2Y + z$ is
(a)4 (b) 2 (c) -2 (d) 1
- Which of the following expression is a binomial
(a) $2X + 1$ (b) $3Y + z$ (c) none of the above (d) both a and b
- How many terms are there in a monomial
(a) 1 (b) 2 (c) 3 (d)4
- which of the following expression is unlike term
(a) $2x$ (b) $-7x$ (c) $8XY$ (d) $15x$
- Numerical Coefficient in the expression $-8xyz$ is
(a)x (b)y (c) z (d) -8
- The sum or difference of 2 like terms is
(a)like term (b)unlike term (c) both a and b. (d) none of the above
- In the formula for area of a circle the numerical constant in the expression is
(a) π (b) $22/7$. (c) 3.14 (d)all the above are correct
- Find the value of $17x - y$ for $x=1$ and $y= -3$
(a) 17 (b) 20 (c) -17 (d) -20
- Evaluate $3x^2 + 2$ for $x=1$
(a)3 (b)5 (c) 2. (d)0

Short Answer Type Questions

- State which of the following pairs of terms are like and which are unlike terms.
(i) $-3X$ and $-5Y$ (ii) $7XY$ and $-2YX$
- Give an algebraic expression for - product of numbers X and Y subtracted from 17.
- Give an algebraic expression for - Number 3 added to 5 times the product of numbers m and n.
- Identify the terms and factors in the expression $7x + 15yz$.
- Identify the term with factor y and write the Coefficient of y in the expression $18 + yz$.

6. Identify the numerical Coefficients of the terms of the expression $2m+7pq-5x$.
7. Find the value of the expression $20-4x^2$ for $x = 1$.
8. Find the value of the expression $10x^2-100$ for $x= 9$.
9. Find the value of the expression $7a - 4b$ for $a=2,b=1$
10. Find the value of $3n^2-2n$ for $n= -1$

Long Answer Type Questions

1. Simplify the expression. $x+8+2(x-5)$ and then find its value for $x=3$.
2. What should be the value of 'a' if the value of $3x^2- a+x$ is 10 when $x = 5$
3. If $a = 0$ and $b = -1$, find the value of
 - (i) $a+b$.
 - (ii) a^2+b^2
4. Express algebraically -
The number of scarfs of length half meter that can be made from Y meters of cloth.
5. The length of a side of a square is given as $2x+3$. What will be the algebraic expression for its perimeter.
6. Write two different algebraic expressions for the word phrase : $-\frac{1}{4}$ the sum of x and 7.

Case Study Based Questions

1.



National association for the blind (NAB) aimed to empower and well inform visually challenged population of our country, thus enabling them to lead a life of dignity and productivity.

Meera donates ₹ $(x+y)$ to NAB. Total (x^2-y^2) students donated. ₹ $(x-y)$ each for the help of blind people.

- (a) what will be the total amount donated by all students. (1 mark)
- (b) Meera donated ₹ $(x+y)$ and Sheena donated ₹ $(3x -4y)$. What is the total money donated by both of them. (1 mark)

CHAPTER TEST 1MM. 20

Note: Q1 to 4 are of 1 mark each. Q5 to 8 are of 2 marks each. Q 9 and 10 are of 4 marks each.

- How many terms are there in a binomial
a) 1 b) 2 c) 3 d) 4
- Coefficient of x in the expression. $-3xyz$. is
a) -3 b) $-3y$ c) $-3yz$ d) $-3xyz$
- One fourth of the product of m and n may be expressed as
a) $\frac{mn}{4}$ b) $\frac{m+n}{4}$ c) $4mn$ d) $4(m+n)$
- Find the value of $m-2$ for $m = -5$
a) -5 b) -2. c) -7. d) 7
- Give one example each of a monomial and a binomial.
- The length and breadth of a rectangle is $2x$ and $3y$ respectively give an expression for its perimeter.
- Find the value of $2m^2+3m-1$ for $m = -1$
- Find the value of $7xyz-2$ for $x=0, y=1, z=2$.

Case Study Based Question

9.



In a test of mathematics for class 7, the teacher wrote the following statements on the blackboard for which the students were required to give algebraic expression. What expression will you give for.

- 10 times X subtracted from 5. (1 mark)
 - one half of the sum of x and y. (1 mark)
 - 2 times the product of X and Y subtracted from 3 times the sum of x and y. (2 marks)
10. Which of the following are like terms.

$4x, -2y, -3x^2, 14x, 7xy, 4yx, 100x^2, 2y^2x, 13x^2y, -10xy^2, -4x^2y, 10y$

TEST 2

ALGEBRAIC EXPRESSION

MM. 20

Note: Q 1 to 6 are of 1mark each, Q 7 to 9 are of 2 marks each, Q 10 and 11 are of 3 marks each.

Q 12 and 14 are of 4 marks each.

- How many terms are there in a trinomial
a)1 b) 2 c) 3 d) 4
- Two third of the product of x and z is
a) $\frac{2}{3}xz$ b) $\frac{3}{2}xz$ c) $\frac{2}{3}(x+z)$ d) $\frac{3}{2}(x+z)$
- Find the value of $x-5$ for $x = -2$
a) -5. b) -2. c)-7 d)0
- Find the value of $xy+yz+zx$ for $x=0, y=1, z=2$.
a)0 b)1 C)2 d)3
- Coefficient of xy in the expression $-12xyz$ is
a)-12 b)-12x c) -12y d) -12z
- Which of the following is a binomial
a) $2x$. b) $2x+3y$. c) $2x +3y+4z$. d) none of the above
- Give one example each of a binomial and a trinomial
- The length of base of a triangle is $3x$. and corresponding height is y . Give an expression for its area.
- Evaluate $3x^2+2y-1$, for $x=1, y=2$.
- What should be the value of a ,if the value of $3x+2y-a=10$ for $x=1, y=-2$.
- If $z=10$,find the value of $z^3-2(z+5)$.
- Give algebraic expressions for
a) 7 times x multiplied to the sum of y and z b) 4 times z subtracted from the product of x and y .
- Which of the following are like terms
 $17x, -3y, -4x^2, 17x, 3xy, 15x^2, 7yx, 8y$

Case Study Based Question

- Mr. Mohan Singh owns a square plot of side $7x$ units. His brother Mr. Sohan Singh wishes to go abroad for which he needed a lot of money, so he decides to sell his small rectangular plot of length $7x$ units and breadth $5y$



units to brother Mohan. Mr. Mohan is happy to give money in lieu of Sohan's plot as Sohan's plot is just adjoining to his own one

- a) what is the area of Mr. Mohan's plot. (1 mark)
- b) what is the area of Mr. Sohan's plot. (1 mark)
- c) what is the perimeter of the combined plot of Mr. Mohan and Sohan. (2 marks)

JSUNIL TUTORIAL

EXPONENTS AND POWERS

I. Important Concepts: - The continued product of a number multiplied with itself a number of times can be written as the number raised to the power a natural number, equal to the number of times the number is multiplied with itself.

Ex: $5 \times 5 \times 5$ can be written as 5^3 and it read as 5 raised to the power 3 or third power of 5

Similarly, $a \times a = a^2$, $a \times a \times a = a^3$, $a \times a \times a \times a = a^4$

In general, if n is a natural number, then,

$a \times a \times a \times a \times \dots \times a = a^n$ (a^n is called n^{th} power of a)

Laws of exponents:

- | | |
|------------------------------------------|-------------------------------------------------------------------------------------------|
| (1) $a^m \times a^n = a^{m+n}$ | $3^3 \times 3^7 = 3^{3+7} = 3^{10}$ |
| (2) $a^m \div a^n = a^{m-n}$ | $5^7 \div 5^3 = 5^{7-3} = 5^4$ |
| (3) $(a^m)^n = a^{m \times n} = (a^n)^m$ | $(4^3)^5 = 4^{3 \times 5} = 4^{15}$ |
| (4) $a^n \times b^n = (ab)^n$ | $3^4 \times 2^4 = (3 \times 2)^4 = 6^4$ |
| (5) $a^0 = 1$ | $1000^0 = 1$ |
| (6) $a^{-m} = \frac{1}{a^m}$ | $2^{-5} = \frac{1}{2^5} = \frac{1}{2 \times 2 \times 2 \times 2 \times 2} = \frac{1}{32}$ |

Expanded Form: $8604 = 8 \times 10^3 + 6 \times 10^2 + 0 \times 10^1 + 4 \times 10^0$

Standard Form: $27065 = 2.7065 \times 10^4$; $0.3567 = 3.567 \times 10^{-2}$; $0.000056 = 5.6 \times 10^{-5}$

General Form: $3.5 \times 10^3 = 3500$; $3.76 \times 10^{-6} = 0.00000376$.

II. MCQs.

1) Write exponential form for $8 \times 8 \times 8$ taking base as 2.

- a) 2^8 b) 2^{10} c) 2^{12} d) 2^4

2) Express $\frac{81}{256}$ in exponential form.

- a) $\frac{3}{4}$ b) $\left[\frac{3}{4}\right]^4$ c) $\left[\frac{3}{4}\right]^3$ d) $\frac{4}{3}$

3) The reciprocal of $\left[\frac{2}{5}\right]^6$ is.

- a) $\left[\frac{2}{5}\right]^6$ b) 2^6 c) 5^6 d) $\left[\frac{5}{2}\right]^6$

4) Is 2^3 is equal to 3^2 .

- a) $3^2 > 2^3$ b) $3 > 2$ c) $2^3 > 3^2$ d) 0

5) Simplify $2^3 \times 7$.

6) Evaluate $(-4)^4$.

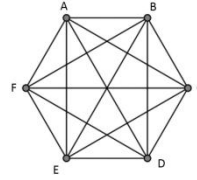
7) Write 4963 in expanded form.

8) Find the value of $(5x)^3$ when $x = -2$.

9) Simplify $(3^0 + 4^{-1}) \times 2^3$.

10) The number of diagonals of an n-sided polygon is $\frac{(n^2 \times 3n)}{2}$. Use the formula to find.

- a) Number of diagonals of triangle.
- b) Number of diagonals of hexagon.
- c) Number of diagonals of octagon.



Questions for Practice.

MCQ

11) Find the value of 7^3 .

- a) 10
- b) 21
- c) 49
- d) 343

12) Express in exponential form $2 \times 2 \times a \times a \times a \times a$.

- a) $(2a)^2$
- b) $(2a)^4$
- c) $2^2 \times a^4$
- d) None of these

13) Express in exponential form 625

- a) 25^2
- b) 5^4
- c) 5^3
- d) None of these

14) Which is greater?

- a) $3^4 > 4^3$
- b) $4 > 3$
- c) $4^3 > 3^4$
- d) 0

15) Simplify: $8^3 \times 3^3$

- a) $(24)^6$
- b) $(24)^9$
- c) 5
- d) $(24)^3$

16) Simplify: $(-2)^5$

- a) (-32)
- b) 32
- c) (-10)
- d) None of these

17) Simplify: $2^0 \times 5^0 \times 7^0$

- a) 2
- b) 20
- c) 1
- d) 3

18) The value of $\left[\frac{1}{8}\right]^{-3}$ is

- a) 512
- b) 24
- c) 5
- d) 11

19) Write 5900 in standard form.

- a) 59
- b) 5.9×10^3
- c) 5.90
- d) 59×100

20) The value of $(-1)^{\text{odd number}}$ is:

- a) 1
- b) 2
- c) -1
- d) 0

III. Short Answer Type.

- 1) Express as product of power 540.
- 2) Simplify $(-3)^2 \times 2^3$.
- 3) Simplify $3^3 \times 10^3$.
- 4) Simplify $8^2 \div 2^3$.
- 5) Find $(2^0 \times 3^0 + 4^0)$
- 6) Find $4^0 - 2^0$.
- 7) Evaluate $2^3 \times a^3 \times b^3$.
- 8) Write 318000000 in standard form.
- 9) Write 0.00000898 in standard form.
- 10) Write $3 \times 10^3 + 4 \times 10^2 + 5 \times 10^0$ in usual form.

IV. Long Answer Type.

- 1) Find the value of $(-7)^3 \times (-10)^3$.
- 2) Simplify $3^8 \div 3^2 \times 3^4$.
- 3) Simplify $[(3^2)^2 \times 3^6] \times 3^{-8}$.
- 4) Simplify $(2 \times 3^4 \times 2^5) \div (9 \times 4^2)$
- 5) Evaluate $3^4 \times a^6 \times 5a^4$.
- 6) Find the value of $(7^0 - 9^{-1}) \times 3^3$.

Case Study:

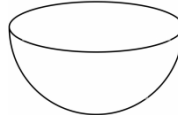
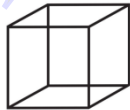
7. In our earth 36141900 square Km of area is covered with water and 148647000 square Km of area is covered with land. Find
 - a) Area of water in standard form?
 - b) Area of land in standard form?
 - c) Which has greater area?
8. A teacher shows 4 articles of different lengths (ball, cube, basket & book) in a classroom. The difficulty is that the length are in exponential form. The length of different articles are as following

i. $3 \times 16^{3/4}$

ii. $4^{1/2} \times 27^{2/3}$

iii. $7^0 \times 81^{3/4}$

iv. $6 \times 9^{3/2} \times 3^{-2}$



Then, find.

- 1) The length of ball is

- a) 6
- b) 12
- c) 24
- d) None of these

- 2) The product of length I ball, and III basket is

- a) 192
- b) 144
- c) 324
- d) 648

- 3) The ratio of the length of 1st and 4th articles is

- a) 3:4 b) 4:3 c) 1:1 d) 4:9

Solution:

II. MCQ.

- 1) $2^{12} \rightarrow c$
- 2) $\left[\frac{3}{4}\right]^4 \rightarrow b$
- 3) $\left[\frac{5}{2}\right]^6 \rightarrow d$
- 4) $3^2 > 2^3 \rightarrow a$
- 5) $2^3 \times 7 = 2 \times 2 \times 2 \times 7 = 8 \times 7 = 56.$
- 6) $(-4)^4 = (-4) \times (-4) \times (-4) \times (-4) = 16 \times 16 = 256.$
- 7) $4963 = 4 \times 1000 + 9 \times 100 + 6 \times 10 + 3 \times 10^0 = 4 \times 10^3 + 9 \times 10^2 + 6 \times 10^1 + 3 \times 10^0.$
- 8) $(5x)^3 = [5 \times (-2)]^3 = 5^3 \times (-2)^3 = 125 \times (-8) = -1000.$
- 9) $(3^0 + 4^{-1}) \times 2^3 = \left[1 + \frac{1}{4}\right] \times 2^3 = \left(\frac{4+1}{4}\right) \times 2 \times 2 \times 2 = \frac{5}{4} \times 8 = 10.$
- 10) (a) Zero
 (b) $n = 6$, No. of diagonals $= \frac{(n^2-3n)}{2} = \frac{(6^2-3 \times 6)}{2} = \frac{(36-18)}{2} = 9.$
 (c) $n = 8$, No. of diagonals $= \frac{(n^2-3n)}{2} = \frac{(8^2-3 \times 8)}{2} = \frac{(64-24)}{2} = \frac{40}{2} = 20.$

III. MCQ.

- | | |
|----------------------------------------------------|------------------------------------|
| 1) $7^3 = 7 \times 7 \times 7 = 343 \rightarrow d$ | 6) $(-32) \rightarrow a$ |
| 2) $2^2 \times a^4 \rightarrow c$ | 7) $1 \rightarrow c$ |
| 3) $5^4 \rightarrow b$ | 8) $512 \rightarrow a$ |
| 4) $3^4 > 4^3 \rightarrow a$ | 9) $5.9 \times 10^3 \rightarrow b$ |
| 5) $(24)^3 \rightarrow d$ | 10) $-1 \rightarrow c$ |

IV. Short Answer Type.

- 1) $540 = 2 \times 2 \times 3 \times 3 \times 5 = 2^2 \times 3^2 \times 5$
- 2) $(-3)^2 \times 2^3 = (-3) \times (-3) \times 2 \times 2 \times 2 = 9 \times 8 = 72$
- 3) $3^3 \times 10^3 = (3 \times 10)^3 = 30 \times 30 \times 30 = 27000$
- 4) $8^2 \div 2^3 = (2^3)^2 \div 2^3 = 2^6 \div 2^3 = 2^{6-3} = 2^3 = 8$
- 5) $(2^0 \times 3^0 + 4^0) = 1 \times 1 + 1 = 1 + 1 = 2$
- 6) $4^0 - 2^0 = 1 - 1 = 0$
- 7) $2^3 \times a^3 \times b^3 = (2 \times a \times b)^3 = (2ab)^3$
- 8) $318000000 = 3.18 \times 10^8$
- 9) $0.00000898 = 8.98 \times 10^{-6}$
- 10) $3 \times 10^3 + 4 \times 10^2 + 5 \times 10^0 = 3000 + 400 + 5 = 3405.$

V. Long Answer Type:

- 1) $(-7)^3 \times (-10)^3 = (-7) \times (-7) \times (-7) \times (-10) \times (-10) \times (-10) = 343000$
- 2) $3^8 \div 3^2 \times 3^4 = 3^8 \div 3^{2+4} = 3^8 \div 3^6 = 3^{8-6} = 3^2 = 3 \times 3 = 9$
- 3) $[(3^2)^2 \times 3^6] \times 3^{-8} = [3^{2*2} \times 3^6] \times 3^{-8} = [3^4 \times 3^6] \times 3^{-8} = 3^{4+6} \times 3^{-8} = 3^{10-8} = 3^2 = 9$

- 4) $\frac{2 \times 3^4 \times 2^5}{3^2 \times 2^4} = 2 \times 3^4 \times 2^5 \times 3^{-2} \times 2^{-4} = 2^6 \times 2^{-4} \times 3^4 \times 3^{-2} = 2^2 \times 3^2 = 4 \times 9 = 36$
- 5) $3^4 \times a^6 \times 5a^4 = (3 \times 3 \times 3 \times 3 \times 5) \times a^6 \times a^4 = 805a^{10}$.
- 6) $(7^0 - 9^{-1}) \times 3^3 = \left[1 - \frac{1}{9}\right] \times 3 \times 3 \times 3 = \left[\frac{9-1}{9}\right] \times 3 \times 3 \times 3 = 8 \times 3 = 24$.

7) Case Study.

- a) Area of water = 36141900 = 3.61419×10^8 square Km.
 b) Area of land = 148647000 = 1.48647×10^8 square Km.
 c) Area of water is greater.
- 8) a) 24 → c b) 648 → d c) 4:3 → b

Chapter Test – I

Time: 1 Hour

M.M.: 20

Note: All questions are compulsory.

Section A

(1 mark each)

1. The number 243 can be expressed in the exponential notations as:
 a) 3^4 b) 3^5 c) 3^3 d) 9^3
2. The standard form of 85,00,000 is.
 a) 8.5×10^7 b) 8.5×10^5 c) 8.0×10^7 d) None of these
3. The value of 15^3 is.
 a) 2275 b) 3315 c) 3335 d) 3375
4. Simplify: $5^4 \times 2^4$
 a) 100 b) 400 c) 1000 d) None of these

Section B

(2 marks each)

5. The value of n in $n = 32^{2/5}$ is
 6. Simplify $(-2)^{-5} \times (-1)^{-5}$.
 7. Express in exponential form 2187.

Section C

(3 marks each)

8. Simplify $(4 \times 3^4 \times 4^3) \div (27 \times 4^2)$.
 9. Express in standard form 3,40,30,000.

Section D

(4 mark)

10. Simplify $(25 \times 2^3 \times t^8) \div (10^3 \times t^4)$

Or

Express as a product of prime factors only in exponential form 729×64 .

Chapter Test – II

Time: 1½ Hours

M.M.: 30

Note: All questions are compulsory.

Section A

(1 mark each)

1. The value of $2^0 + 3^0 + 4^0$ is:

- a) 9 b) 24 c) 3 d) None of these

2. Write the exponential form of 270.

- a) $2 \times 3 \times 5^3$ b) $2^2 \times 5 \times 3^2$ c) $2 \times 5^2 \times 3^2$ d) None of these

3. Simplify $2^3 \times a^3 \times 5 \times a^5$.

- a) $40a^{15}$ b) $40a^8$ c) $10a^8$ d) $40a^2$

4. Simplify: $8^2 \div 4^3$

- a) 1 b) 4 c) 8 d) 12

5. Write 16^2 as a power of 2 is:

- a) 2^6 b) 2^8 c) 2^4 d) 2^{16}

6. Simplify $(3^2)^4$

- a) 3^2 b) 3^6 c) 3^0 d) 3^8

Section B

(2 marks each)

7. Express 144 as the product of power of prime numbers.

8. Write 43010000 in standard form.

9. Evaluate $\left[-\frac{2}{5}\right]^3$

10. Simplify $(2^5 \times 3^4) \div 6^4$.

11. Simplify $(-2)^5 \times (-10)^2$.

Section C

(3 marks each)

12. Simplify $\left[\frac{21}{19}\right]^4 \times \left[\frac{19}{7}\right]^4$

13. Simplify $3^0 - 8^{1/3}$

14. If $x=3$, find the value of $27^{1/x}$

Section D

(5 mark)

15. In our earth, 361419000 square km of area is covered with water and 148647000 square km of area is covered with land. Find

a. Area of water in standard form.

(2)

- b. Area of land in standard form. (2)
 c. Which has greater area. (1)
-

Solution: Test I

- 1) $3^5 \rightarrow b$ 2) $8.5 \times 10^7 \rightarrow a$ 3) $3375 \rightarrow d$ 4) $1000 \rightarrow c$
 5) $n = 32^{2/5} = 2^{5 \cdot 2/5} = 2^2 = 2 \times 2 = 4.$
 6) $(-2)^{-5} \times (-1)^{-5} = \frac{1}{(-2)^5 \times (-1)^5} = \frac{1}{(-32) \times (-1)} = \frac{1}{32}$
 7) $2187 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 3^7.$
 8) $\frac{4 \times 3^4 \times 4^3}{27 \times 4^2} = 4^{3+1} \times 3^4 \times 3^{-3} \times 4^{-2} = 4^{4-2} \times 3^{4-3} = 4^2 \times 3 = 48.$
 9) $3,40,30,000 = 3.43 \times 10^6.$
 10) $\frac{(25 \times 2^3 \times t^8)}{10^3 \times t^4} = \frac{5^2 \times 2^3 \times t^8}{5^3 \times 2^3 \times t^4} = \frac{t^4}{5}.$

Or

$$729 \times 64 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = (3 \times 2)^6 = 6^6.$$

Solution: Test II

- 1) $3 \rightarrow c$ 2) $2 \times 3 \times 5^3 \rightarrow a$ 3) $40a^8 \rightarrow b$ 4) $1 \rightarrow a$ 5) $2^8 \rightarrow b$ 6) $3^8 \rightarrow d$
 7) $144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 2^4 \times 3^2.$
 8) $43010000 = 4.301 \times 10^7.$
 9) $\left[\frac{-2}{5}\right]^3 = \left[\frac{(-2) \times (-2) \times (-2)}{5 \times 5 \times 5}\right] = \frac{-8}{125}.$
 10) $(2^5 \times 3^4) \div 6^4 = (2^5 \times 3^4) \div (2^4 \times 3^4) = 2^5 \times 2^{-4} \times 3^4 \times 3^{-4} = 2.$
 11) $(-2)^5 \times (-10)^2 = (-32) \times 100 = -3200.$
 12) $\left[\frac{21}{19}\right]^4 \times \left[\frac{19}{7}\right]^4 = \frac{7^4 \times 3^4}{7^4} = 3 \times 3 \times 3 \times 3 = 81.$
 13) $3^0 - 8^{1/3} = 1 - 2^{3 \times 1/3} = 1 - 2 = -1.$
 14) $27^{1/x} = 3^{3 \times 1/3} = 3.$
 15)
 a. Area of Water = $361419000 = 3.61419 \times 10^8$ square km.
 b. Area of land = $148647000 = 1.48647 \times 10^8$ square km.
 c. Water has greater area.

SYMMETRY

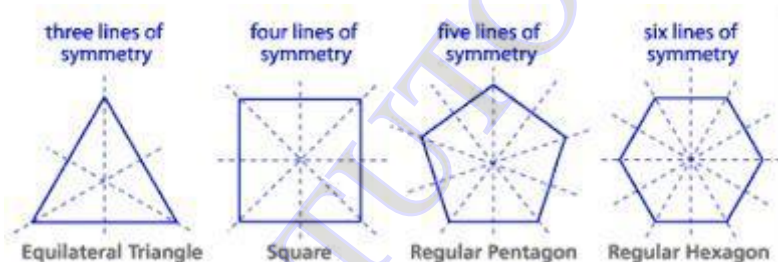
IMPORTANT CONCEPTS

- Symmetry is a geometrical concept that is found in most cases including nature.
- Any geometric shape can be said to be symmetric or asymmetric
- A shape is said to be symmetric if there exists an imaginary line passing through that divides the shape into halves and that these halves overlap each other completely.
- In other words, fold the shape about the imaginary line to check if the two halves completely overlap each other or not. If they overlap each other completely the shape is symmetric, if not, then it is asymmetric.
- The imaginary line is called as the **line of symmetry**.
- The symmetry observed in the above example is called as a line symmetry or bilateral symmetry.

Lines of Symmetry for Regular Polygons

- Regular polygons are closed shapes that have equal sides and equal angles.
- Such polygons have multiple lines of symmetry.

Some regular polygons with their line of symmetry are shown below:



Rotational Symmetry

- There exists another concept of symmetry that does not involve folding the figure to check if they coincide.
- Rotational symmetry is one where when a figure is rotated about a centre point, the figure looks exactly the same before rotation.
- The particular centre for which rotational symmetry is observed is called the centre of rotation.
- The angle of turning during rotation is called angle of rotation.
- The number of positions in which a figure can be rotated and still appears exactly like it did before the rotation is called order of symmetry.

SOME EXAMPLES(With Solutions)

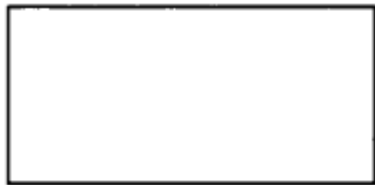
MCQs

Q1. The angle of rotation of an isosceles triangle is

- (a) 120° (b) 270° (c) 180° (d) 360°
 180°

Sol: (c)

Q2 The order of rotational symmetry of the following figure is:



- (a) 1 (b) 2 (c) 3 (d) 4

Sol: b) 2

Q3 . Find the number of lines of symmetry of an Equilateral triangle?

- (a) 1 (b) 2 (c) 3 (d) 4

Sol : c) 3

Q4 Which of the followings has both horizontal as well as vertical line of symmetry

- (a) S (b) A (c) U (d) H

Sol : d)

H

Case based study Qyestion

The Universal Recycling symbol is rendered with a black outline and green fill and is internationally recognized for recycling activity. Both filled and outline versions are in use. To raise awareness of environmental issues, a contest on designing the Universal designing symbol was won by a 23- year old university student named Gary Anderson. The logo is usually displayed with the arrows circulating clockwise. The triangle is made up of three arrows drawn as a continuous loop.



Question 1.1: The number of times this logo coincides one full rotation in clockwise direction is:

- i. Two times ii. Three times iii. Four times iv. None of the above.

Question 1.2: The direction of rotation of logo is:

- (i) clockwise (ii) anticlockwise

Question 1.3: Does the logo show rotational symmetry ?

Solution: 1.1 Three times

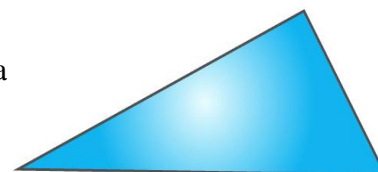
1.2 clockwise

1.3 yes

SHORT ANSWER TYPE QUESTIONS

Q1 . Give an example of a geometrical figure which has neither a line of svmmetry nor a rotational symmetry.

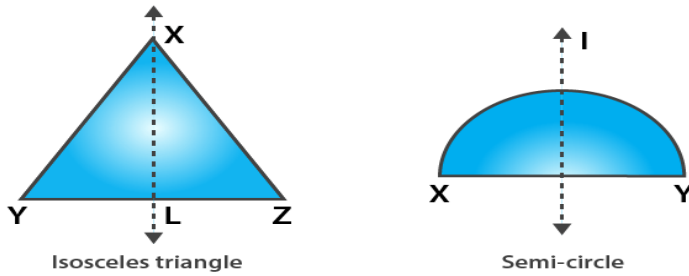
Solution: A scalene triangle has neither a line of symmetry nor a rota



Scalene triangle

Q2 . Give an example of a geometrical figure which has neither a line of symmetry nor a rotational symmetry.

Solution: A semicircle and an isosceles triangle have a line of symmetry but do not have rotational symmetry.



Q3 Give an example of a letter of the English alphabet which has

- (i) No line of symmetry**
- (ii) Rotational symmetry of order 2.**

Solution:

- (i) The letter of the English alphabet which has no line of symmetry is Z.
- (ii) The letter of the English alphabet which has rotational symmetry of order 2 is N.

LONG ANSWER TYPE QUESTIONS

Q1 Fill in the blanks.

Shape	Centre of rotation	Order of rotation	Angle of rotation
Semi-circle			
Circle			
Regular hexagon			
Equilateral triangle			
Rhombus			
Rectangle			

Solution :

Shape	Centre of rotation	Order of rotation	Angle of rotation
Semi-circle	Mid-pointer of diameter is the centre of rotation.	1	360 degrees represent the angle of rotation.
Circle	Centre depicts the centre of rotation.	infinite	Every angle represents the angle of rotation.
Regular hexagon	Intersecting point of diagonals is the centre of rotation.	6	60 degrees represent the angle of rotation.
Equilateral triangle	Intersecting points of media is the centre of rotation	3	120 degrees represent the angle of rotation.
Rhombus	Intersecting point of diagonals is the centre of rotation.	2	180 degrees represent the angle of rotation.
Rectangle	Intersecting point of diagonals is the centre of rotation.	2	180 degrees represent the angle of rotation.

Q2 Fill in the blanks

- The fixed point around which the rotation turns the object is known as _____
- _____ is the angle at which the object rotates.
- A half-turn refers to rotation by _____
- The rotation could be either _____ or _____
- In _____, complete rotation of 360 degrees, the number of times the object looks exactly the same.

Solution 1. Centre of rotation

2. angle of rotation

3. 180 degrees

4. clockwise or anticlockwise

5. order of rotational symmetry

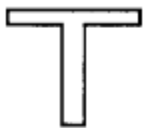
QUESTION FOPR PRACTICE

MCQs

Q1 The order of rotational symmetry of a circle is

- (a) 1 (b) 4 (c) 2 (d) infinite

Q2. How many lines of symmetry are there in the following figure?

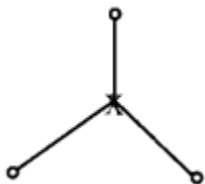


- (a) 1 (b) 2 (c) 3 (d) 4

Q3 How many lines of symmetry are there in a scalene triangle?

- (a) 1 (b) 0 (c) 2 (d) 4

Q4. The order of the rotational symmetry of the following figure about the point marked x is

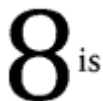


- (a) 1 (b) 2 (c) 3 (d) 4

Q5. The order of rotational symmetry of a circle is:

- (a) 1 (b) 4 (c) 2 (d) infinite

Q6. The rotational symmetry of order



- a) 1 b) 2 c) 3 d) 4

Q7. A figure which can be rotated into itself is said to have symmetry.

Q8. The number of times a figure fits into itself in one complete rotation is called the order of symmetry.

Q9. Rotating a figure through 90° clockwise is the same as rotating it anti-clock wise through [$270^\circ/180^\circ$]

Q10. Which of the following has only one line of symmetry?

- (a) A rectangle (b) A square (c) A semi circle (d) An equilateral triangle

SHORT ANSWER TYPE QUESTIONS

Q1. Give an example of the English letter or alphabet which has reflectional symmetry about a vertical mirror.

Q2 Draw and name the two figures which have both line symmetry and rotational symmetry.

Q3. Name a triangle which has only one line of symmetry and has no rotational symmetry of order of more than 1.

Q4. Answer the following question in yes or no.

Can we have a rotational symmetry of order more than 1 when 45 degrees is the angle of rotation?

Q5. Can we have a rotational symmetry of order more than 1 whose angle of rotation is 17 degrees?

Q6. Give two examples of figures having both line and rotational symmetry.

Q7. What is the name of the solid which has one circular face , one curved surface and one vertex.

Q8. When a torch is pointed towards one of the vertical edge of the cube, what shadow will you get?

Q9. How many faces , edges and vertices does a square pyramid has?

Q10. Each of the letter H,N,S,Z has rotational symmetry of which order?

LONG ANSWER TYPE QUESTIONS

Q1. Match the following:

Column A	Column B
(1) A rectangle has a rotational symmetry of order.....	(a) Infinite
(2) An equilateral triangle has lines of symmetry	(b) 6
(3) A circle has lines of symmetry.	(c) 1
(4) The letter "A" has rotational symmetry of order.....	(d) 3
(5) The number of lines of symmetry of a regular hexagon is	(e) 2

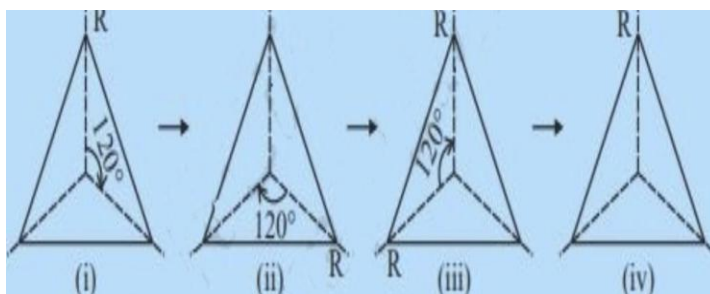
Q2. How many lines of symmetry do the following have:

- (a) a parallelogram.
- (b) an equilateral triangle.
- (c) a right angle with equal legs.
- (d) an angle with equal arms.

Q3. After rotating by 60° about a centre, a figure looks exactly the same as its original position. At what other angles will this happen for the figure?

Q4) Can you now tell the order of the rotational symmetry for an equilateral triangle?

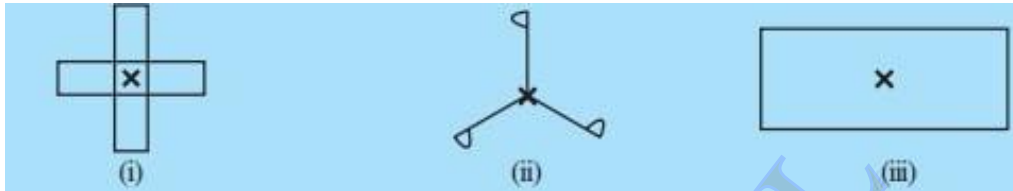
(b) How many positions are there at which the triangle looks exactly the same, when rotated about its centre by 120° ?



Q5) Which of the following shapes have rotational symmetry about the marked point.



Q6.) Give the order of the rotational symmetry of the given figures about the point marked x



CASE BASED STUDY QUESTIONS

Q1. The left side of an object appears to be the right side in the mirror. When the driver of the front vehicle sees the word “Ambulance” in the rear view mirror, he can see the inverted image of the word and read it correctly giving way to the Ambulance.

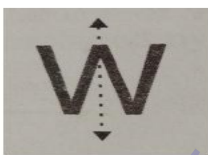
Question 1.1: Why are the letters of Ambulance reversed?

Question 1.2: Find out the alphabet which was not changed if we take horizontal and vertical image both.

Question 1.3: Find out four alphabets which remains unchanged when we take their vertical mirror image.



Q2. Mohan writes “W” on a tracing paper and draws a line vertically on it at the centre as shown in the following figure. He then folds the paper along the line and gets two parts of alphabet W.



Question 2.1: Do the two parts coincide with each other?

Question 2.2: What will happen if he draws a line horizontally on it at the centre and fold the paper along the horizontal line?

Question 2.3: Answer the following questions:-

Observation Say Yes/ No (a) Does W have horizontal line of symmetry? Yes/No

(b) Does W have vertical line of symmetry? Yes/No

Question 2.4: Find out the letters given in the above image having vertical line of symmetry.

ANSWERS FOR PRACTICE QUESTIONS

MCQS

Ans1) infinite Ans2) 1 Ans3) 0 Ans4) 3
Ans5) infinite Ans6) 2 Ans7) point Ans8) Rotational
Ans9) 270° Ans10) semicircle

SHORT ANSWER TYPE QUESTIONS

Q1. A, H, I, M, O, U, V, W, X, YQ2 : Equilateral triangle Ans3) an isosceles triangle.
Ans4) yes Ans5) no Ans6) regular hexagon and equilateral triangle
Ans7) cone Ans8) rectangle but not a square Ans9) F-5, E-8, V-5
Ans10) 2

LONG ANSWER TYPE QUESTIONS

Ans1) 1e, 2d, 3a, 4c, 5b Ans2) a-0, b-3, c-1, d-2
Ans3) 120° , 180° , 240° , 300° , 360° Ans4) a-3, b-4 Ans5) (i) Ans6) (i)4 (ii)3 (iii)2

CASE BASED STUDY QUESTIONS

Ans1) 1.1- reversed so that driver sees the right way around in the rear view mirror
1.2- O
1.3- A, H, I, M

Ans2) 2.1- yes 2.2- does not coincide 2.3- no, yes 2.4 I, H

QUESTION PAPER (OF 20 MARKS)

- Q1. Find the number of lines of symmetry of an Equilateral triangle? (2)
Q2 Find out the angle of rotation of an isosceles triangle. (2)
Q3 Give three example of a geometrical figure which has neither a line of symmetry nor a rotational symmetry. (3)
Q4 . How many lines of symmetry do the following have: (3)
(a) a parallelogram.
(b) an equilateral triangle.
(c) a right angle with equal legs.
Q5 How many faces, edges and vertices does a square pyramid has? (3)
Q6 Give an example of a letter of the English alphabet which has (3)
(i) No line of symmetry
(ii) Rotational symmetry of order 2.
Q7 . Each of the letter H, N, S, Z has rotational symmetry of which order?
Q8 Give an example of a letter of the English alphabet which has (4)
(i) No line of symmetry (ii) Rotational symmetry of order 2.

Question paper of 30 marks

- Q1. Name a triangle which has only one line of symmetry and has no rotational symmetry of order of more than 1 (2)
Q2 Draw and name the two figures which have both line symmetry and rotational symmetry. (2)

Q3 Draw a figure having an infinite number of lines of symmetry.

(2)

Q4 Give three examples of shapes with no line of symmetry.

(2)

Q5 What other name can you give to the line of symmetry of

(3)

(a) an isosceles triangle? (b) a circle (c) equilateral triangle

Q6 What letters of the English alphabet have reflectional symmetry (i.e., symmetry related to mirror reflection) about.

(a) a vertical mirror (b) a horizontal mirror (c) both horizontal and vertical mirrors (3)

Q7 State the number of lines of symmetry for the following figures: (4)

(a) An equilateral triangle (b) An isosceles triangle (c) A scalene triangle (d) square

Q8 fill in the blanks: (4)

- The fixed point around which the rotation turns the object is known as _____
- _____ is the angle at which the object rotates.
- A half-turn refers to rotation by _____
- The rotation could be either _____ or _____

Q9 State true or false:

(4)

(i) When an object rotates, its shape changes.

(ii) if a shape possess rotational symmetry, it will surely have line of symmetry.

(iii) We can not have a rotational symmetry of order more than 1 whose angle of rotation is 23°

(iv) A pentagon which has more than one line of symmetry must be regular.

Q10

(4)

Shape	Centre of rotation	Order of rotation	Angle of rotation
Semi-circle			
Circle			
Regular hexagon			
Equilateral triangle			

VISUALISING SOLID SHAPES

IMPORTANT CONCEPTS

Dimensions

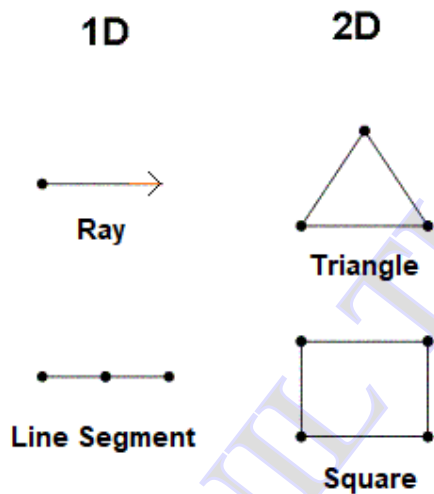
- Dimension is a measurable length along a direction.
- Dimensions are length, breadth (or width) or height (or depth).
- A point is dimensionless.
- Based on the number of dimensions a figure has, there are one-dimensional, two-dimensional and three-dimensional figures.

1D and 2D figures

One-dimensional figures do not enclose any area and have only one direction.

Example: A ray or a line segment.

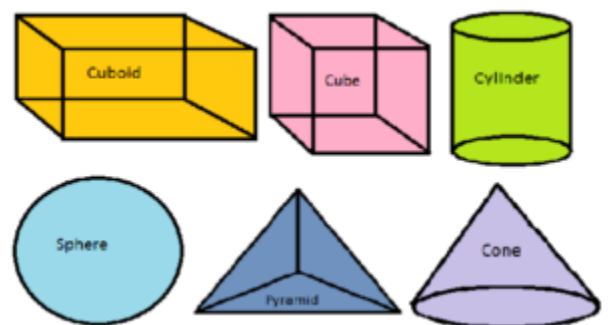
- Two-dimensional figures have an area associated with them. They have length and breadth or width. They are usually plane figures, like squares, rectangles and circles.



Solid Shapes

Solid shapes have length, breadth or width and depth or height.

They are called 3D or three-dimensional shapes.

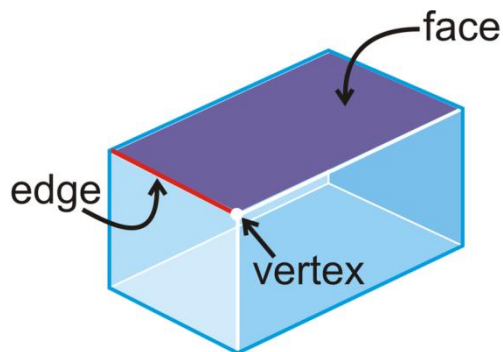


Example: Cuboids, Cylinders, Spheres and Pyramids.

Quantities Associated with a Solid

Faces, edges and vertices

- The corners of a solid shape are called its vertices.
- The line segment joining two vertices is called an edge, or when two planes of a solid meet it forms an edge.
- The surfaces of a solid shape are called as its face.



Nets of Solid Shapes

Building 3-D objects

A net is a flattened out skeletal outline or a blueprint of a solid which can be folded along the edges to create solid. The same solid can have multiple nets.

Example: A net for a cube box.

Representing 3D Shapes on a Paper

Drawing solids on a flat surface

- Solid shapes can be represented on a 2D flat surface like paper.
- This is done by drawing oblique sketches, to make it appear 3D. This is called as 2D representation of a 3D solid.

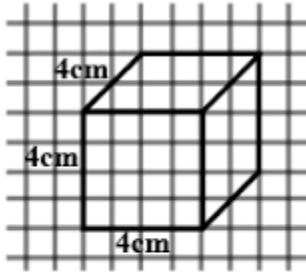
Obliques sketches

- Oblique sketches do not have the exact length of a solid shape but appears exactly like the solid shape.

Isometric sketches

- Isometric sketches have measurements equal to that of the solid.
- They are usually drawn on an isometric dotted paper.
- Example: Drawing an isometric sketch of a cuboid of dimensions $4 \times 3 \times 3$

(i) Oblique sketch



(ii) Isometric sketch



SOME EXAMPLES(With Solutions)

MCQs

Q1. A cube has _____ faces

- a) 6. b) 7 c) 8. d) 10. Ans b) 6

Q2 Number of vertices a cone has:

- a) One b). Two c) Three d)Four Ans a) one

Q3 A sphere has how many faces?

- a) One b)Two c)Four d)None Ans d) none

Q4. An example of the cone is:

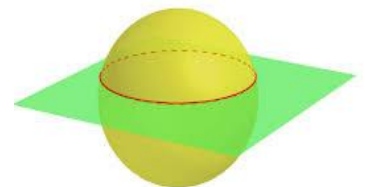
- a) Tube. b)A tent. c). A ball. d) A box. Ans b) a box

CASE STUDY BASED QUESTIONS

Mike and Harvey wanted to block print geometrical shapes on a plain white tablecloth, but they couldn't find any of the 2D shapes they wanted. Instead they found many 3D solid shapes lying about. Mike came up with an idea to convert these 3D solids into simple 2D shapes by cutting them open and using their cross section to print the shapes. Help Mike and Harvey figure out what shapes the cross-sections of the 3D solids will form when sliced open as shown in the figures

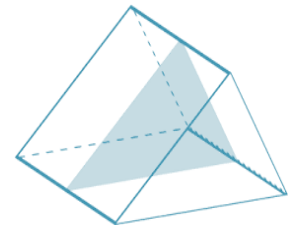
Que 1. Which best describes the two-dimensional shape created by the cross-section shown?

- (a) Oval(b) Circle
(c) Ellipse(d) Sphere



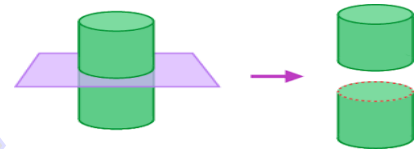
Que 2. Which best describes the two dimensional shape created by the cross-section shown?

- (a) Square (b) Triangle
(c) Rectangle (d) Trapezoid



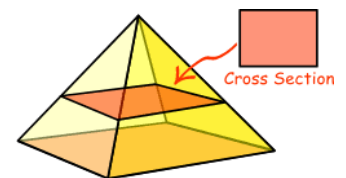
Que 3. Which best describes the two dimensional shape created by the cross-section shown?

- (a) Circle (b) Rectangle
(c) Ellipse (d) Parallelogram



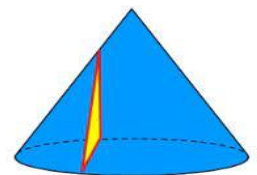
Que 4. Which best describes the two dimensional shape created by the cross-section shown?

- (a) Square (b) Triangle
(c) Trapezoid (d) Rectangle



Que 5. Which best describes the two dimensional shape created by the cross-section shown?

- (a) Circle (b) Ellipse
(c) Triangle (d) Rectangle



Answer: circle, triangle, circle, rectangle, triangle

SHORT ANSWER TYPE QUESTIONS

Q1. What cross-sections do you get when you give a horizontal cut to an ice-cream cone?

Ans : circle

Q2. If three cubes of dimensions 2 cm × 2 cm × 2 cm are placed end to end, what would be the dimension of the resulting cuboid?

Ans: Length of the resulting cuboid = 2 cm + 2 cm + 2 cm = 6 cm

Breadth = 2 cm

Height = 2 cm

Q3. Why a cone is not a pyramid?

Ans: Cone is not a pyramid because its base is not a polygon.

LONG ANSWER TYPE QUESTIONS

Q1. Write down the number of edges on each of the following solid figures:

- (i) Cube (ii) Tetrahedron (iii) Sphere (iv) Triangular prism

Solution:

- (i) 12 (ii) 6 (iii) 0 (iv) 9

Q2)

Draw the sketches of two figures that have no vertex and also draw their net diagrams.

QUESTION FOR PRACTICE

MCOs

Q1 Name the solid having one curved and two flat faces but no vertex.

- a) Cylinder b) square c) cube d) none

Q2. The top view of a cube looks like a:

- a) Circle b) Square c) Rectangle d) Triangle

Q3 The base of a prism is:

- a) Circle b) Triangle c) Square d) Any shape

Q4 Which of the following object resemble a sphere?

- a) Matchbox b) Earth c) Pipe d) none of these

Q5. 3D objects have the same views from different positions.(T/F)

Q6. The shadow of lamp of a cube when seen under an overhead projector is

- a) Triangle b) square c) circle d) rectangle

Q7 The top view of cone looks like a

- a) Triangle b) square c) circle d) rectangle

Q8) What cross section do you get when you give a horizontal cut to a die?

- a) Triangle b) square c) circle d) rectangle

Q9) The corners of solid shape are called its

- (a) vertices (b) edges (c) faces (d) net

Q10 The number of faces of a cylinder is

- (a) 1 (b) 6 (c) 2 (d) 3

SHORT ANSWER TYPE QUESTIONS

Q1. Name any three objects which resemble a sphere and cone.

Q2 Three cubes each with 6cm edge are placed side to side. What would be the length of the solid formed.

Q3. Fill in the blanks

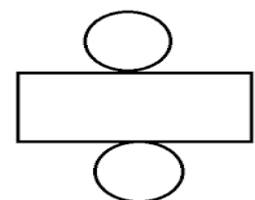
The solid with one circular face, one curved surface and one vertex is called

Total no. of edges a cylinder are

Q4 What cross section do you get when you give a horizontal cut to an apple.

Q5 The given figure is net of which solid shape?

Q6 Identify the correct statement



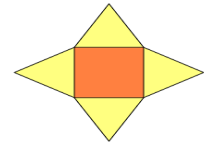
- a) A triangle has 3 sides and 4 vertices.
- b) A cylinder has 3 faces.
- c) All sides of the rectangle are equal.
- d) A cuboid has 4 flat faces and 12 straight edges.

Q7. Two cubes of dimensions $2\text{ cm} \times 2\text{ cm} \times 2\text{ cm}$ are placed side by side, What will be the length of resulting cuboid?

Q8 The dimensions of a cuboid are 5 cm, 3 cm, and 2cm, Draw an isometric sketch of this cuboid.

Q9 How many square are there in the net of cube.

Q10 The figure is the net of



LONG ANSWER TYPE QUESTIONS

Q1. Name the solids that have:

- (i) 1 curved surface
- (ii) 4 faces
- (iii) 6 faces
- (iv) 5 faces and 5 vertices

Q2 Draw the nets of the following:

- (i) Triangular prisms
- (ii) Tetrahedron
- (iii) Cuboid.

Q3 Fill in the blanks:-

- i. Plane figure is also called _____
- ii. A solid shape that has only a curved surface is called a _____

Q4 Draw the net of a cube and a cone.

Q5 What cross-section would you get when you give a Vertical cut and Horizontal cut to a basket ball

Q6 True and false

- a. A pyramid has only one vertex
- b. If the base of a pyramid is a square, it is called a square pyramid.
- c. The solid shapes are of two-dimensional.
- d. A net is a skeleton-outline of a solid that can be folded to make it.

Q7 What cross-section do you get when you give a horizontal cut to the following solids ?

- (A) A Brick
- (b) A round apple
- (c) a die
- (d) A circular pipe

CASE BASED STUDY QUESTIONS

Q1. A hanging focus light is suspended from the ceiling. Its light beam falls on these objects.

1) What is the shape of the shadow formed by an open book?

Answer :

2) What is the shape of the shadow formed by a table lamp?

Answer :

3) Which of the given objects casts a triangular shaped shadow?

Answer :

4) What is the shape of the shadow formed by a basketball?

Answer :

5) Which of the given objects casts a rectangular shaped shadow

Q2

Rhea witnessed a shadow dance in zedlands got talent. As she was learning about 3D shapes in school she decided to find out the shadows the shape would cast on a wall. Before trying them out herself she decided to deduce the 2D shapes she could make with the 3D shapes she had.



Que 1. What shadows will be cast by a ball (Sphere)?

Que 2. What shadows will be cast by a Cylindrical container?

Que 3. Cone cast two type of shadow one is triangle .Other will be

Que 4. Can a Rubik's Cube cast three different type of Shadow :

Yes / No

Que 5 . If yes, list the shapes the shadow of a Rubik's cube can take

ANSWERS FOR PRACTICE QUESTIONS

MCQS

- | | | | | |
|---------|----------|-----------|---------|--------------|
| Ans1) a | Ans2) b | Ans3) d | Ans4) b | Ans 5) FALSE |
| Ans6) b | Ans 7) c | Ans 8) b | Ans9) a | Ans 10) d |

SHORT ANSWER TYPE QUESTIONS

Ans1) Sphere: Football, Earth, Round table

Cone: Conical funnel, ice cream cone, conical cracker

- | | | | |
|------------|-----------------------|------------------------|----------------|
| Ans2) 18cm | Ans 3) cone ,3 | Ans4) circle | Ans5) cylinder |
| Ans6) b | Ans7) length-4cm | Ans8) isometric sketch | |
| Ans9) six | Ans10) square pyramid | | |

LONG ANSWER TYPE QUESTIONS

Ans1) sphere,tetrahedron,cube,square pyramid

Ans2 draw net Ans 3) 2D , sphere Ans4) draw nets Ans5) circle,circle

Ans6) F,T,F,T Ans7) Rectangle, circle, square, circle

CASE BASED STUDY QUESTIONS

Ans1) a) rectangle b) circle c) cone d) circle e) mobile phone

Ans2) a) circle b) rectangle c) circle d) yes e) square

QUESTION PAPER (20 MARKS)

- Q1** Number of vertices a cone has:
 a)One b). Two c) Three d)Four Ans a) one (1)
- Q2** The top view of a cube looks like a: (1)
 a) Circle b) Square c) Rectangle d)Triangle
- Q3** Fill in the blanks (2)
 The solid with one circular face, one curved surface and one vertex is called
 Total no. of edges a square pyramid are
- Q4** Why a cylinder is not a prism? (2)
- Q5** Draw the net of a cylinder. (2)
- Q6** What will be the shadow of book when seen under a overhead projector? (2)
- Q7** Draw the nets of the following: (3)
 (i) Triangular prisms (ii) Tetrahedron (iii) Cuboid
- Q8** True and false (3)
 a. Rectangle is an example of 3D
 b. If the base of a pyramid is a square, it is called a square pyramid.
 c. All the faces ,except the base of a square pyramid are triangular
- Q9** Name the solids that have: (4)
 (i) 3 surfaces (ii) 8 vertices (iii) 6 faces (iv) 5 faces and 5 vertices

QUESTION PAPER (30 MARKS)

- Q1** What cross-sections do you get when you give a horizontal cut to an ice-cream cone? (1)
- Q2.** Three cubes each with 6cm edge are placed side to side. What would be the length of the solid formed. (2)
- Q3** Draw the sketch of two figures which has no edge. (2)
- Q4** Name the solids that have 8 triangular faces. (2)
- Q5** Draw the net of cuboid . (2)
- Q6** Explain why a cone is not a pyramid and a cylinder is not a prism. (3)
- Q7** Draw the net of triangular pyramid with base as equilateral triangle of side 3 cm and slant edges 5 cm (3)
- Q8** Draw an isometric view of a cuboid 6 cm × 4 cm × 2 cm.
- Q9** Draw the nets of the following: (4)
 (i) square prism (ii) Tetrahedron
 (iii) Cuboid. (iv) square pyramid
- Q10** Draw a net of a cuboid having same breadth and height, but length double the breadth. (4)
- Q11** Match the following with their nets: (4)

