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**DISTRICT INSTITUTE OF EDUCATION AND TRAINING
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LEARNING BASED ASSESMENT QUESTION BANK

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MATHEMATICS

8

EIGHTH STANDARD

**DEPARTMENT OF STATE EDUCATIONAL RESEARCH AND
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INDEX

Sl.No	CHAPTER	Page No.
01	RATIONAL NUMBERS	4 – 9
02	LINEAR EQUATIONS IN ONE VARIABLE	10 – 12
03	INTRODUCTION TO QUADRILATERALS	13 – 18
04	DATA HANDLING	19 – 25
05	SQUARES AND SQUARE ROOTS	26 – 31
06	CUBES AND CUBE ROOTS	32 – 35
07	COMPARING QUANTITIES	36 – 40
08	ALGEBRAIC EXPRESSION AND IDENTITIES	41 – 45
09	MENSURATION	46 – 50
10	EXPONENTS AND POWERS	51 – 55
11	DIRECT AND INVERSE PROPORTION	56 – 61
12	FACTORISATION	62 – 66
13	INTRODUCTION TO GRAPHS	67 – 73
14	KEY ANSWERS	76 - 152

CHAPTER-1: RATIONAL NUMBERS

Learning Outcome

Generalise the properties of Rational numbers through number patterns.

Teaching Points:

- * Natural numbers, Whole Numbers, Integers and Rational Numbers and the Mathematical operations.
- * Properties of rational numbers: Closure, Commutativity, Associativity for addition, subtraction, multiplication and division, the role of zero, the role of one (1) and Distributivity of multiplication over addition.
- * Using the Rational Numbers in daily life situation to solve the problems.

Type of questions:

EASY - 31

AVERAGE-13

DIFFICULT- 04

TOTAL - 48

I. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

1) A number which can be expressed as $\frac{p}{q}$ where p and q are integers and $q \neq 0$ is [EASY]

- (A) natural number (B) whole number (C) integer (D) rational number

2) The additive identity for rational numbers is [EASY]

- (A) 1 (B) 0 (C) -1 (D) $\frac{1}{2}$

3) The multiplicative identity for rational numbers is [EASY]

- (A) 1 (B) 0 (C) -1 (D) $\frac{1}{2}$

4) If $x + 0 = 0 + x = x$, which is rational number, then 0 is called [EASY]

- (A) Identity element for addition of rational numbers. (B) additive inverse of x
(C) multiplicative inverse of x (D) reciprocal of x

5) The addition inverse of $\frac{3}{5}$ is [EASY]

- (A) $\frac{3}{5}$ (B) $-\frac{5}{3}$ (C) $\frac{5}{3}$ (D) $-\frac{3}{5}$

6) The additive inverse of $\frac{-7}{19}$ is [EASY]

- (A) $\frac{-7}{19}$ (B) $\frac{7}{19}$ (C) $\frac{19}{7}$ (D) $\frac{-19}{7}$

7) The additive inverse of $\left(-2\frac{7}{5}\right)$ is [AVERAGE]

- (A) $2\frac{5}{7}$ (B) $\frac{17}{5}$ (C) $-\frac{17}{5}$ (D) $\frac{5}{17}$

8) The multiplicative inverse of $\frac{8}{5}$ is [EASY]

- (A) $\frac{8}{5}$ (B) $\frac{5}{8}$ (C) $-\frac{8}{5}$ (D) $-\frac{5}{8}$

9) The multiplicative inverse of $\left(-\frac{4}{9}\right)$ is [EASY]

- (A) $\frac{4}{9}$ (B) $-\frac{9}{4}$ (C) $\frac{9}{4}$ (D) 1

10) The reciprocal of $\frac{7}{12}$ is [EASY]

- (A) $\frac{7}{12}$ (B) 1 (C) $\frac{12}{7}$ (D) $1\frac{5}{7}$

11) To get the product 1, we should multiply $\frac{8}{21}$ by [EASY]

- (A) $\frac{8}{21}$ (B) $\frac{-8}{21}$ (C) $\frac{21}{8}$ (D) $\frac{-21}{8}$

12) The number of rational numbers that exists between any two given rational numbers are

- (A) Zero (B) One (C) Two (D) Infinite

[EASY]

13) The product of $\frac{1}{x}$ and its reciprocal is [EASY]

- (A) 0 (B) 1 (C) x (D) $2x$

14) The rational number between $\frac{2}{5}$ and $\frac{3}{5}$ is [AVERAGE]

- (A) $\frac{4}{5}$ (B) $\frac{1}{5}$ (C) $\frac{1}{2}$ (D) 1

15) The Rational numbers are not closed under the operation [EASY]

- (A) Addition (B) Subtraction (C) Multiplication (D) Division

16) The property of rational numbers holds good under the operation subtraction [EASY]

- (A) Commutative (B) Associative
(C) Distributive (D) None of these

17) The Whole numbers are not closed upon the operations [EASY]

- (A) Addition and Multiplication (B) Multiplication and Subtraction
(C) Subtraction and Addition (D) Subtraction and Division

18) The Integers are not closed upon the operation [EASY]

- (A) Addition (B) Multiplication (C) Division (D) Subtraction

19) The Rational numbers are not closed upon the operation [EASY]

- (A) Addition (B) Subtraction (C) Division (D) Multiplication

20) The sum of any two Rational numbers is [AVERAGE]

- (A) Whole numbers (B) Integers (C) Rational numbers (D) Natural numbers

21) $\frac{2}{3} + \frac{4}{5} = \frac{4}{5} + \frac{2}{3}$ the property of Rational numbers used here is [EASY]

- (A) Closure property (B) Commutative property
(C) Associative property (D) Identity property

22) $\frac{1}{2} \times \left(\frac{3}{2} \times \frac{-5}{3}\right) = \left(\frac{1}{2} \times \frac{3}{2}\right) \times \frac{-5}{3}$ the property of Rational numbers used here is [EASY]

- (A) Identity property (B) Commutative property
(C) Associative property (D) Closure property

23) $\frac{-5}{2} \times \left(\frac{4}{3} \times \frac{3}{2}\right) = \left(\frac{4}{3} \times \frac{3}{2}\right) \times \frac{-5}{2}$ the property of Rational numbers used here is [EASY]

(A) Commutative property

(B) Associative property

(C) Closure property

(D) Identity property

II. Answer the following questions:(1 Mark Questions)

24) Write the additive identity for Rational numbers. [EASY]

25) Write the multiplicative identity for Rational numbers. [EASY]

26) (-13) is not a whole number. Give reason. [AVERAGE]

27) Define rational number. [EASY]

28) Write the number -2 and 4 in the form $\frac{p}{q}$ [EASY]

29) Find the value of : $5 - (-3)$ and $-3 - 5$ [EASY]

30) What is negative number? [EASY]

31) Find the product of : $\frac{-2}{3} \times \frac{4}{5}$ [EASY]

32) Write the additive inverse of $2\frac{5}{4}$ [EASY]

33) Write the multiplicative inverse of $\left(-4\frac{3}{8}\right)$ [EASY]

34) The product of two rational numbers is -8 . If one of the number is (-10) , find the other.

[AVERAGE]

III. Answer the following questions :(2 Mark Questions)

35) Solve the left-hand side and right-hand side of the problem to test addition, Commutative property of the Rational numbers. [AVERAGE]

$$2\frac{1}{4} + \frac{3}{2} = \frac{3}{2} + 2\frac{1}{4}$$

36) Solve the left-hand side and right-hand side of the problem to test multiplication, Commutative property of the Rational numbers. [AVERAGE]

$$1\frac{3}{4} \times 3\frac{2}{5} = 3\frac{2}{5} \times 1\frac{3}{4}$$

37) Solve the left-hand side and right-hand side of the problem to test multiplication, Associative property of the Rational numbers. [AVERAGE]

$$\frac{2}{3} \times \left[\frac{-3}{5} \times \frac{5}{8} \right] = \left[\frac{2}{3} \times \frac{-3}{5} \right] \times \frac{5}{8}$$

38) Solve the left-hand side and right-hand side of the problem to test the distributive property of a rational numbers. [AVERAGE]

$$\frac{6}{5} \left[\frac{5}{7} + \frac{1}{2} \right] = \frac{6}{5} \times \frac{1}{2} + \frac{6}{5} \times \frac{1}{2}$$

39) If 'a', 'b' and 'c' are any three positive numbers and then write the following properties.

(i) Distributive property of multiplication over addition.

(ii) Distributive property of multiplication over subtraction. [EASY]

IV. Answer the following questions: (3 Mark Questions)

40) Find the value of: $\frac{-4}{5} \times \frac{3}{7} \times \frac{15}{16} \times \left[\frac{-14}{9} \right]$ [AVERAGE]

41) Find the value of: $\frac{3}{7} + \left[\frac{-6}{11} \right] + \left[\frac{-8}{21} \right] + \left[\frac{5}{22} \right]$ [AVERAGE]

42) Verify the property $x \times (y + z) = (x \times y) + (x \times z)$ of rational numbers by taking $x = \frac{-1}{2}$, $y = \frac{2}{3}$ and $z = \frac{3}{4}$ and write the name of this property. [DIFFICULT]

43) Find the value of: $\frac{2}{5} \times \frac{-3}{7} - \frac{1}{14} - \frac{3}{7} \times \frac{3}{5}$ [DIFFICULT]

V. Answer the following questions: (4 Mark Questions)

44) Name the property under addition used in each of the following: [EASY]

i) $a + b = b + a$

ii) $a + 0 = 0 + a = a$

iii) $a(b + c) = ab + ac$

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

45) Find the value using distributive property for rational numbers.

[AVERAGE]

$$\left\{\frac{7}{5} \times \left(\frac{-3}{12}\right)\right\} + \left\{\frac{7}{5} \times \frac{5}{12}\right\}$$

46) Verify the Distributive property of multiplication over addition for rational number by

considering the rational numbers $\frac{-3}{4}$, $\frac{2}{3}$ and $\frac{-5}{6}$

[AVERAGE]

47) Consider a, b and c be the three rational numbers, where $a = \frac{2}{3}$, $b = \frac{4}{5}$ and $c = \frac{-5}{6}$.

Verify: i) $a + (b + c) = (a + b) + c$ (Associative property of addition)

ii) $a \times (b \times c) = (a \times b) \times c$ (Associative property of multiplication)

[DIFFICULT]

48) Simplify:

i) $\frac{32}{5} + \frac{23}{11} \times \frac{22}{15}$

ii) $\frac{3}{7} + \frac{28}{15} \div \frac{14}{5}$

iii) $\frac{2}{7} \times \left[\frac{7}{16} - \frac{21}{4}\right]$

iv) $\frac{3}{4} \times \left[\frac{8}{9} - 40\right]$

[DIFFICULT]

CHAPTER - 2: LINEAR EQUATIONS IN ONE VARIABLE

Learning Outcome

Solves linear equation in one variable and daily life problems with the help of variables.

Teaching Points:

- * Concepts of Algebraic expressions, equations, variables, highest power of the variable, linear equations, linear equations in one variable and few steps to find the solutions of the equation.
- * To solve the linear equations with one variable which have linear expression on one side and number on the other side.
- * To solve the linear equation comparing or equating the quantities.
- * Solving linear equations having the variable on both sides.
- * Reducing the Linear equations to simpler form to solve.

Type of questions:

EASY: 26

AVERAGE: 13

DIFFICULT: 03

TOTAL - 42

I. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

- 1) The Linear equation in the given algebraic expressions is [EASY]
(A) $y + 1$ (B) $p(p + 2)$ (C) $x^3 + x^2 - 1$ (D) $t^2 - 1$
- 2) Which of the following is not a linear equation [EASY]
(A) $x - 1 = 0$ (B) $m + 7 = 0$ (C) $4x = \frac{1}{x}$ (D) $2x + 5 = 1$
- 3) The variable in the equation $3m + 4 = 10$ is [EASY]
(A) 3 (B) 4 (C) m (D) 10
- 4) The linear equation in one variable among the following is [EASY]
(A) $4x + 3y = 12$ (B) $2x + 5y = 0$ (C) $y - 3 = 3(x - 4)$ (D) $3y + 4 = 0$
- 5) The highest power of the variable 'z' in the algebraic expression $1 + z + z^2 + z^3$ is [EASY]
(A) 0 (B) 1 (C) 2 (D) 3
- 6) The highest power of the variable appearing in the linear equation is [EASY]
(A) 0 (B) 1 (C) 2 (D) 3

7) Among the following signs, the equality sign is [EASY]

- (A) $\times$ (B) $\div$ (C) $\neq$ (D) $=$

8) The algebraic term in the equation $5x - 6 = \frac{4}{5}$ is [EASY]

- (A) x (B) -6 (C) $\frac{4}{5}$ (D) $5x$

9) In the given linear equation $2x - 3 = 7$ the value of x is [EASY]

- (A) 10 (B) 5 (C) -2 (D) 2

10) The value of p in the linear equation $\frac{5}{3} - 4p = 1$ is [AVERAGE]

- (A) $\frac{1}{6}$ (B) 6 (C) $-\frac{1}{6}$ (D) -6

11) In the linear equation $8x = 15 + 3x$, the value of x is [EASY]

- (A) -3 (B) 3 (C) 5 (D) -5

12) In the linear equation $3n - 5 = 6 + 2n$, the value of n is [EASY]

- (A) 1 (B) 11 (C) -11 (D) -1

13) In the linear equation $2y - 1 = 17 - y$, the value of y is [EASY]

- (A) 6 (B) -6 (C) 8 (D) $\frac{16}{3}$

14) A person has certain number of ₹2 coins which amounts to ₹20. The expression to find the number of coins is [EASY]

- (A) $x + 2 = 20$ (B) $2x = 20$ (C) $x + 20 = 2$ (D) $20x = 2$

15) 'The sum of two consecutive numbers is 73'. The expression to find the numbers is [EASY]

- (A) $x + (x + 1) = 73$ (B) $2x = 73$ (C) $x(x+1) = 73$ (D) $x + (x + 2) = 73$

16) The perimeter of the rectangular swimming pool is 22m. If its length is 6m then its breadth is

- (A) 6m (B) 5m (C) 10m (D) 12m [AVERAGE]

II. Answer the following equations: (1 Mark questions)

17) Define linear equation. [EASY]

18) Define an equation. [EASY]

19) Define an Algebraic equation. [EASY]

20) Write the expression on the LHS in the equation $2x - 3 = x + 2$ [EASY]

21) Write the expression on the RHS in the equation $3x = 2x + 18$ [EASY]

22) In the given equation $10x + 7 = 3x - 28$, transpose $3x$ to LHS and rewrite the equation. [EASY]

23) Find the value of x in equation $7x = -35$ [EASY]

24) $y + y^2$ is not a linear equation, give reason? [AVERAGE]

25) What you call the values of the expressions on the LHS and RHS are equal? [EASY]

III. Answer the following equations: (2 Mark questions)

26) Solve: $5x = 3x + 6$ [EASY]

27) Solve: $x + 7 = 8x$ [EASY]

28) Solve: $6m - 5 = 4m + 11$ [EASY]

29) Solve: $4(2p - 1) = 3p + 6$ [EASY]

30) Solve: $\frac{15}{4} - 7x = 9$ [AVERAGE]

31) Solve: $3n - 5n = \frac{8}{3}$ [AVERAGE]

IV. Answer the following equations: (3 Mark questions)

32) Solve: $\frac{2}{5}y + \frac{1}{2} = y - 3\frac{1}{2}$ [DIFFICULT]

33) Solve: $\frac{2}{3}n - \frac{3}{2} = \frac{4}{3}n + \frac{5}{2}$ [DIFFICULT]

34) Solve: $\frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$ [DIFFICULT]

35) The perimeter of rectangular field is 154m. If its length is 2m more than its breadth. What are the length and breadth of the field? [AVERAGE]

36) Sum of two numbers is 95. If one number exceeds the other by 15, find the other number.

37) The sum of three consecutive numbers is 51. Find those numbers by framing linear equation. [AVERAGE]

V. Solve the following equations: (4 Mark questions)

38) Solve the following linear equations: [AVERAGE]

i) $\frac{6x+1}{3} + 1 = \frac{x-3}{6}$

ii) $m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$

39) Simplify and solve the following linear equations: [AVERAGE]

i) $15(y - 4) - 2(y - 9) = 5(y + 6)$

ii) $3(5z - 7) - 2(9z - 11) = 4(8z - 13) - 17$

40) The angles of a triangles are in the ratio1:2:3. Find the measure of each angle of the triangles. [AVERAGE]

41) The metal sheet is in the form of isosceles triangle whose perimeter is 36cm and one of its unequal side measures 10cm. Find the remaining two sides which are equal. [AVERAGE]

42) The age of a son is one third of his father's age. If the age of his father is 48 years. Find the present age of the son, also find the age of his younger sister whose age 2 years less. [AVERAGE]

CHAPTER 3 –UNDERSTANDING QUADRILATERALS

Learning Outcome

Solves problems related to angle sum property of a quadrilateral

Teaching points:

- * Polygons: Definition, Types of polygons, exterior and interior angles of a polygons.
- * Convex and Concave polygons.
- * Regular and Irregular Polygons.
- * Sum of the measures of the exterior angles of a polygon.
- * Kinds of quadrilaterals: Trapezium, Kite, Parallelogram.
- * Elements of a parallelogram, angles of a parallelogram, Diagonals of a parallelogram.
- * Some special Parallelograms: Rhombus, a rectangle, a square.

Type of questions:

EASY: 22

AVERAGE: 25

DIFFICULT: 09

TOTAL - 56

I. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

1. A simple closed curve made up of only line segments is

(A) polygon

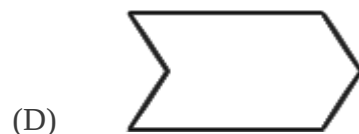
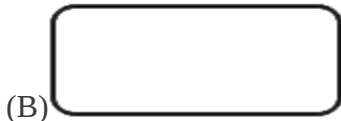
(B) square

(C) rectangle

(D) triangle

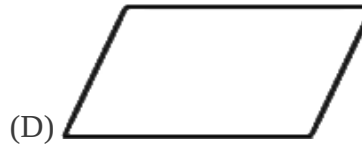
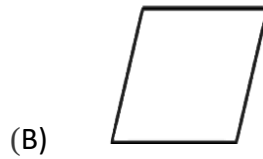
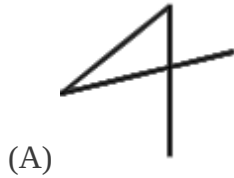
[EASY]

2. In the following figures, polygon is



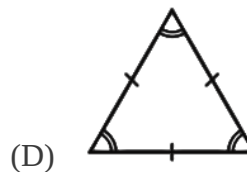
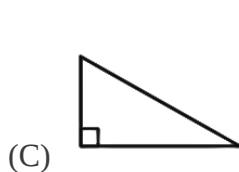
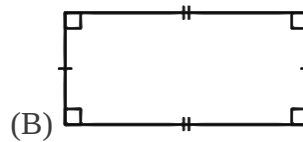
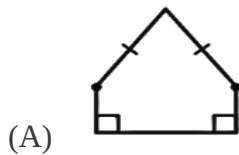
[AVERAGE]

3. Among the following figures, not a polygon is



[AVERAGE]

4. Regular polygon among the following figures is



[EASY]

5. The maximum number of sides that a polygon can have is

[AVERAGE]

- (A) three (B) four (C) five (D) infinite

6. Triangle is a polygon with sides

[EASY]

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

7. The name of a polygon having seven sides is

[EASY]

- (A) hexagon (B) octagon (C) heptagon (D) decagon

8. A parallelogram each of whose angles measures 90° is

[AVERAGE]

- (A) square as well as Rectangle (B) rectangle (C) parallelogram (D) square

9. The sum of the measures of the external angles of any polygon is

[EASY]

- (A) 180° (B) 360° (C) 240° (D) 90°

10. If one angle of a right-angled triangle is equal to 30° , then the measure of third angle is

- (A) 90° (B) 30° (C) 180° (D) 60°

[AVERAGE]

11. The sum of adjacent angles of a parallelogram is

[EASY]

- (A) 70° (B) 110° (C) 180° (D) 360°

12. The sum of all the angles of a four-sided convex polygon is equal to [EASY]
 (A) 180° (B) 90° (C) 240° (D) 360°
13. In the following Quadrilaterals, a regular quadrilateral is [EASY]
 (A) Rectangle (B) Square (C) Kite (D) Rhombus
14. A polygon which is both 'equiangular' and 'equilateral' is
 (A) Regular polygon (B) Scalene triangle
 (C) Rectangle (D) Rhombus [EASY]
15. The sum of the measures of the three interior angles of a triangle is [EASY]
 (A) 360° (B) 210° (C) 180° (D) 240°
16. In regular quadrilateral each interior angle measures [EASY]
 (A) 90° (B) 180° (C) 240° (D) 360°
17. A parallelogram having equal diagonals is [EASY]
 (A) A trapezium (B) A rectangle (C) A rhombus (D) A kite
18. The interior angles of a quadrilaterals are 40° , 120° , 10° and x , then the measure of x is
 (A) 40° (B) 120° (C) 190° (D) 180° [AVERAGE]
19. The formula to find the sum of all the interior angles of a polygon with 'n' number of sides is [EASY]
 (A) $(n-2) \times 180^{\circ}$ (B) $(n-2) \times 360^{\circ}$ (C) $(n-1) \times 180^{\circ}$ (D) $(n-1) \times 360^{\circ}$
20. If two diagonals of a square intersect, then the angle of intersection is [EASY]
 (A) 45° (B) 180° (C) 90° (D) 120°
21. The number of diagonals does a triangle has [EASY]
 (A) 0 (B) 1 (C) 2 (D) 3

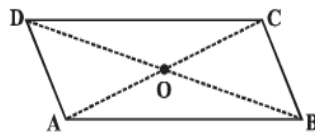
II. Answer the following questions: (One mark questions)

22. Define polygon. [EASY]
23. Define quadrilateral. [EASY]
24. What is a regular polygon? [EASY]
25. Five angles of a hexagon are 150° , 95° , 80° , 135° & 125° . Find the sixth angle.
 [DIFFICULT]
26. How many diagonals are there in a hexagon? [AVERAGE]
27. How many sides does a regular polygon have if the measure of an exterior angle is 24° ?
 [AVERAGE]

28. How many sides does a regular polygon have if the measure of an interior angle is 165° ? [AVERAGE]
29. Find the measure of each interior angle of a regular pentagon. [AVERAGE]
30. What is the least interior angle possible for a regular polygon? [DIFFICULT]
31. What is the greatest exterior angle possible for a regular polygon? [DIFFICULT]
32. One angle of a parallelogram is 60° . Find its opposite angle and the adjacent angle. [AVERAGE]

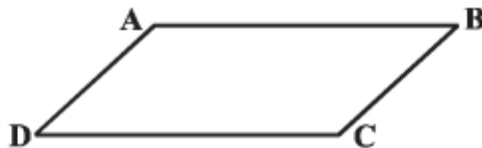
III. Answer the following questions: (Two mark questions)

33. Differentiate between convex and concave polygons. [AVERAGE]
34. Differentiate between regular and irregular polygons. [AVERAGE]
35. Write any two properties of a Kite. [EASY]
36. Write any two properties of a Rectangle. [EASY]
37. Write any two properties of a Square. [EASY]
38. Name the Diagonals, in the given parallelogram ABCD.



[EASY]

39. Name one pair of the following by observing the given figure.
i) opposite sides ii) opposite angles iii) adjacent sides iv) adjacent angles



[AVERAGE]

40. Find the number of sides of a regular polygon whose each exterior angle has a measure of 60° . [AVERAGE]
41. An angle of a parallelogram measures 70° . Find the measure of the remaining three angles. [AVERAGE]
42. The measures of two adjacent angles of a parallelogram are in the ratio 3 : 2. Find the measure of each of the angles of the parallelogram. [AVERAGE]

IV. Answer the following questions: (Three mark questions)

43. What is a regular polygon? Write the name of a regular polygon of

(i) 3 sides

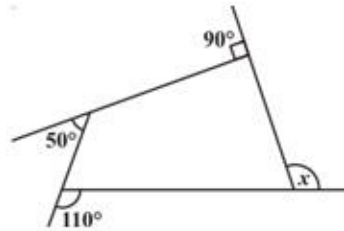
(ii) 4 sides

(iii) 6 sides

[AVERAGE]

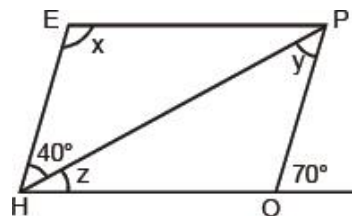
44. Find the measure of 'x' in the adjoining figure.

[AVERAGE]



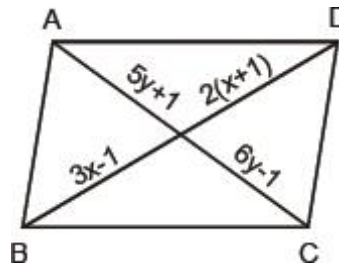
45. In the following figure, HOPE is a parallelogram. Find the angle measure x, y and z. State the properties you use to find them.

[DIFFICULT]



46. Find value of x and y in the parallelogram ABCD.

[DIFFICULT]



47. In a quadrilateral ABCD, the angles A, B, C and D are in the ratio 1: 2: 3: 4. Find the measure of each angle of the quadrilateral.

[AVERAGE]

48. Four angles of a quadrilateral are in the ratio 3:4:5:6. Find its angles.

[AVERAGE]

49. An exterior angle and the interior angle of a regular polygon are in the ratio 2 : 7. Find the number of sides of the polygon.

[AVERAGE]

50. Find the number of sides of a regular polygon whose each exterior angle has a measure of 45° .

[AVERAGE]

51. Find the sum of an interior angles of a regular polygon having 15 sides.

[AVERAGE]

52. Prove that the diagonals of a rhombus bisect each other.

[AVERAGE]

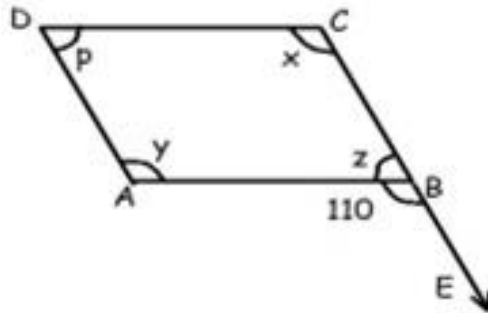
53. Two adjacent angles of a parallelogram are $(3x-4)^\circ$ and $(3x+10)^\circ$. Find the angles of the parallelogram. [DIFFICULT]

54. Three angles of a quadrilateral are in the ratio 4 : 6 : 3. If the fourth angle is 100° , find the remaining three angles of the quadrilateral. [DIFFICULT]

55. The measure of the diagonal of a rectangle is 5cm. If one of its sides is 3cm, then find its perimeter. [DIFFICULT]

56. In the given figure, ABCD is a parallelogram. Find the value of x, y, z and p.

[DIFFICULT]



CHAPTER: 4 – DATA HANDLING

Learning outcome:

-  Constructs and understands Bar graphs and Pie charts.
-  Understands the meaning of random experiment and calculates the probability of an event.

Teaching points:

- * Different types of graphs
 - i) A Pictograph
 - ii) A bar graph
 - iii) Double bar graph
- * Circle graph or Pie Chart
- * Drawing pie charts
- * Chance and Probability
 - i) Getting a result
 - ii) Equally likely outcomes
 - iii) Linking chances to probability
 - iv) Outcomes as events
 - v) Chance and probability related to real life

Level of questions:

Easy : 33

Average:10

Difficult: 6

Total - 49

I.Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

1. Primary data is collected by
(A) some unpublished data (B) investigator himself
(C) newspaper agency (D) some friends [AVERAGE]
2. Mention of scale is important in
(A) bar charts (B) pictographs
(C) multiple bar charts (D)all of these [AVERAGE]
3. In a pictograph, if the symbol  represents 50 students, then the picture    is equivalent to
(A) 100 students (B) 110 students
(C) 120 students (D) 150 students [AVERAGE]

4. A pictorial representation of data using symbols is known as [EASY]
 (A) bar graph (B) pictograph (C) circle graph (D) double bar graph
5. A display of information using bars of uniform width, with their heights being proportional is known as [EASY]
 (A) bar graph (B) pictograph (C) circle graph (D) double bar graph
6. A graph showing two sets of data simultaneously is known as [EASY]
 (A) bar graph (B) pictograph (C) circle graph (D) double bar graph
7. A graph used for the comparison of the data is [EASY]
 (A) bar graph (B) pictograph (C) circle graph (D) double bar graph
8. A graph shows the relationship between a whole and its parts is known as [EASY]
 (A) bar graph (B) pictograph (C) circle graph (D) double bar graph
9. The total angle at the centre of a circle is [EASY]
 (A) 90° (B) 180° (C) 270° (D) 360°
10. The central angle of the sectors will be a fraction of [EASY]
 (A) 90° (B) 180° (C) 270° (D) 360°
11. In given pictograph, smiley represents destination in which students are interested to visit.

Destination	Number of students
Kashmir	      
Manali	  
Shimla	   
Agra	 
Coorg	  

The number of students interested to visit Agra is [EASY]

- (A) 2 (B) 3 (C) 7 (D) 4
12. The following pictograph shows the mode of transport used by students in a class.

Mode of Transport	Number of students  = 2girls  = 2boys
	      
	  
	
	  

The numbers of girls prefer cycling to the school than boys is

[EASY]

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

13. The given pie chart shows the results of a survey of how students travel to school.

The most common method used by students to travel is

- (A) Taxi (B) Metro (C) Bus (D) Walking



[EASY]

14. If a coin is tossed once, then the number of all possible outcomes is

[EASY]

- (A) 1 (B) 2 (C) 3 (D) 0

15. If a fair die is rolled once, then the number of all possible outcomes is

[EASY]

- (A) 1 (B) 2 (C) 3 (D) 6

16. If a fair die is thrown once, then the probability of getting even number is

[EASY]

- (A) $\frac{1}{2}$ (B) $\frac{1}{6}$ (C) $\frac{1}{3}$ (D) $\frac{2}{3}$

17. The probability that cannot exist in the following is

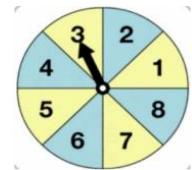
[EASY]

- (A) 3 (B) $\frac{2}{3}$ (C) 15% (D) 0.7

18. The probability of the spinner to land on an odd number is

[AVERAGE]

- (A) $\frac{4}{8}$ (B) $\frac{4}{4}$ (C) $\frac{1}{4}$ (D) $\frac{1}{3}$



II. Answer the following questions: (One mark questions)

19. What is a Pictograph?

[EASY]

20. What is a Bar graph?

[EASY]

21. What is a Double bar graph?

[EASY]

22. What is a circle graph?

[EASY]

23. What does bar heights represent in Bar graph?

[AVERAGE]

24. Which type of graph is useful for the comparison of data?

[EASY]

25. What is the size of each sector represents in circle graph?

[EASY]

26. What is a random experiment?

[AVERAGE]

27. Write the outcomes when a coin is tossed once.

[EASY]

28. Write the outcomes when a die is thrown once.

[EASY]

29. Define Probability of an event.

[EASY]

30. What is an event?

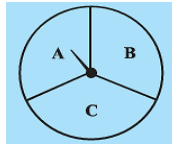
[EASY]

31. What are the possible outcomes when you try to start a scooter?

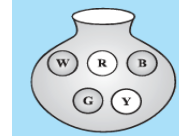
[EASY]

32. When you spin the wheel as shown in the figure, list the possible outcomes.

[EASY]



33. You have a bag with five identical balls of different colours and you are to pull out a ball without looking it. List the outcomes you would get.



[EASY]

III. Answer the following questions: (Two mark questions)

34. Write two properties of a Bar graph.

[EASY]

35. The sale of fans on the first six days of a week is shown below (✂=2fans)

Monday	✂✂✂✂✂✂
Tuesday	✂✂✂✂✂✂✂✂✂✂
Wednesday	✂✂✂✂✂✂
Thursday	✂✂✂✂✂
Friday	✂✂✂✂✂✂✂✂✂✂
Saturday	✂✂✂✂✂✂

Which day of the week the sale is maximum and how much?

[AVERAGE]

36. Observe the following Pictograph and answer the following:

- (i) How many cars were produced in the month of July?
(ii) In which month were maximum number of cars produced?

Months	 = 100 CARS  = 50 CARS
JULY	  
AUGUST	  
SEPTEMBER	   

[DIFFICULT]

37. Represent the given data in a Bar graph using an appropriate scale:

Favourite food	Number of people
North Indian	30
South Indian	40
Chinese	25
Others	25

[AVERAGE]

38. The number of students in a hostel, speaking different languages is given below. Display the data in pie chart.

Language	Hindi	English	Marathi	Tamil	Bengali	Total
Number of students	40	12	9	7	4	72

[DIFFICULT]

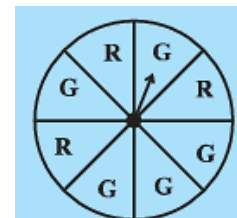
39. A fair die is thrown once. Find the probability of getting a prime number. [EASY]
40. A bag has 4 red balls and 2 yellow balls. (The balls are identically in all respects other than colour). A ball is drawn from the bag without looking into the bag. What is the probability of getting a red ball? Is it more or less than getting a yellow ball? [AVERAGE]
41. The probability that it will rain tomorrow is 0.85. What is the probability that it will not rain tomorrow? [AVERAGE]
42. If you have a spinning wheel with 3 green sectors, 1 blue sector and 1 red sector, what is the probability of getting a green sector? What is the probability of getting a non blue sector?

[DIFFICULT]

III. Answer the following questions: (three marks questions)

43. Suppose you spin the wheel

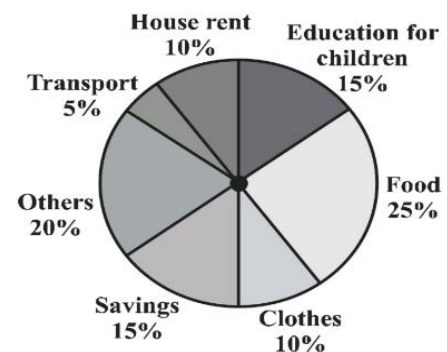
- list the number of outcomes of getting a green sector and non-getting a green sector on this wheel.
- find the probability of getting a green sector.
- find the probability of not getting a green sector.



[DIFFICULT]

44. Adjoining pie chart gives the expenditure (in percentage) on various items and savings of a family during a month.

- On which item, the expenditure was maximum?
- Expenditure of which item is equal to the total savings of the family?
- If the monthly savings of the family is Rs3000, what is the monthly expenditure on clothes?



[DIFFICULT]

45. Draw an appropriate graph to represent the given information:

Children who prefer	School A	School B	School C
Walking	40	55	15
Cycling	45	25	35

[AVERAGE]

V. Answer the following questions: (Four marks questions)

46. Draw an appropriate graph to represent the given information percentage wins in ODI by 8 top cricket teams, in double bargraph

Teams	Win % From Champions Trophy to World cup-06	Last 10 ODI in 07
South Africa	75%	78%
Australia	61%	40%
Srilanka	54%	38%
Newzealand	47%	50%
England	46%	50%
Pakistan	45%	44%
Westindies	44%	30%
India	43%	36%

[DIFFICULT]

47. When a die is thrown, list the outcomes of an event of getting

i) a prime number

ii) not a prime number

iii) a number greater than 5

iv) a number not greater than 5

[EASY]



48. Numbers 1 to 10 are written on ten separate slips (one number on one slip), kept in a box and mixed well. One slip is chosen from the box without looking into it. What is the probability of

i) getting a number 6?

ii) getting a number less than 6?

ii) getting a number greater than 6?

iv) getting a 1- digit number? [AVERAGE]

49. The following pictograph shows the number of bullock carts in 5 villages.

Villages	Number of Bullock carts
A	
B	
C	
D	
E	

Observe the pictograph and answer the following questions.

A) Which village has the maximum number of bullock carts?

B) Which village has the minimum number of bullock carts?

C) How many more bullock carts does village B have as compared to village C?

D) What is the total number of bullock carts in all the 5 villages? [DIFFICULT]

CHAPTER 5 – SQUARES AND SQUARE ROOTS

Learning outcome:

Finds squares and square roots of numbers using different methods.

Teaching Points:

- * Properties of square numbers.
- * Some interesting patterns.
- * Finding the square of a number.
- * Pythagorean triplets.
- * Finding square roots of a perfect square numbers.
- * Finding square root through repeated subtraction method.
- * Finding square root through prime factorisation method.
- * Finding square root by division method.
- * Finding square roots of decimals.

Type of questions:

EASY: 17

AVERAGE: 43

DIFFICULT: 11

TOTAL - 71

- I. **Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.**

1. The sum of the first 'n' odd natural numbers is always equal to [EASY]
(A) n (B) n+1 (C) n^2 (D) 2n
2. The square of 13 is [EASY]
(A) 26 (B) 169 (C) 196 (D) 1313
3. The perfect square among these is [EASY]
(A) 10 (B) 15 (C) 25 (D) 30
4. The square of (-7) is [EASY]
(A) 14 (B) - 14 (C) 49 (D) -49
5. If $\sqrt{x} = 8$, then the value of 'x' is [AVERAGE]
(A) 2 (B) 4 (C) 8 (D) 64
6. The perfect square number between 30 and 40 is [AVERAGE]
(A) 32 (B) 35 (C) 36 (D) 39
7. The sum first eight odd natural numbers is [AVERAGE]
(A) 16 (B) 64 (C) 36 (D) 8

8. The square root of 0.09 is [AVERAGE]
(A) 0.3 (B) 0.03 (C) 0.81 (D) 0.0081
9. If it takes 11 steps of repeated subtraction to reach zero, then the original number is
(A) 100 (B) 121 (C) 144 (D) 169 [AVERAGE]
10. If a perfect square number ends with 9, then the digit in the unit's place of its square root is [AVERAGE]
(A) 3 or 9 (B) only 3 (C) only 9 (D) 3 or 7
11. The number of zeros in the square of 400 is [AVERAGE]
(A) 2 (B) 3 (C) 4 (D) 6
12. If a number has 1 or 9 in the unit's place, then the digit in units place of its square is [AVERAGE]
(A) 1 (B) 2 (C) 3 (D) 6
13. In the following, the number that can be expressed as the sum of two consecutive perfect squares is [DIFFICULT]
(A) 20 (B) 25 (C) 50 (D) 100
14. In the following, the Pythagorean triplet is [EASY]
(A) (1, 2, 3) (B) (2, 3, 4) (C) (3, 4, 5) (D) (4, 5, 6)
15. If (8, 15, x) is a Pythagorean triplet, then the value of x is [AVERAGE]
(A) 16 (B) 17 (C) 18 (D) 23
16. The symbol of a positive square root of a number is denoted as [EASY]
(A) $\sqrt[3]{}$ (B) $\sqrt{}$ (C) $\in$ (D) $\neq$
17. To find the square root of a perfect square by repeated subtraction, we subtract consecutive [EASY]
(A) even number (B) odd number (C) prime number (D) natural number
18. The number of steps included in finding the square root of 25 by repeated subtraction method is [AVERAGE]
(A) 3 (B) 4 (C) 5 (D) 6
19. The square of 31 is [AVERAGE]
(A) 62 (B) 961 (C) 691 (D) 91
20. The value of $\sqrt{144} + \sqrt{25}$ is [AVERAGE]
(A) 17 (B) 19 (C) 169 (D) 12

21. If the area of the square field is 625 m^2 then, the length of its side is [AVERAGE]
 (A) 5m (B) 15m (C) 25m (D) 35m
22. A ladder is 13m long. If it is leaning against a vertical wall with its base 5m away from the wall, then the height of the wall in which top of the ladder touches is [DIFFICULT]
 (A) 8m (B) 12m (C) 13m (D) 18m
23. A square shaped park has an area of 900 m^2 . If a person walks around the perimeter of the park twice, then the total distance covered is [DIFFICULT]
 (A) 120m (B) 240m (C) 900m (D) 1800m

II. Answer the following questions: (1 Mark questions)

24. Which is the smallest perfect square number? [EASY]
25. Define a square number. [EASY]
26. Write the perfect square number between 60 and 70. [EASY]
27. Write the digits in the units place of any square number. [AVERAGE]
28. Check whether 2061 is a perfect square number. Give reason. [AVERAGE]
29. Which is the next perfect square after 100? [EASY]
30. How many natural numbers lie between the squares of 6 and 7? [AVERAGE]
31. Find the sum of first 4 odd natural numbers. [AVERAGE]
32. Express 49 as the sum of 7 consecutive odd numbers. [AVERAGE]
33. Express 7^2 as the sum of two consecutive integers. [AVERAGE]
34. If one number of a Pythagorean triplet is 2m, then write the other two numbers. [EASY]
35. If $3^2 - 2^2 = 5$, $4^2 - 3^2 = 7$, then write the value of $5^2 - 4^2$. [AVERAGE]
36. Observe the pattern: $(1 + 2)^2 = 9$, $(2 + 3)^2 = 25$ Write the value of $(3 + 4)^2$. [AVERAGE]
37. If the area of a square is 144 cm^2 , then find the side of the square. [AVERAGE]
38. Find the value of $(\sqrt{9})^2$. [EASY]
39. If $11^2 = 121$. What is the square root of 121? [EASY]
40. If $x^2 = 36$, then find the value of x. [EASY]
41. A number when multiplied by itself gives 144. Find that number? [EASY]
42. Find the square of 0.6. [EASY]
43. Write the smallest 4-digit square number. [AVERAGE]

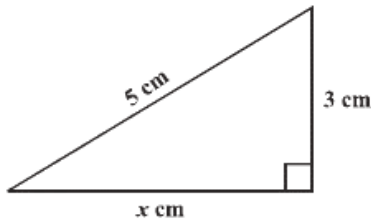
III. Answer the following questions: (2 Mark questions)

44. Write a Pythagorean triplet whose smallest member is 8.

[AVERAGE]

45. In the given figure, find the value of x .

[AVERAGE]



46. Find the prime factors of 12^2 .

[AVERAGE]

47. Find the square root of 196 by prime factorization method.

[AVERAGE]

48. Find the smallest number by which 9408 must be divided so that the quotient is a perfect square. Find the square root of the quotient.

[AVERAGE]

49. Find the smallest square number that is divisible by each of the numbers 4, 9 and 10.

[DIFFICULT]

50. Find the square root of 2304 by division method.

[AVERAGE]

51. Find the smallest whole number that should be multiplied to 180 to make it a perfect square.

[AVERAGE]

52. Find the smallest whole number that should be divided to 396 to make it a perfect square.

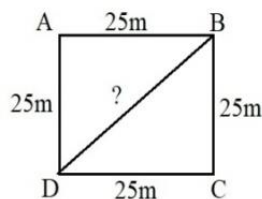
[AVERAGE]

53. Write a Pythagorean triplet whose smallest number is 12.

[AVERAGE]

54. In the given figure, if a square playground has side of length 25m, then find the diagonal of the playground.

[AVERAGE]



55. In a right angled triangle, if the length of the hypotenuse is 5cm and one of its side is 3cm, then find the length of the other side.

[DIFFICULT]

56. Find the square root of 729 by Division method.

[AVERAGE]

57. Find the square root of 2.56 by Division method.

[AVERAGE]

58. The students of class 8th of a school donated ₹2401 in all, for prime ministers National Relief Fund. Each student donated as many rupees as the number of students in the class. Find the number of students in the class.

[DIFFICULT]

59. 2025 plants are to be planted in a garden in such a way that each row contains as many plants as the number of rows. Find the number of rows and the number of plants in each row. [AVERAGE]

IV. Answer the following questions: (3 Mark questions)

60. Find the square root of 121 by repeated subtraction method. [AVERAGE]
61. Is 2352 a perfect square? If not, find the smallest multiple of 2352 which is a perfect square. Find the square root of the new number. [AVERAGE]
62. Find the smallest whole number that should be multiplied to 2028 to make it a perfect square number. Also find the square root of the square number so obtained. [AVERAGE]
63. Find the smallest whole number that should be divided to 2645 to make it a perfect square number. Also find the square root of the square number so obtained. [AVERAGE]
64. Find the square root of 3136 by Division method. [AVERAGE]
65. Find the least number which must be subtracted from 1989 so as to get the perfect square. Also find the square root of the perfect square so obtained. [AVERAGE]
66. Find the least number which must be added from 1825 so as to get the perfect square. Also find the square root of the perfect square so obtained. [AVERAGE]
67. The area of a square room is 144 m^2 . Square tiles of side 0.5m are used to cover the floor. Find how many tiles are required to cover the entire floor. [DIFFICULT]
68. A rectangular garden has a length of 18m and width of 72m. If it needs to be converted into a square garden having the same area then, what will be the side length of the new square garden? [DIFFICULT]
69. A gardener has 1000 plants. He wants to plant these in such a way that the number of rows and the number of columns remains same find the minimum number of plants he needs more for this. [DIFFICULT]

V. Answer the following questions: (4 Marks questions)

70. In a garden 2025 saplings are to be planted in such a way that each row contains as many saplings as the number of rows. Find the number of rows and the number of saplings present in each row. If 5 more rows have to be added, then find the number of saplings required for planting. [DIFFICULT]

71. There are 1464 students in a school. For a P.E drill all of them have to stand in such a manner that the number of rows is equal to number of columns. In doing so the P.E teacher finds out that few students were left out.

- i. Find the number of students in each row of a drill.
- ii. How many students left out in the arrangement?
- iii. How many students are there in forming a square?

[DIFFICULT]

CHAPTER 6- CUBES AND CUBE ROOTS

Learning outcome:

Finds cubes and cube roots of numbers using different methods.

Teaching Points:

- * Cube of a number.
- * Some interesting patterns:
 - i) Adding consecutive odd numbers
 - ii) Cubes and their prime factors
- * Smallest multiple that is a number perfect cube.
- * Cube root of a cube number.
- * Cube root through prime factorisation method.

Type of questions:

EASY: 10

AVERAGE: 29

DIFFICULT: 07

TOTAL - 46

I. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

1. The cube of 7 is [EASY]
(A) 14 (B) 21 (C) 49 (D) 343
2. In the cube of 7, the digit in its unit place is [EASY]
(A) 3 (B) 7 (C) 1 (D) 4
3. The cube root of 1000 is [EASY]
(A) 10 (B) 20 (C) 100 (D) 1000
4. The value of cube of 0.3 is [AVERAGE]
(A) 0.27 (B) 27 (C) 0.027 (D) 0.0027
5. In the following, the perfect cube number is [EASY]
(A) 128 (B) 100 (C) 1000 (D) 225
6. In the following, the number which is not perfect cube is [EASY]
(A) 216 (B) 1000 (C) 100 (D) 343
7. The symbol used to denote cube root is [EASY]
(A) $\sqrt[3]{}$ (B) $\sqrt{}$ (C) $\in$ (D) $\neq$

8. The value of $(-3)^3$ is [EASY]
(A) -9 (B) 9 (C) -27 (D) 27
9. If the unit's digit of a perfect cube is 8, then the unit's digit of its cube root is [AVERAGE]
(A) 2 (B) 4 (C) 6 (D) 8
10. The cube of an odd number is always a [EASY]
(A) Odd number (B) Even Number
(B) (C) Prime number (D) Negative number
11. If $x^3 = x^2$ for a positive integer 'x', then the value of x is [AVERAGE]
(A) 1 (B) 2 (C) 3 (D) 9
12. If a number ends with two zeros, then the number of zeros present in its cube is [EASY]
(A) 2 (B) 4 (C) 6 (D) 9
13. The smallest number that should be multiplied to 24 to make it a perfect cube number is [AVERAGE]
(A) 2 (B) 3 (C) 9 (D) 18
14. If the difference between the cube of a number and its square is 100, then the number is [DIFFICULT]
(A) 5 (B) 10 (C) 15 (D) 20
15. The sum of the cubes of first two natural numbers is [AVERAGE]
(A) 2 (B) 9 (C) 17 (D) 36
16. The value of $\sqrt[3]{8} \times \sqrt[3]{27}$ is [AVERAGE]
(A) 6 (B) 12 (C) 35 (D) 216
17. If $x^3 = 512$, then the value of x is [AVERAGE]
(A) 4 (B) 6 (C) 8 (D) 12
18. The product of square and cube of a least prime number is [AVERAGE]
(A) 1 (B) 4 (C) 8 (D) 32
19. If the prime factorisation of a number is $2^3 \times 3^3 \times 5^3$, then its cube root is [AVERAGE]
(A) 6 (B) 11 (C) 30 (D) 9000
20. If a sculptor is making a perfectly cubical block of side length 7cm, then the volume of the marble block is [DIFFICULT]
(A) 21cm^3 (B) 49cm^3 (C) 343cm^3 (D) 2401cm^3
21. The cube root of 0.000512 is [AVERAGE]
(A) 8 (B) 0.08 (C) 0.008 (D) 8

22. If the volume of a cube is 125cm^3 then, the length of its side is [AVERAGE]
(A) 5 cm (B) 10 cm (C) 15 cm (D) 25 cm

II. Answer the following questions: (1 Mark Questions)

23. Which is the smallest perfect cube greater than 1? [EASY]
24. List out the cube of numbers from 1 to 5. [AVERAGE]
25. If $a \times a \times a = 64$, then find the value of a . [AVERAGE]
26. Express 2^3 as sum of odd numbers. [AVERAGE]
27. Find the prime factors of 15. [AVERAGE]
28. What is the next number in the series 1, 8, 27, 64, ___? [AVERAGE]
29. Find the value of $\sqrt[3]{64 \times 27}$. [AVERAGE]
30. Write the digit in units place of the cube of 24. [AVERAGE]
31. A number in its prime factors can be written as $2^2 \times 3^3 \times 5^1$. Find the least number that should be multiplied to it to make a perfect cube. [AVERAGE]
32. Find the value of $8^3 - 7^3$. [AVERAGE]

III. Answer the following questions: (2 Mark questions)

33. Find the cube root of 512 by prime factorization method. [AVERAGE]
34. Express 4^3 as sum of odd numbers. [AVERAGE]
35. Write the prime factors of 216. [AVERAGE]
36. Is 243 a perfect cube? Give reason. [AVERAGE]
37. Find the smallest number by which 81 should be multiplied to obtain a perfect cube. [AVERAGE]
38. Calculate the volume of the cube whose side length is 6cm. [AVERAGE]
39. Is 392 a perfect cube? If not, find the smallest natural number by which 392 must be multiplied so that the product is a perfect cube. [AVERAGE]
40. A cuboid has a dimension 5cm, 2cm, 5cm. How many such cuboids are required to arrange them as a perfect cube? [DIFFICULT]
41. Find the cube root of 13824 by prime factorisation method. [AVERAGE]

IV. Answer the following questions: (3 Mark Questions)

42. Write the cubes of numbers from 1 to 10. [AVERAGE]
43. Is 53240 a perfect cube? If not, then by which smallest natural number should 53240 be divided so that the quotient is a perfect cube? [DIFFICULT]
44. Is 68600 a perfect cube? If not, find the smallest number by which 53240 to be multiplied to get a perfect cube. [DIFFICULT]
45. A factory manufactures cubical blocks of wood, each with a volume of 8cm^3 . If 64 such blocks are stacked to form a larger cube then, what will be the side length of the new larger cube? [DIFFICULT]

V. Answer the following questions:(4 Mark questions)

46. Two metallic cubes of sides 9cm and 10cm are melted and recast to form a single bigger cube. While doing so 1 cm^3 of metal is wasted. Then find
- (a) The volume of each smaller cube.
- (b) The side length of the new bigger cube. [DIFFICULT]

CHAPTER – 7: COMPARING QUANTITIES

Learning outcome:

Applies the concept of percentage to the context of profit and loss, discount, VAT and solves the related problems.

Teaching points:

- * Recalling Ratios and Percentages.
- * Finding discounts.
- * Estimation in percentages.
- * Sales tax/Value Added Tax / Goods and Services Tax
- * Calculating interest, simple interest and Compound interest.
- * Deducing a formula for compound interest.
- * Applications of compound interest formula.

Type of questions:

EASY: 10

AVERAGE: 30

DIFFICULT: 09

TOTAL - 49

I. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

1. The formula used in compound interest is

(A) $A = R\left(1 + \frac{P}{100}\right)^n$

(B) $A = R\left(1 - \frac{P}{100}\right)^n$

(C) $A = P\left(1 + \frac{P}{100}\right)^R$

(D) $A = P\left(1 + \frac{R}{100}\right)^n$

[EASY]

2. The ratio form of a fraction $\frac{30}{25}$ is

(A) 5 : 2

(B) 6 : 5

(C) 4 : 6

(D) 5 : 6

[EASY]

3. Express in terms of ratio, if the number of oranges is $\frac{1}{4}$ th the number of apples is

(A) 4 : 1

(B) 1 : 4

(C) 4 : 2

(D) 2 : 4

[AVERAGE]

4. The ratio of 50 paise to ₹1 is

- (A) 1 : 2 (B) 2 : 1 (C) 1 : 1 (D) 1 : 5

[EASY]

5. A girl purchased a table for ₹1000 and sold it for ₹1200, then the profit she get is

- (A) ₹ 1000 (B) ₹1200 (C) ₹200 (D) ₹800

[EASY]

6. The ratio of 25kg to 200g is

- (A) 120 : 123 (B) 100 : 110 (C) 125 : 1 (D) 115 : 123

[AVERAGE]

7. The marked price of book is ₹100. The shopkeeper gives 25% discount on it. Then, the selling price of the book is

- (A) ₹ 100 (B) ₹25 (C) ₹125 (D) ₹75

[AVERAGE]

8. A luxury car travelled 120km per hour whereas an ordinary car will travel 25km per hour, then the ratio of speed of luxury car : speed of ordinary car is

- (A) 24 : 5 (B) 25 : 4 (C) 25 : 3 (D) 23 : 5

[AVERAGE]

9. There are 8 men out of 20 family members, then percentage of men is

- (A) 20% (B) 40% (C) 52% (D) 68%

[AVERAGE]

10. In a class, 60% of the total students are girls, and their number is 18, then number of boys are

- (A) 12 (B) 15 (C) 16 (D) 13

[AVERAGE]

11. A watch is marked at ₹1200 and a discount of ₹240 is given, then percentage of discount is

- (A) 25% (B) 18% (C) 20% (D) 15%

[AVERAGE]

12. If a number is increased by 20% and the increased number is decreased by 20%.The net change is

- (A) No change (B) 8% decrease (C) 4% increase (D) 4% decrease

[DIFFICULT]

13. The marked price of a TV is ₹40,000. If a discount of 8% is given then the selling price is

- (A) ₹ 32,000 (B) ₹3,200 (C) ₹36,800 (D) ₹43,200

[AVERAGE]

14. A book costs ₹1000 and a sales tax of 16% is added, then the total cost of the book is

- (A) ₹1060 (B) ₹1016 (C) ₹1160 (D) ₹1006

[AVERAGE]

15. A product is priced at ₹1000. If the VAT is 12%, then the selling price of the product including VAT is

- (A) ₹ 1,120 (B) ₹1,200 (C) ₹1,100 (D) ₹1,012

[AVERAGE]

II. Answer the following questions:(1 Mark questions)

16. What is meant by discount? [EASY]

17. Expand G.S.T. [EASY]

18. In which year Government of India introduced GST. [EASY]

19. Write the full form of VAT. [EASY]

20. Write the formula to find the Amount in compound interest. [EASY]

21. What is the relation between amount, principal and compound interest? [EASY]

22. Convert ratio 4 : 5 into percentage. [AVERAGE]

23. Convert fraction $\frac{3}{4}$ into percentage. [AVERAGE]

24. The marked price of a book is ₹80. If the shopkeeper sells it for ₹72, then find the discount.

[AVERAGE]

25. A person A has ₹200 with him. He spent 80% amount he had. Find the amount left with him. [AVERAGE]

26. A pen marked at ₹40 is available for ₹32. Find at what percent discount is given on the market price. [AVERAGE]

III. Answer the following questions:(2 Mark questions)

27. Students of the class were given some plants on Vanamahotsava programme. 50% of students were given Indian beech sapling (pongam saplings), 30% of students were given Neem sapling, 20% of students were given tamarind saplings. 24 students received tamarind saplings, then find total number of students in the class. [AVERAGE]

28. A person purchased a TV for ₹14560 including 12% VAT. Find the price before VAT was added. [AVERAGE]

29. The population of K.G.F was 1,63,600 in the year 2021. It increased at the rate of 5% p.a. Find the population at the end of 2 years. [AVERAGE]
30. A trader marked an item costing ₹800 at ₹1000. He then sold it at 10% discount. What is the profit he made? [AVERAGE]
31. A person buys a T.V for ₹40,000 and the GST rate is 28%. What is the GST amount? [AVERAGE]
32. The cost of a ticket for an exhibition is increased from ₹50 to ₹65. Find the percentage of increase in the cost of the ticket. [AVERAGE]
33. If the sum of ₹1000 is borrowed for one year at an interest of 10% compounded annually, then find the amount to be paid after 1 year. [AVERAGE]

IV. Answer the following questions:(3 Mark questions)

34. The compound interest on a principal amount of ₹1500 is ₹315 after 2 years. Find the rate of compound interest. [AVERAGE]
35. A seller earned a 20% profit even after giving a 25% discount on an item. If the cost price of the item is ₹480, what is the marked price? [AVERAGE]
36. A mobile phone was purchased for ₹32000. The value of the mobile phone depreciated at a rate of 10% per annum. What will be the selling price of the mobile phone after 2 years? [AVERAGE]
37. A person bought a wrist watch for ₹3200 after getting a discount of 20%. Find the marked price of the watch. [AVERAGE]
38. A customer buys an item marked at ₹6000 and gets a 15% discount. If a 10% sales tax is added. What is the total amount paid by the customers? [AVERAGE]
39. Write three situations where we could use the formula for calculation of amount in Compound Interest. [AVERAGE]
40. Articles are marked at a price which gives a profit of 25%. After allowing a certain discount, the profit reduces to $12\frac{1}{2}\%$. Find the discount profit. [DIFFICULT]

V. Answer the following questions: (4 Mark questions)

41. A sum of ₹16,872.96 is accumulated in three years at a compound interest at a rate of 4% per annum. Find the principal amount. [AVERAGE]

42. The difference between simple interest and compound interest on a certain principal amount is ₹228 for 3 years at an interest rate of 5%. Find the principal amount. [DIFFICULT]
43. By reducing the selling price of an article by ₹50 a gain of 5% turn into a loss of 5%. Find the original selling price of the article. [DIFFICULT]
44. A man sold two articles at ₹25920 each. These were sold at 8% gain and 4% loss respectively. Find the gain or loss percent in the whole transaction. [DIFFICULT]

VI. Answer the following question: (5 Mark question)

45. Find the purchase price of each of the following items with 8% sales tax added.
- (a) Toothpaste costing ₹180.
 - (b) Three tennis balls costing ₹250 each.
 - (c) Two umbrellas costing ₹300 each. [DIFFICULT]
46. A person invests ₹15000 for three years at a certain rate of interest compounded annually. At the end of one year this sum amounts to ₹16,350. Calculate
- i) The rate of interest per annum.
 - ii) The amount at the end of the second year.
 - iii) The amount at the end of the third year. [AVERAGE]
47. The difference between two selling price of a shirt at a profit of 4% and 5% is ₹6. Find the cost price of the shirt and the two selling price of the shirt. [DIFFICULT]
48. A dealer bought 2 tables for ₹3120. He sold one at a loss of 15% and the other at a profit of 36%. If the selling price of each table is the same, then find the cost price of each table. [DIFFICULT]
49. Three items are purchased at ₹450 each. One of them is sold at a loss of 10%. At what price should the other two be sold so as to gain 20% on the whole transaction? What is the gain percentage on the transaction? [DIFFICULT]

CHAPTER: 8 – ALGEBRAIC EXPRESSIONS AND IDENTITIES

Learning outcome:

Solves the problems by applying addition and subtraction rules of polynomials.

Teaching Points:

- * Addition and subtraction of algebraic expressions.
- * Multiplication of algebraic expressions.
- * Multiplying a monomial by a Monomial
 - i) Multiplying two monomials
 - ii) Multiplying three or more monomials
- * Multiplying monomial by a polynomial.
 - i) Multiplying a monomial by a polynomial.
 - ii) Multiplying a monomial by a trinomial.
- * Multiplying a polynomial by a polynomial.
 - i) Multiplying a polynomial by a polynomial.
 - ii) Multiplying a binomial by a trinomial.

Type of questions:

EASY: 17

AVERAGE: 26

DIFFICULT: 05

TOTAL - 48

I. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

1. An expression containing one or more terms with non-zero coefficient (with variables having non zero negative integers as exponents) is called as

(A) Monomial (B) Binomial (C) Trinomial (D) Polynomial

[EASY]

2. Terms have same variables and the powers of these variables are same are

(A) Like terms (B) Unlike terms (C) Constant term (D) variables

[EASY]

3. While adding polynomials, first

(A) Look for unlike terms and add them (B) Add all constant terms
(C) Look for monomials and add them (D) Look for like terms and add them

[EASY]

4. The product obtained from one monomial with another monomial is

(A) Trinomial (B) Binomial (C) Monomial (D) Can't predict

[EASY]

5. Coefficient of like terms

- (A) Must be same (B) Need not be the same
(C) Must be different (D) Must be zero

[EASY]

6. The expression $(xy + x^2yz)$ is a

- (A) Monomial (B) Binomial (C) Trinomial (D) Quadratic polynomial

[EASY]

7. The product of '5a' and '6a²' is

- (A) $30a^2$ (B) $30a$ (C) $30a^3$ (D) $11a^2$

[EASY]

8. The product $a^3.b^3.c^3$ we get, by multiplying the terms among the following is

- (A) a^2, ab^3, ca (B) ab, bc, ca (C) ab^2, bc^2, ca^2 (D) ab, b^2c, ca^2

[AVERAGE]

9. The product of $(m + n)$ and $(m - n)$ is

- (A) $m^2 + n^2$ (B) $m^2 - n^2$
(C) $m^2 + n^2 + 2mn$ (D) $m^2 + n^2 - 2mn$

[AVERAGE]

10. The product of two consecutive numbers is $k^2 + k$. Then the two numbers are

- (A) k^2 and k (B) k^2 and $(k+1)$
(C) k and (k^2+1) (D) k and $(k+1)$

[AVERAGE]

11. A triangular prism has a base area of $(x^2 + 2x + 1)$ sq.m and a height of $(x - 1)$ m then the volume of the prism in cubic meter is

- (A) $(x + 1)^2(x - 1)$ (B) $(x-1)^2(x+1)$ (C) $x^3 - x^2 - x + 1$ (D) $x^3 + x^2 + x - 1$

[AVERAGE]

12. A shirt costs ₹ $(x + 20)$ and a pair of pants costs ₹ $(2x - 10)$, then the total cost of 3 shirts and 2 pairs of pants is

- (A) ₹ $(7x + 40)$ (B) ₹ $(7x + 80)$ (C) ₹ $(7x - 80)$ (D) ₹ $(7x - 40)$

[AVERAGE]

II. Answer the following questions: (1 mark questions)

13. Define monomial. [EASY]
14. Define binomial. [EASY]
15. Define Trinomial. [EASY]
16. Define Polynomial. [EASY]
17. Identify terms and their numerical coefficients of $3xyz - 8y$. [EASY]
18. Write the statement for the expression $2x - 9$. [EASY]
19. Find the product of: $4x \times 5y \times 7z$. [AVERAGE]
20. Find the product of : $8ab \times 6a^2b^2 \times 4a^3b^3$. [AVERAGE]
21. Find the area of rectangle whose length is $2x^2y$ and breadth is $3yz^2$? [AVERAGE]
22. Find the product of $(2a - 3b)$ and $2a$. [EASY]
23. Multiply: $(-6s^2t)$ and $2st^2$. [EASY]
24. Write the algebraic expression for the statement - "Twice a number is subtracted from 5" [EASY]
25. The cost of an article is ₹ $(a + b)$. If you buy 'c' articles, then find the total cost of articles? [AVERAGE]

III. Answer the following questions: (2 mark questions)

26. Simplify: $(a + b + c)(a - b - c)$. [AVERAGE]
27. Simplify: $(q + 4)(q - 4) + 16$. [AVERAGE]
28. Find the product of: $(x - y^2)(x^2 - y)$. [AVERAGE]
29. Add: $8x^3 - 2x + 8$ and $9x^2 + 5x - 10$. [AVERAGE]
30. Add: $8ab + 3bc - 7ca$, $6bc + 3ca + 8b$ and $-ac + 10c - 3ab$. [AVERAGE]
31. Find the volume of the rectangular box whose length, breadth and height are $3ab$, $6bc$ and $4ca$ respectively. [AVERAGE]
32. Find the product of: $6x(5x^2 + 2x^3 - 8)$. [AVERAGE]
33. Subtract: $4a - 7ab + 3b + 12$ from $12a - 9ab + 5b - 3$. [AVERAGE]
34. Find the product of : $-8p$ and $(-6p + 4q + r)$. [AVERAGE]
35. Simplify: $(x - y)(3x + 5y - 2z) - (4x + 3y)z$. [AVERAGE]
36. Find the volume of a cuboid whose length, breadth and height are u^2 , u and $(2u + 1)$ respectively. [AVERAGE]

37. Calculate the volume of the rectangular box whose dimensions are $15a \times 2b \times 12c$.

[AVERAGE]

38. The length and breadth of a rectangular black board are $(2x + 3)$ and $(x - 1)$ units respectively. Find the area of the black board.

[AVERAGE]

39. An object travels at a speed of $(v + 5) \text{ ms}^{-1}$ for $(t - 2)$ second. Find the distance travelled by the object.

[AVERAGE]

40. The side of square garden measures $(3p - 2)$ units. Find the area of the garden.

[AVERAGE]

IV. Answer the following questions: (3 mark questions)

41. Give two examples for each of the following.

(a) Monomial.

(b) Binomial.

(c) Trinomial.

[EASY]

42. Complete the table for area of a rectangle with given length and breadth.

Sl.No	Length	Breadth	Area
1	$2a$	$3b$	
2	$4y$	$7y^2$	
3	$3ab$	$5bc$	

[AVERAGE]

43. A school decided to buy 'y' kilogram of mangoes at 'x' rupees per kilogram for a trip. If the price of mangoes per kilogram is reduced by 4 rupees and 7 kilograms less mangoes are bought, find the amount to be paid.

[DIFFICULT]

44. Simplify the expression: $7x(3x - 2) + 3x(x + 2) - 80$ for $x = 2$.

[DIFFICULT]

45. Multiply the binomials: $\left(\frac{1}{6}x^3 + 4y^2\right)$ and $\left(3x^4 - \frac{1}{12}y^3\right)$

[DIFFICULT]

V. Answer the following questions:(4 Mark questions)

46. Find the volume of each rectangular box with given length, breadth and height.

Sl. No	Length	Breadth	Height	Volume
1	5a	3b	2c	
2	2q	4q ²	8q ³	
3	xy	3yz	4zx	
4	- 2m	4nm	-8n ² m	

[AVERAGE]

47. Simplify: $9x^2(2x - 4) + 6$ and find its values if (i) $x = 4$, (ii) $x = 6$.

[DIFFICULT]

VI. Answer the following questions:(5 Mark questions)

48. Complete the table:

	First expression	Second expression	Product
(i)	a	$b + c + d$	
(ii)	$x + y - 5$	$5xy$	
(iii)	p	$6p^2 - 7p + 5$	
(iv)	$4p^2q^2$	$p^2 - q^2$	
(v)	$a + b + c$	abc	

[DIFFICULT]

CHAPTER - 9 MENSURATION

Learning Outcome:

Finds Surface area and Volume of Cube, Cuboidal and Cylindrical objects.

Teaching Points:

- * To find the areas of a polygon.
- * Find perimeter and area of various plane figures.
- * Solves problems related to area and perimeter of other plane closed figures like quadrilaterals, trapezium ...
- * Solid shapes – congruent faces
- * To find the surface area of cube, cuboid and cylinder.
- * To find the volume of cube, cuboid and cylinder.
- * Volume and Capacity.

Type of questions:

EASY:23

AVERAGE:16

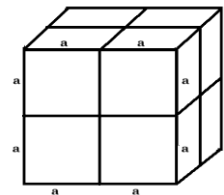
DIFFICULT:4

TOTAL - 43

- I. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.**

- 1) The formula used to find the area of triangle of base (b) and height (h) is [EASY]
A) $A = b \times h$ B) $A = \frac{1}{2} \times (b + h)$ C) $A = \frac{1}{2} (b \times h)$ D) $A = b + h$
- 2) The formula used to find the area of trapezium having two parallel sides as a and b , the distance between the parallels is [EASY]
A) $A = \frac{1}{2} (a + b)h$ B) $A = (a + b)h$ C) $A = \frac{1}{2} (a \times b)h$ D) $A = \frac{axb}{h}$
- 3) The area of a trapezium is 56cm^2 if its parallel sides are 5cm and 9cm in length, then the distance between the parallel sides is [AVERAGE]
A) 6cm B) 8cm C) 16cm D) 4cm
- 4) The formula to find the area of Rhombus given its diagonals as d_1 and d_2 is [EASY]
A) $A = \frac{1}{2} (d_1 + d_2)$ B) $A = \frac{1}{2} (d_1 \times d_2)$ C) $A = d_1 + d_2$ D) $d_1 \times d_2$
- 5) The formula to find the lateral surface area of the Cylinder given that its radius of base 'r' and the height 'h' is [EASY]

- A) $2\pi rh$ B) $2\pi r(r + h)$ C) $\pi r(2h + r)$ D) $\pi r(r + h)$
- 6) The formula to find the total surface area of the Cylinder given that its radius of base 'r' and the height 'h' is [EASY]
- A) $2\pi rh$ B) $2\pi r(r + h)$ C) $\pi r(2h + r)$ D) $\pi r(r + h)$
- 7) The formula to find the surface area of the Cylinder given that its radius of base 'r' and the height 'h' and it is open on top is [EASY]
- A) $2\pi rh$ B) $2\pi r(r + h)$ C) $\pi r(2h + r)$ D) $\pi r(r + h)$
- 8) The formula to find the lateral surface area of the cuboid whose length 'l', breadth 'b' and height 'h' is [EASY]
- A) $h(l + b)$ B) $2h(l + b)$ C) $2l(h + b)$ D) $bl + lh$
- 9) The formula to find the Area of a circle of radius 'r' is [EASY]
- A) πr^2 B) πr C) $2\pi r$ D) $\frac{\pi r}{2}$
- 10) The formula to find the perimeter of the circle is [EASY]
- A) πr B) πr^2 C) πd D) $2\pi r^2$
- 11) The curved surface area of a cylinder of height 14cm is 88cm^2 . The diameter of the base of the cylinder is [AVERAGE]
- A) 4cm B) 2cm C) 4cm D) 3cm
- 12) The circle shaped 500 papers of radius 'r' are arranged one upon the other to match the center of them all, then the volume of this solid so formed is [AVERAGE]
- A) $500 r^2$ B) $500 \pi r^2$ C) $500 \pi r$ D) $\frac{500}{\pi r}$
- 13) The 64 cubes measuring each side 1 cm are arranged to form a bigger cube, then the number of smaller cubes placed on each edge will be [AVERAGE]
- A) 4 B) 8 C) 16 D) 32
- 14) The 8 cubes of each side 'a' are placed so as to form bigger cube as shown in the figure. The sides of the bigger cube is painted by red colour, then the surface area painted in red colour is [AVERAGE]
- A) $4a^2$ B) $16a^2$ C) $32a^2$ D) $24a^2$



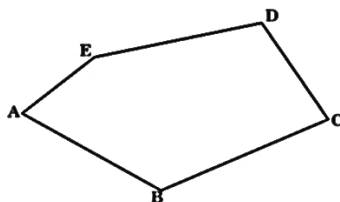
II. Answer the following questions: (1 Mark questions)

- 15) Define volume of three-dimensional object. [EASY]

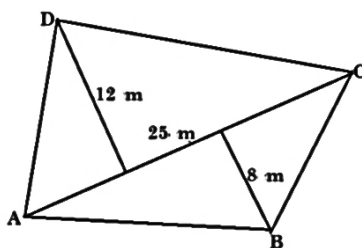
- 16) Write the formula to find the area of Rectangle of length (l) and breadth(b) units. [EASY]
- 17) Write the formula to find the area of Square, given its side as 'a' units. [EASY]
- 18) Write the formula to find the total surface area of the Cube if each edge is 'a' units. [EASY]
- 19) Write the formula to find the lateral surface area of the Cube if each edge is 'a' unit. [EASY]
- 20) Write the formula to find the total surface area of the Cuboid, whose length (l), breadth (b) and height (h) units. [EASY]
- 21) Write the formula to find the volume of Cuboid, whose length(l), breadth(b) and the height(h) units. [EASY]
- 22) What will be the shape if 200 sheets of A₄ size papers are arranged, so as the edges matches one above the other. [EASY]

III. Answer the following questions (2 Mark questions)

- 23) In the given figure, divide the given polygon into triangles and trapezium by drawing the lines. [EASY]



- 24) Find the area of Rhombus given the diagonals 8cm and 5cm. [EASY]
- 25) In the given figure, the playground is in the form of quadrilateral with diagonal 25m and the perpendicular heights drawn from diagonal to the vertices are 12m and 8m. Find the area of the playground. [AVERAGE]



- 26) There are two cubes of each edge 6cm. If both are joined to match its square face, find the surface area of the solid so formed. [AVERAGE]
- 27) The soapbox of cuboidal shape, whose length is 12cm, breadth is 10cm and the height is 3cm. Find the surface area of the soapbox. [EASY]
- 28) The tooth paste box made up of cardboard which is in the cuboidal shape is of length 16cm, breadth and height are 4cm. Find the cardboard required to make the box. [AVERAGE]
- 29) Write the difference between Volume and Capacity. [EASY]

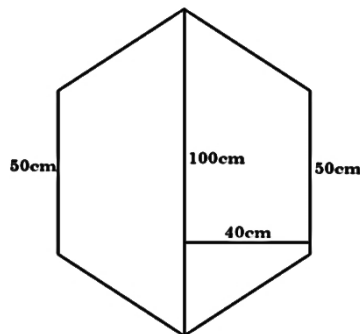
IV. Answer the following questions: (3 mark questions)

30) Two parallel lines of 12m and 8 m are drawn to the wall perpendicularly 7m apart each other, the ends of the lines are also joined. Find the area bounded by a wall and the lines drawn.

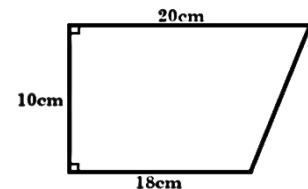
[AVERAGE]

31) In the figure the hexagon shaped table top is given in which one of its diagonal drawn is 100cm. the two edges parallel to diagonal are 50cm each, the diagonal is 40cm away from the two parallel edges. Find the surface area of the table top.

[DIFFICULT]



32) The trapezium is cut from the rectangular paper of length 20cm and breadth 10cm as shown in the figure. Find



i) The area of trapezium

ii) Area of triangle which completes the rectangle.

[AVERAGE]

33) The length of the brick is 9inch, breadth is 4inch and the height is 3inch. Find the volume of the brick, and also the volume of wall that can be built by 80 such bricks.

[AVERAGE]

34) The vehicle with cuboidal shaped container of inner volume 9000 cubic feet. The container is stored by steel cuboidal shaped boxes of length 5 feet, breadth 4 feet and height 3feet. Find the number of boxes in the container.

[DIFFICULT]

35) A cylindrical well is dug out whose diameter is 14 m and height is 20 m is half filled with water. Find the volume of water inside the well.

[EASY]

36) Find the volume of milk poured in the cylinder-shaped vessel, whose diameter is 28cm and height 50cm.

[EASY]

37) The building has four pillars of cylinder in shape of radius 1m and height of 3.5m. Find

the amount required to paint its surface at the cost of ₹200 per square meter.

[AVERAGE]

V. Answer the following questions: (4 mark questions)

38) The length of the wall of the room is 12feet, breadth is 9feet and the height of the wall is 8feet. Find the cost of painting the inner walls of the room at the cost of 50₹ per square feet.

[AVERAGE]

- 39) The length of the Aquarium is 50cm, breadth is 25cm and the height is 30cm. Find the area of glass required to make Aquarium without top covered. [AVERAGE]
- 40) A boy wanted to divide the cuboidal shaped cardboard box of length 100cm breadth 60cm height of 50cm into for equal parts of same volume, he wants to divide along its length and breadth. Find the cardboard required to make partition. [DIFFICULT]
- 41) The coffee tin of cylindrical shape is of height 16cm and the radius of its base is 7cm. Find the area of label required to cover the lateral area of the tin. {Use; $\pi = \frac{22}{7}$ } [AVERAGE]
- 42) The metal sheet of 20cm x 44cm is brought to the shape of cylinder of height 20cm, and its base is also covered. Find the radius of its base and volume of the cylinder. {Use; $\pi = \frac{22}{7}$ } [AVERAGE]

VI Answer the following (5 Mark Question)

- 43) The road roller has its radius 1m and length of 3.5m. Rolled one side direction along the road to level. If it has covered 2640 square meter, find the number of rotations the roller has made. {Use: $\pi = \frac{22}{7}$ } [DIFFICULT]

CHAPTER :10 – EXPONENTS AND POWERS

Learning outcome:

Knows negative powers of exponents, express large numbers and small numbers using exponents, Solves problems using laws of exponents.

Teaching points:

- * Powers with negative exponents.
- * Laws of exponents.
- * Use of exponents to express small numbers in standard form.
- * Comparing very large and very small numbers.

Type of questions:

EASY:21

AVERAGE:32

DIFFICULT:02

TOTAL - 55

I. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

1. If m and n are natural numbers, then $a^m \times a^n$ is

(A) $a^{m \times n}$

(B) a^{m+n}

(C) a^{m-n}

(D) $a^{m \div n}$

[EASY]

2. The value of 2^3 is

(A) 6

(B) 8

(C) 9

(D) 27

[EASY]

3. The value of $(-1)^3$ is

(A) 3

(B) - 3

(C) -1

(D) 1

[EASY]

4. Any non - zero number raised to the power of zero is equal to

(A) 0

(B) 1

(C) the number itself

(D) Not defined

[EASY]

5. The simplified form of $(3^0 + 4^0 + 5^0)$ is

(A) 1

(B) 3

(C) 12

(D) 0

[EASY]

6. 1 micron is equal to

(A) 10^{-3}

(B) 10^{-4}

(C) 10^{-5}

(D) 10^{-6}

[EASY]

7. The value of $(-1)^{\text{even number}}$ is

- (A) 1 (B) -1 (C) 0 (D) 2

[EASY]

8. The value of $(5^0 + 3^0) \times 2^0$ is

- (A) 0 (B) 1 (C) 2 (D) 16

[AVERAGE]

9. The simplest form of $7^2 \div 7^3$ is

- (A) $\frac{1}{7}$ (B) 7 (C) $\frac{1}{14}$ (D) -7

[EASY]

10. The exponential form of 64 is

- (A) 2^6 (B) 4^6 (C) $\frac{1}{8^2}$ (D) $\frac{1}{2^6}$

[AVERAGE]

11. The value of $(2^{-1} - 4^{-1})^2$ is

- (A) $-\frac{1}{16}$ (B) $\frac{1}{16}$ (C) 4 (D) -4

[AVERAGE]

12. The simplified form of $(y^4)^2$ is

- (A) y^6 (B) y^8 (C) y^{16} (D) $2y^4$

[AVERAGE]

13. The simplified form of $(3x^2)^3 \times x^4$ is

- (A) $9x^{10}$ (B) $27x^{10}$ (C) $27x^{12}$ (D) $9x^{12}$

[AVERAGE]

14. The exponential form of $\sqrt{m}$ is

- (A) m^2 (B) m^0 (C) $m^{\frac{1}{2}}$ (D) $m^{-\frac{1}{2}}$

[EASY]

15. If $81 = 3^y$, then the value of y is

- (A) 3 (B) 4 (C) 9 (D) 27

[AVERAGE]

16. If the standard form of 0.00034 is 3.4×10^x , then the value of x is

- (A) 4 (B) -4 (C) 3 (D) -3

[AVERAGE]

17. In the following, the smallest number is

- (A) 1.6×10^{-3} (B) 1.6×10^{-4} (C) 1.6×10^{-2} (D) 1.6×10^{-5}

[EASY]

18. The exponential form of 300,000,000 is

- (A) 3×10^5 (B) 3×10^6 (C) 0.3×10^8 (D) 3×10^8

[EASY]

19. In the following, the smallest number is

- (A) -3^2 (B) $(-3)^2$ (C) -2^3 (D) $(-2)^3$

[AVERAGE]

20. $2^3 \times 2^4 \times 2^5$ is equal to

- (A) 2^{12} (B) 2^{30} (C) 2^{24} (D) 2^{60}

[AVERAGE]

21. If $(2)^{m+1} \times (2)^5 = (2)^7$, then the value of m is

- (A) 5 (B) 7 (C) 1 (D) 3

[AVERAGE]

22. The value of $4^2 \times 4^{-2}$ is

- (A) 0 (B) 1 (C) 4 (D) 8

[AVERAGE]

23. The simplest form of $(5^2)^3$ is

- (A) 5^5 (B) 5^3 (C) 5^6 (D) 5^4

[AVERAGE]

24. If $5^x = 625$, then the value of 'x' is

- (A) 5 (B) 2 (C) 3 (D) 4

[AVERAGE]

25. In the following, the greater number is

- (A) 2^3 (B) 4^2 (C) 99^0 (D) 3^2

[AVERAGE]

26. If a cubic box has a side length of 2^3 cm, then the volume of the cubic box in cm^3 is

- (A) 2^3 (B) 2^6 (C) 2^9 (D) 2^{12}

[AVERAGE]

27. The approximate distance of the moon from the earth is 384,467,000m, then the exponential form this distance is

(A) $3.84467 \times 10^8 \text{m}$

(B) $3.84467 \times 10^{-8} \text{m}$

(C) $38.4467 \times 10^8 \text{m}$

(D) 38.4467×10^{-8}

[AVERAGE]

28. The standard form of $6 \times 10^{-5} \text{m}$ is

[AVERAGE]

(A) 0.00006m

(B) 0.000006m

(C) 0.0006m

(D) 0.0000006m

II. Answer the following questions: (1 Mark questions)

29. Write $2 \times 2 \times 2 \times 2 \times 2 \times 2$ in exponential form.

[EASY]

30. Write the base in the expression 5^3 .

[EASY]

31. Find the value of: 3^4 .

[EASY]

32. Evaluate: 3^{-2}

[AVERAGE]

33. Write in exponential form: $a \times a \times a \times a \times b \times b \times b \times c \times c$

[EASY]

34. Write the simplest form of $a^5 \times a^3$.

[EASY]

35. Express 125 as a power of 5.

[AVERAGE]

36. Express 3^{-4} with a positive exponent.

[EASY]

37. Simplify: $(3x)^2$

[EASY]

38. Write 0.000001 in exponential form using base 10.

[EASY]

39. Find the value of : 9^0

[EASY]

40. Find the value of: $5^0 + 6^1$.

[AVERAGE]

41. Write the product of: 2^3 and 3^2 .

[AVERAGE]

III. Answer the following questions: (2 Mark questions)

42. Evaluate: $(3^2 - 2^3) \times (4^0 + 1^4)$.

[AVERAGE]

43. Express the following numbers in exponential form:

[AVERAGE]

i) 0.000035

ii) 4050000

44. Simplify: $(-2a^2b^3)^2$.

[AVERAGE]

45. Express the following numbers in usual form:

[AVERAGE]

i) 3.52×10^5

ii) 3×10^5

46. If $a = 2$ and $b = -1$ then, find the value of $a^b + b^a$.

[AVERAGE]

47. Find the value of: $\left(\frac{2}{3}\right)^{-2}$

[AVERAGE]

IV. Answer the following questions: (3 Mark questions)

48. Express the following in decimal form.

[AVERAGE]

i) 3.02×10^{-6}

ii) 5123×10^{-8}

iii) 4.35×10^9

49. If $5^{2x+1} = 625$, then find the value of x.

[AVERAGE]

50. Simplify: $\left(\frac{2}{3}\right)^{-2} \times \left(\frac{9}{4}\right)^2$.

[AVERAGE]

51. Find the value of: $\left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-2}$

[AVERAGE]

52. Evaluate: $\frac{12^4 \times 9^3 \times 4}{6^3 \times 8^2 \times 27}$

[DIFFICULT]

V. Answer the following questions: (4 Mark questions)

53. Write all the laws of exponents.

[EASY]

54. Evaluate:

i) $\frac{25 \times t^{-4}}{5^{-3} \times 10 \times t^{-8}} (t \neq 0)$

ii) $\frac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}}$

[DIFFICULT]

55. A square plot of land has a side length 'a' meters.

[AVERAGE]

(a) Write an expression for the area of the plot.

(b) If the side of the plot is tripled, then find the area of the plot in terms of 'a'.

(c) Find the ratio of the area increased.

CHAPTER :11 – DIRECT AND INVERSE PROPORTION

Learning Outcomes:

Understand and solves problems on Direct and Inverse proportions.

Teaching Points

- * Concept of Direct proportion.
- * Methods to solve Direct Proportion problems.
- * Concept of Inverse proportion.
- * Explain the constant of proportionality.
- * Provide real-life examples
- * Use tables to illustrate the concepts
- * Solves problems.

EASY

31

AVERAGE

10

DIFFICULT

5

TOTAL

46

I. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

1) x and y are quantities and k is a constant, options that indicates inverse proportion is

A) $\frac{x}{y} = k$

B) $y = xk$

C) $xy = k$

D) $y = x + k$

(Easy)

2) If two quantities are inversely proportional, then

A) both the quantities decrease

B) If one increases the other decreases

C) their ratio remains the same

D) their product is a constant

(Easy)

3) If ' a ' and ' b ' are directly proportional, then the ratio $\frac{a}{b}$ is

A) a constant

B) zero

C) varying

D) a negative

(Easy)

4) ' x ' and ' y ' are inversely proportional & if the value of ' x ' doubles, then the value of ' y ' is

A) increases by two times

B) remains same

C) doubles

D) halves

(Average)

5) 'y' is directly proportional to 'x' and $x = 4, y = 10$, if $x = 6$, then the value of 'y' is

- A) 12 B) 15 C) 14 D) 20

(Easy)

6) If $m \propto \frac{1}{n}$ and $m_1 = 4, n_1 = 6, m_2 = 8$, then the value of n_2 is

- A) 12 B) 2 C) 3 D) 10

(Easy)

7) The scale of a map is given as 1:3000000. Two cities are 4 cm apart on the map. The actual distance between them is

- A) 120km B) 1200km C) 12000 cm D) 300km

(Difficult)

8) If 20 men take 60 days to complete a work, then 30 men can complete it in

- A) 20 days B) 90 days C) 30 days D) 40 days

(Easy)

9) If two quantities x and y vary inversely with each other, then

A) $\frac{x}{y}$ remains constant B) $x - y$ remains constant

C) $x + y$ remains constant D) $x \times y$ remains constant (Easy)

10) There is enough food to last for 40 peoples for 10 days. If 10 more people join them the food will last for

- A) 8 days B) 10 days C) 12 days D) 20 days

(Easy)

11) If the cost of 1 kg sugar is ₹36, then the cost of 3 kg sugar is

- A) ₹109 B) ₹108 C) ₹39 D) ₹72

(Easy)

12) If a car uses 4 litres of petrol to travel a distance of 60 km, then distance travelled by a car using 15 liters of petrol is

- A) 180km B) 60km C) 225km D) 252km

(Easy)

13) If a school wants to spend ₹6000 on mathematics textbook, then the number of books bought at ₹50 each is

- A) 150 B) 80 C) 100 D) 120

(Easy)

- 14) If 1 kilogram is equal to 1000 gm, then $2\frac{1}{2}$ kilogram is equal to (Easy)
- A) 1500 B) 2500 C) 1000 D) 1200

II. Answer the following questions: (1 Mark questions)

- 15) Define Direct proportion. (Easy)
- 16) Define Inverse proportion. (Easy)
- 17) The cost of two books is ₹30. Find the cost of 3 such books. (Easy)
- 18) A certain cloth of 5m cost ₹210. What is the cost of 2m of same cloth? (Easy)
- 19) Observe the table given below and write the relationship between x and y variables.

x	4	6	8
y	6	9	12

(Easy)

- 20) Observe the table given below and find the value of ' a '. (Easy)

x	3	6	2
y	6	3	a

- 21) Two quantities ' x ' & ' y ' are directly proportional, write this statement in mathematical form. (Easy)

III. Answer the following questions: (2 marks questions)

- 22) An electric pole, 14 meters high, casts a shadow of 10 meters. Find the height of a tree that casts a shadow of 20 meters under similar conditions. (Easy)
- 23) If the weight of 12 sheets of thick paper is 40 grams, how many sheets of the same paper would weigh $2\frac{1}{2}$ kilograms? (Average)
- 24) 6 pipes are required to fill a tank in 1 hour 20 minutes. How long will it take if only 5 pipes of the same type are used? (Easy)
- 25) In a model of a ship, the mast is 9 cm high, while the mast of the actual ship is 12 m high. If the length of the ship is 28 m, how long is the model ship? (Easy)



- 26) There are 100 students in a hostel. Food provision for them is for 20 days. How long will these provisions last if 24 more students join the group? **(Easy)**
- 27) A factory requires 42 machines to produce a given number of articles in 63 days. How many machines would be required to produce the same number of articles in 54 days. **(Easy)**
- 28) A train takes 3 hours to travel 120km. If the train travels with the same speed, find the time taken by the train to travel 160km. **(Easy)**
- 29) Volume of given mass of a gas is inversely proportional to pressure applied on it. If pressure on the gas is 100pa, then its volume is 8 liters. Find the volume of this gas if the pressure applied is 200pa. **(Difficult)**
- 30) A machine produces 120 articles in 8 hours. Find the number of articles produced by the same machine in 12 hours. **(Easy)**
- 31) In a school there are 20 teachers for 600 students. By maintaining 'the ratio of number of teachers to the number of students' constant, find the number of students required to increase the number of teachers to 30. **(Average)**
- 32) A school has 8 periods a day each of 45 min duration. How long would each period be, if the school has 9 periods a day, assuming the number of school hours to be the same? **(Easy)**
- 33) A car takes two hours to reach a destination by travelling at the speed of 60km/hour. How long will it take when the car travels at the speed of 80km/hour? **(Easy)**
- 34) A picture of a bacterium enlarged 60000 times has a length of 3 cm. Find the actual length of the bacterium. **(Difficult)**
- 35) A packet of laddus was distributed among 30 children and each of them received 4 Laddus. Find the number of laddus each child gets, if the number of children is reduced by 6. **(Average)**

IV. Answer the following questions: (3 marks questions)

- 36) In a television game show the prize money of 1,00,000 is to be divided equally among the Winners, complete the following table. Find whether the prize money given to an individual winner is directly or inversely proportional to the number of winners. **(Average)**

Number of winners	1	2	4	5	8	10	20
Prize for each winner(in ₹)	1,00,000	50,000					

37) A hostel has enough food to feed 50 students for 20 days. After 5 days, 10 more students join. Find out how many more days the remaining food will be available. **(Difficult)**

38) Two persons could fit new windows in a house in 3 days. **(Average)**

(i) One of the persons fell ill before the work started. How long would the job take now?

(ii) How many persons would be needed to fit the windows in one day?

39) 900 soldiers in an army barrack had enough food for 20 days. After 4 days, some soldiers were transferred to another barrack and thus food lasted now for 24 more days. Find the number of soldiers left the barrack. **(Difficult)**

40) If 4 goats or 6 sheep can graze a field in 40 days, Find the number of days taken by 4 goats and 14 sheep to graze the same field. **(Average)**

V. Answer the following questions: (4 marks questions)

41) Suppose 2kg of sugar contains 9×10^6 crystals. Find the number of sugar crystals present from **(Average)**

i) $5\frac{1}{2}$ kg of sugar. ii) 1.2 kg of sugar.

42) 5 m 60cm high vertical pole cast a shadow 3m 20cm long. Find the following

i) the length of shadow cast by another pole 10m 50cm high at the same time

ii) the height of a poll which casts a shadow 5m long at the same time.

(Easy)

43) Observe the table given below. x & y are directly proportional.

Find the values of y_1, y_2, x_1 & x_2 .

(Easy)

x	x_1	5	7	x_2	11
y	12	20	y_1	48	y_2

44) The minute hand of a clock rotates through an angle of 30° in 5 minutes.

Find the following,

(Average)

i) angle formed by minute hand

A) in 10 minutes

B) in 25 minutes

ii) time taken by minute hand

A) to make an angle of 90° B) to make an angle of 270°

Angle			90°	270°
Time(min)	10	25		

45) It takes 12 minutes to fill a tank with 4 taps with even flow of water.

(Easy)

i) How many such taps be required to fill the same tank in 6 minutes?

ii) How much time does it take to fill the tank using 2 taps?

46) A boy is making a wheel using spokes. He wants to fix equal spokes in such a way that the angles between any pair of consecutive spokes are equal. Help him by completing the following table.

(Average)



Number of spokes	4	6	8	10	12
Angle between a pair of consecutive spokes	90°	60°	...	...	...

(i) Are the number of spokes and the angle formed between the pairs of consecutive spokes in inverse proportion?

(ii) Calculate the angle between a pair of consecutive spokes on a wheel with 15 spokes.

(iii) How many spokes would be needed, if the angle between a pair of consecutive spokes is 40° ?

CHAPTER 12 - FACTORISATION

Learning Outcome

- During factorization, identification of factors, factorization by using identities.
- Factorization principles will be applied in daily life situations,

Teaching Points:

- * Factors of natural numbers and factors of algebraic expression.
- * Factorization and methods to factorize.
 - Method of common factors
 - Factorization by regrouping terms
 - Factors of the form $(x + a)(x + b)$
- * Division of algebraic expressions
 - Division of monomial by another monomial
 - Division of a polynomial by a monomial
- * Division of polynomial by polynomial

Level of questions:

Easy	Average	Difficult	Total
24	30	13	67

I. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

1. The common factor of $2x$ and $3xy$ is (Easy)

- (A) $5xy$ (B) $6x^2y$ (C) xy (D) x

2. The HCF of $12m$ and 36 is (Easy)

- (A) 12 (B) $36m$ (C) $12m$ (D) 36

3. The HCF of $5x$ and $7y$ is (Easy)

- (A) $5x$ (B) $7y$ (C) 1 (D) $35xy$

4. The product of $(x - y)(x + y)$ is (Easy)

- (A) $x^2 + y^2$ (B) $x^2 - y^2$ (C) $(x - y)^2$ (D) $(x + y)^2$

5. The factorization of $m^2 - 9$ is **(Easy)**
 (A) $m^2 + 3^2$ (B) $(m - 3)^2$ (C) $(m - 3)(m - 3)$ (D) $(m - 3)(m + 3)$
6. The factorization of $25 - 10m + m^2$ is **(Average)**
 (A) $(5 + m)(5 - m)$ (B) $(m - 5)^2$ (C) $(5 + m)^2$ (D) $(m - 25)^2$
7. The common factor of $2x^2y$ and $4xy^3$ is **(Easy)**
 (A) $8x^2y^3$ (B) $6x^3y^4$ (C) $2x^2y$ (D) $2xy$
8. The factors of $x^2 - (a + b)x + ab$ are **(Easy)**
 (A) $(x + a)(x + b)$ (B) $(x - a)(x + b)$ (C) $(x - a)(x - b)$ (D) $(x + a)(x - b)$
9. The factors of $6a^2b - 9ab^3$ are **(Average)**
 (A) $3ab^2(4a^2 - 3b)$ (B) $3ab(3a - 6b^2)$ (C) $3ab^2$ (D) $3ab(2a - 3b^2)$
10. Irreducible factors of $15x(x + 2)$ are **(Average)**
 (A) $15, x, (x + 2)$ (B) $3, 5, x, x + 2$ (C) $2, 3, 5, x, x + 2$ (D) $15, x(x + 2)$
11. The factorization of $ax - a + x - 1$ is **(Average)**
 (A) $(a - 1)(x + 1)$ (B) $(a - 1)(x - 1)$ (C) $(a + 1)(x - 1)$ (D) $(a + 1)(x + 1)$
12. The expanded form of $(m - n)^2$ is **(Easy)**
 (A) $m^2 - n^2$ (B) $m^2 - 2mn + n^2$ (C) $m^2 + 2mn - n^2$ (D) $m^2 - 2mn - n^2$
13. If $(x + k)^2 = x^2 + 6x + 9$, then the value of k is **(Difficult)**
 (A) 3 (B) 2 (C) 9 (D) 6
14. If $12x^2y$ is divided by $4xy$, then the quotient is **(Easy)**
 (A) $3xy$ (B) $3x$ (C) $8x$ (D) 3
15. If $-9x^3$ is divided by $3x$, then the quotient is **(Easy)**
 (A) $-3x$ (B) $3x^2$ (C) $-3x^2$ (D) $27x^2$
16. If $(4xy + 2y)$ is divided by $(2x + 1)$, then the quotient is **(Average)**
 (A) $2x + 1$ (B) $2y + 1$ (C) $2y$ (D) $2y + 1y$

II. Answer the following questions:(One-mark questions)

17. What is Factorization of an algebraic expression? (Easy)
18. Find the HCF of $8xy$ and $6yz$. (Easy)
19. Find the HCF of $2ab$ and $3bc$. (Easy)
20. Find the HCF of 4 and $6x$. (Easy)
21. Find the HCF of xy and $3z$. (Easy)
22. Factorise: $3t - 6$ (Easy)
23. Factorise: $x^2 - 4$ (Average)
24. Find the factors of $25 - k^2$. (Average)
25. Find the factors of $9x^2 + x$. (Easy)
26. Factorise: $3pq - 9$ (Easy)
27. Find the factors of $x^2 + 2x + 4$. (Average)
28. Factorise: $x - xy$ (Easy)
29. Find the common factors of $6pq^2$ and $4p^2q^3$. (Average)
30. Factorise: $4 + 2h + 6z$ (Easy)
31. Factorise: $14t - 7t^2$ (Easy)
32. Factorise: $5m - 6mn$ (Easy)
33. Factorise: $2x^3 + 6x^2 - 4x - 12$ (Average)
34. Factorise: $2ax^2 + 3axy - 2nxy - 3ny^2$ (Difficult)
35. Divide $36nm$ by $9n$. (Easy)
36. Divide: $24p^5q^4r^2 \div 8p^2q^2r^2$ (Average)
37. Divide: $(36y^2 - 27y) \div 9y$ (Average)
38. Divide: $30ab^2(2a+b) \div 6ab(a - 2b)$ (Average)

III. Answer the following questions: (Two-marks questions)

39. Find the common factors of $6x^2y$ and $4x^3y^2 + 2xy^2$. (Average)
40. Factorise: $3n^3 + 2n^2 - 3n - 2$. (Average)
41. Find the factors of $y^2 + 5y + 6$. (Average)
42. Factorise: $t^2 - 7t + 12$ (Average)
43. Factorise: $a^2 + a - 20$ (Average)
44. Find the factors of $n^2 - 3n - 18$. (Average)
45. Factorise using identity: $p^2 - 18p + 81$ (Average)
46. Factorise using identity: $4x^2 + 12x + 9$ (Difficult)
47. Find the factors of $6m^2 + 7m - 3$. (Difficult)
48. Factorise: $4x^2 - x - 3$ (Difficult)
49. Factorise: $8x + 3x^2 + 4$ (Difficult)
50. Divide: $(p^2 - 8p + 12) \div (p - 6)$ (Average)
51. Factorise: $9x^3 - 4x$ (Easy)
52. Factorise: $8x - 4y - 2x^3 + x^2y$ (Average)
53. Divide: $x + 6x^2 - 15$ by $(3x + 5)$ (Difficult)
54. Expand: $(x + 6)(x + 5)$ (Easy)

IV. Answer the following questions: (Three-marks questions)

55. Factorise: $m^3 - m^2 - m + 1$ (Average)
56. Find the factors of $x^2 - 6x + 9 - 4y^2$. (Difficult)
57. Factorise: $y^2 - (x^2 - 2xz + z^2)$ (Difficult)
58. Factorise: $x^2 + 8y + 4xy + 4y^2 + 4x$ (Difficult)
59. Find the factors of $4ab - a^2 - 4b^2 + c^2$. (Difficult)

60. Factorise: $a^4 - b^4$ (Average)

61. Find the factors of : $1 - y^4$. (Average)

62. Divide: $12y(16x^4y - 36yx^2) \div 2xy^2(2x + 3)$ (Average)

63. Divide: $(4x^3 - 12x^2 + 9x) \div (2x - 3)$ (Average)

64. Divide: $(r^4 - 16) \div (r + 2)$ (Average)

V. Answer the following questions: (Four-marks questions)

65. Factorise: i) $(l - m)^2 + 4lm$ (Difficult)

ii) $a^2 + \frac{1}{a^2} + 2$

66. Divide: $(9q + 3p)(4q^4 - 3p^2q^2 - p^4) \div (3q + p)(q - p)$ (Difficult)

67. Divide: $10xy(81x^4 - 16) \div (6x^2 + 4x)$ (Average)

CHAPTER – 13: INTRODUCTION TO GRAPHS

Learning Outcome:

Students learn to understand and use line graph to represent data and interpret them and make predictions based on the data.

Teaching Points

- * A Line graph.
- * Some applications
 - i) Quantity and cost
 - ii) Principal and Simple interest
 - iii) Time and Distance

Level of questions

Easy	Average	Difficult	Total
15	08	03	26

I. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet. (Each question carries one mark)

1. A graph displays data that changes continuously over periods of time is

- A) Bar graph B) circle graph C) line graph D) Histogram

(Easy)

2. $(0, b)$ are the co-ordinates of a point lying on

- A) $y - axis$ B) $x - axis$ C) Origin D) 1st Quadrant

(Easy)

3. The point $(5, 0)$ lies on

- A) $y - axis$ B) $x - axis$ C) Origin D) 1st Quadrant

(Easy)

4. The point lie on y-axis in the following is

A) (1,2)

B) (-1,0)

C) (0,3)

D) (0,0)

(Easy)

5. In the following, the point closer to x - axis is

A) (5,3)

B) (3,5)

C) (-2,4)

D) (0,6)

(Easy)

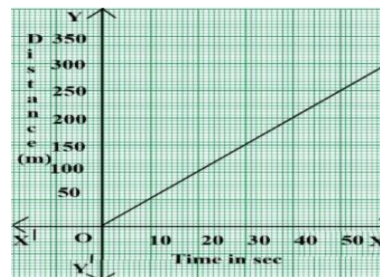
6. By observing the graph, the distance covered by an object in 40 seconds is

A) 150m

B) 200km

C) 250m

D) 200m



(Easy)

II. Answer the following questions:(One- Mark questions)

7. Write the co-ordinates of origin.

(Easy)

8. What is the distance of A(4,2) from the x - axis?

(Easy)

9. What is the distance of P(5,7) from the y - axis?

(Easy)

10. What is the distance of Q(0,4) from the origin?

(Easy)

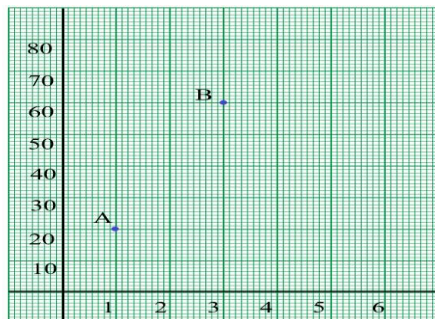
III. Answer the following questions: (Two-marks questions)

11. Draw a line passing through (2, 1) and (1, 2) on a Graph.

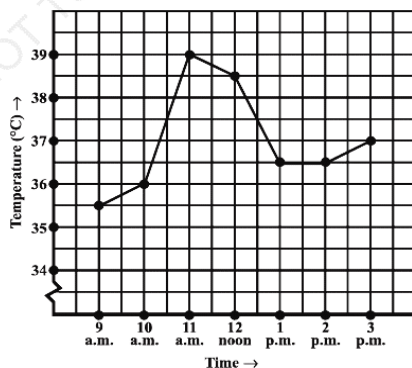
(Easy)

12. From the graph given, write the co-ordinates of the points A & B. From point B move 2 units right & then 1 unit up we get another point, write its coordinates.

(Average)



13. The following graph shows the temperature of a patient in a hospital, recorded every hour. Observe the graph and answer the below questions. (Easy)

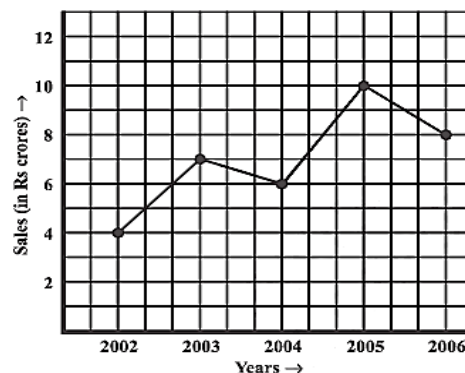


- What was the patient's body temperature at afternoon 12.30?
 - At what time the body temperature of the patient was maximum?
14. The following line graph shows the yearly sales figures for a manufacturing company.

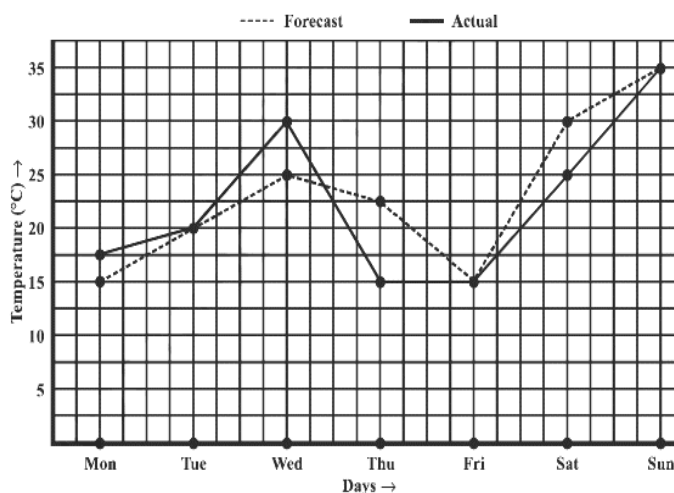
Observe the graph and answer the below questions.

(Easy)

- What are the sales in
 - 2004
 - 2006
- Compute the difference between the sales in 2003 and 2005.



15. The following graph shows the temperature forecast and the actual temperature for each day of a week. Observe the graph and answer the below questions. (Easy)



- a) What was the maximum actual temperature during the week?
- b) What was the minimum forecast temperature during the week?

III. Answer the following questions: (Three-marks questions)

16. Plot points (1, 2), (2, 3), (3, 4), (4, 5) on a graph. Verify if they lie on a line or not.

(Average)

17. Draw a line passing through (3, 1) and (1, 3). Find the co-ordinates of the points at which this line meets the x -axis and y -axis.

(Average)

18. Use the table given below to draw linear graphs.

Population (in thousands) of men and women in a village in different years.

Year	2022	2023	2024	2025
Number of men	9	10	10.5	11
Number of women	8	8.5	9.5	10.5

(Average)

19. Write whether the statements are true or false:

(Easy)

- (a) A point whose x -co-ordinate is zero and y -co-ordinate is 6 will lie on the y -axis.
- (b) The co-ordinates of the origin are (0,0)
- (c) A point whose y -co-ordinate is zero and x -co-ordinate is non-zero, lie on the x -axis.

IV. Answer the following questions: (Four-marks questions)

20. a) Plot the points A (0, 2), B (3, 0), C (-3, 0) and D (0, -2) on the graph sheet.

- b) Join A, B, C and D points.
- c) Name the figure obtained.
- d) Find the area of the figure obtained.

(Average)

21. Following graph describes the movement of a car from a town A to town D. Observe the graph and answers the following questions:

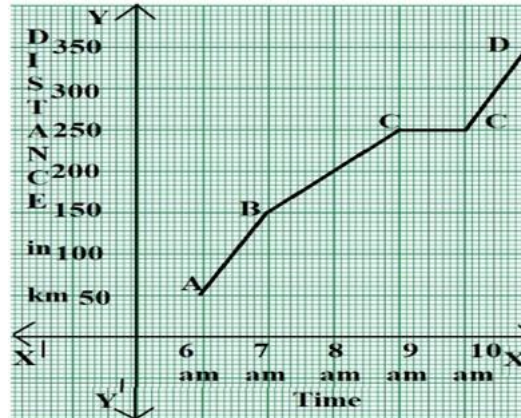
- (i) What is the distance between town A and town D?

(ii) When did the car start from town A?

(iii) Where did the car stop and for what duration?

(iv) What was the average speed of the car from town B to town C?

(Difficult)



22. The line graph shows the yearly sales figure for a manufacturing company. From the graph,

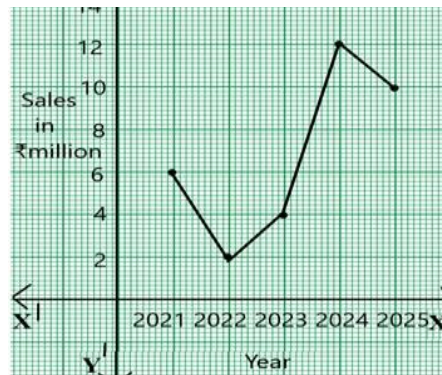
i) What were the sales in 2023?

ii) In which year sales were highest?

What was the sales number in that year?

iii) In which year sales were least?

iv) In which years were sales decreasing compared to previous year?



(Average)

23. Draw a graph for the following tables with suitable scales on the axis.

Number of apples	2	4	6	8	10
Cost(in ₹)	10	20	30	40	50

By observing graph answer the following questions

a) What is the cost of 5 apples?

b) The number of apples purchased for ₹45?

(Average)

24. A bank gives 10% simple interest (S.I) on deposits by senior citizens. Draw a graph to illustrate the relation between the sum deposited and simple interest earned. Find the values from your graph.

(a) the annual interest obtainable for an investment of ₹3500.

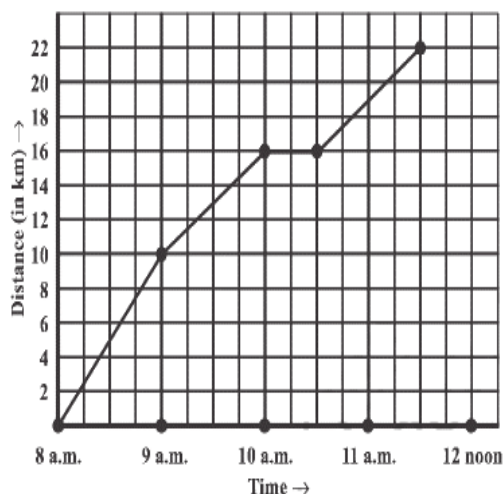
(b) the investment one has to make to get an annual simple interest of ₹800

Sum Deposited (₹)	Simple interest for a year (₹)
1000	100
2000	200
3000	300
4000	400
10000	1000

(Average)

V. Answer the following questions: (Five-marks questions)

25. A courier person cycles from a town to a neighboring urban area to deliver a parcel to a merchant. His distance from the town at different times is shown by the following graph.



- What is the scale taken for the distance axis?
- How much time did the person take for the travel?
- How far is the place of the merchant from the town?
- How much distance he covered till 10:00 am?
- Did the person stop on his way? Explain.

(Difficult)

26. Draw the graph for the following tables of values with suitable scales on the axis interest of deposits for a year

Deposits (in ₹)	1000	2000	3000	4000	5000
Simple interest (in ₹)	80	160	240	320	400

- a) Does the graph pass through the origin?
- b) Use the graph to find the interest on ₹3500 for a year.
- c) To get an interest of ₹360 per year how much money should be deposited?

(Difficult)



Government of Karnataka

DEPARTMENT OF SCHOOL EDUCATION

**DISTRICT INSTITUTE OF EDUCATION AND TRAINING
KOLAR**

LEARNING BASED ASSESSMENT - ANSWER KEY

2025 - 26

MATHEMATICS

8

EIGHTH STANDARD

**DEPARTMENT OF STATE EDUCATIONAL RESEARCH AND
TRAINING,**

BANASHANKARI 3rd STAGE, BENAGALURU-560085

INDEX

Sl.No	CHAPTER	Page No.
01	RATIONAL NUMBERS	76 – 80
02	LINEAR EQUATIONS IN ONE VARIABLE	81– 86
03	INTRODUCTION TO QUADRILATERALS	87 – 95
04	DATA HANDLING	96 – 101
05	SQUARES AND SQUARE ROOTS	102 – 108
06	CUBES AND CUBE ROOTS	109 – 111
07	COMPARING QUANTITIES	112 – 119
08	ALGEBRAIC EXPRESSION AND IDENTITIES	120 – 123
09	MENSURATION	124 – 129
10	EXPONENTS AND POWERS	130 – 133
11	DIRECT AND INVERSE PROPORTIONS	134 – 140
12	FACTORISATION	141 – 147
13	INTRODUCTION TO GRAPHS	148 – 152

1. RATIONAL NUMBERS

I. Multiple choice questions:

- 1) (D) rational number
- 2) (B) 0
- 3) (A) 1
- 4) (A) identity for addition of rational numbers.
- 5) (D) $-\frac{3}{5}$
- 6) (B) $\frac{7}{19}$
- 7) (B) $\frac{17}{5}$
- 8) (B) $\frac{5}{8}$
- 9) (B) $-\frac{9}{4}$
- 10) (B) $\frac{12}{7}$
- 11) (C) $\frac{21}{8}$
- 12) (D) Infinite
- 13) (B) 1
- 14) (C) $\frac{1}{2}$
- 15) (D) Division
- 16) (D) None of these
- 17) (D) Subtraction and Division
- 18) (C) Division
- 19) (C) Division
- 20) (C) Rational numbers
- 21) (B) Commutative property
- 22) (C) Associative property

23) (A) Commutative property

II. One Mark questions:

24) 0

25) 1

26) The set of whole numbers do not have negative numbers

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

28) $\frac{-4}{2}$ and $\frac{8}{2}$

29) 8 and -8

30) Additive inverse of any number is called negative of a number.

31) $\frac{-8}{15}$

32) $-2\frac{5}{4}$

33) $\frac{-8}{35}$

34) $a \times -10 = -8$

$$a = \frac{-8}{-10} = \frac{4}{5}$$

III. Two Mark questions:

35) $2\frac{1}{4} + \frac{3}{2}$

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

$$\frac{9}{4} + \frac{3}{2}$$

$$\frac{3}{2} + \frac{9}{4}$$

$$\frac{9+6}{4} = \frac{15}{4}$$

$$\frac{6+9}{4} = \frac{15}{4}$$

36) $1\frac{3}{4} \times 3\frac{2}{5}$

$$3\frac{2}{5} \times 1\frac{3}{4}$$

$$\frac{7}{4} \times \frac{17}{5}$$

$$\frac{17}{5} \times \frac{7}{4}$$

$$= \frac{119}{20}$$

$$= \frac{119}{20}$$

$$37) \frac{2}{3} \times \left[\frac{-3}{5} \times \frac{5}{8} \right]$$

$$= \frac{2}{3} \times \frac{-15}{40}$$

$$= \frac{-30}{120}$$

$$= \frac{-1}{4}$$

$$\left[\frac{2}{3} \times \frac{-3}{4} \right] \times \frac{5}{8}$$

$$= \frac{-6}{12} \times \frac{5}{8}$$

$$= \frac{-30}{120}$$

$$= \frac{-1}{4}$$

$$38) \frac{6}{5} \left[\frac{5}{7} + \frac{1}{2} \right] = \frac{6}{5} \times \frac{5}{7} + \frac{6}{5} \times \frac{1}{2}$$

$$\frac{6}{5} \left[\frac{5}{7} + \frac{1}{2} \right] = \frac{6}{5} \left[\frac{10+7}{14} \right]$$

$$\frac{6}{5} \times \frac{17}{14} = \frac{51}{35}$$

$$\frac{6}{5} \times \frac{5}{7} + \frac{6}{5} \times \frac{1}{2}$$

$$= \frac{30}{35} + \frac{3}{5} = \frac{30+21}{35} = \frac{51}{35}$$

$$39) a(b+c) = a \times b + a \times c$$

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

IV. Three Mark questions:

$$40) \frac{-4}{5} \times \frac{3}{7} \times \frac{15}{16} \times \left[\frac{-14}{9} \right]$$

$$= \frac{-12}{35} \times \frac{-35}{24}$$

$$= \frac{1}{2}$$

$$41) \frac{3}{7} + \left[\frac{-6}{11} \right] + \left[\frac{-8}{21} \right] + \left[\frac{5}{22} \right]$$

$$= \frac{3}{7} - \frac{6}{11} + \frac{5}{22} - \frac{8}{21}$$

$$= \frac{33-42}{77} + \frac{105-176}{462}$$

$$= \frac{-9}{77} + \frac{-71}{462} = \frac{-54-71}{462} = \frac{-125}{462}$$

$$42) x \times (y+z) = x \times y + x \times z$$

$$\frac{-1}{2} \left(\frac{2}{3} + \frac{3}{4} \right) = \frac{-1}{2} \times \frac{2}{3} + \frac{-1}{2} \times \frac{3}{4}$$

$$\frac{-1}{2} \left(\frac{8+9}{12} \right) = \frac{-2}{6} - \frac{3}{8}$$

$$\frac{-1}{2} \times \frac{17}{12} = \frac{-8-9}{24}$$

$$\frac{-17}{24} = \frac{-17}{24}$$

It is the Distributive Property of Multiplication over Addition.

$$43) \frac{2}{5} \times \frac{-3}{7} - \frac{1}{14} - \frac{3}{7} \times \frac{3}{5}$$

$$= \frac{-6}{35} - \frac{1}{14} - \frac{9}{35}$$

$$= \frac{-15}{35} - \frac{1}{14}$$

$$= \frac{-210-35}{490}$$

$$= \frac{-245}{490} = \frac{-1}{2}$$

V. Four Marks questions:

44) i) Commutative property

ii) Additive identity

iii) Distributive property of multiplication over addition

iv) Associative property

$$45) \left\{ \frac{7}{5} \times \left(\frac{-3}{12} \right) \right\} + \left\{ \frac{7}{5} \times \frac{5}{12} \right\}$$

$$= \frac{-21}{60} + \frac{35}{60}$$

$$= \frac{-21+35}{60}$$

$$= \frac{14}{60} = \frac{7}{30}$$

46) a (b + c) = a x b + a x c

$$\frac{-3}{4} \left(\frac{2}{3} + \frac{-5}{6} \right) = \frac{-3}{4} \times \frac{2}{3} + \frac{-3}{4} \times \frac{-5}{6}$$

$$\frac{-3}{4} \left(\frac{4-5}{6} \right) = \frac{-1}{2} + \frac{5}{8}$$

$$\frac{-3}{4} \times \frac{-1}{6} = \frac{-4+5}{8}$$

$$\frac{1}{8} = \frac{1}{8}$$

$$47) i) a(b + c) = a \times b + a \times c$$

$$\frac{2}{3} \left(\frac{4}{5} + \frac{-5}{6} \right) = \frac{2}{3} \times \frac{4}{5} + \frac{2}{3} \times \frac{-5}{6}$$

$$\frac{2}{3} \left(\frac{4}{5} - \frac{5}{6} \right) = \frac{8}{15} - \frac{5}{9}$$

$$\frac{2}{3} \left(\frac{24-25}{30} \right) = \frac{24-25}{45}$$

$$\frac{2}{3} \left(\frac{-1}{30} \right) = \frac{-1}{45}$$

$$\frac{-1}{45} = \frac{-1}{45}$$

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

$$\frac{2}{3} \times \left(\frac{4}{5} \times \frac{-5}{6} \right) = \left(\frac{2}{3} \times \frac{4}{5} \right) \times \frac{-5}{6}$$

$$\frac{2}{3} \times \frac{-2}{3} = \frac{8}{15} \times \frac{-5}{6}$$

$$\frac{-4}{9} = \frac{-4}{9}$$

$$48) i) \frac{32}{5} + \frac{23}{11} \times \frac{22}{15}$$

$$= \frac{32}{5} + \frac{46}{15}$$

$$= \frac{96+46}{15}$$

$$= \frac{142}{15}$$

$$ii) \frac{3}{7} + \frac{28}{15} \div \frac{14}{5}$$

$$= \frac{3}{7} + \frac{28}{15} \times \frac{5}{14}$$

$$= \frac{3}{7} + \frac{2}{3}$$

$$= \frac{9+14}{21} = \frac{23}{21}$$

$$iii) \frac{2}{7} \times \left[\frac{7}{16} - \frac{21}{4} \right]$$

$$= \frac{2}{7} \times \left[\frac{7-84}{16} \right]$$

$$= \frac{2}{7} \times \frac{-77}{16}$$

$$= \frac{-11}{8}$$

$$iv) \frac{3}{4} \times \left[\frac{8}{9} - 40 \right]$$

$$= \frac{3}{4} \times \left[\frac{8-360}{9} \right]$$

$$= \frac{3}{4} \times \frac{-352}{9}$$

$$= \frac{-88}{3}$$

2. LINEAR EQUATIONS IN ONE VARIABLE

I. Multiple choice questions:

- 1) (A) $y + 1$
- 2) (C) $4x = \frac{1}{x}$
- 3) (C) m
- 4) (D) $3y + 4 = 0$
- 5) (D) 3
- 6) (B) 1
- 7) (D) $=$
- 8) (D) $5x$
- 9) (B) 5
- 10) (A) $\frac{1}{6}$
- 11) (B) 3
- 12) (B) 11
- 13) (A) 6
- 14) (B) $2x = 20$
- 15) (A) $x + (x + 1) = 73$
- 16) (B) $5m$

II. One mark questions:

- 17) The linear equation is an equation in which the highest power of the variable is always 1.
- 18) A mathematical statement or expression that consists of two algebraic statements and it also includes equal '=' sign.
- 19) The algebraic equation is an equality involving variables, with LHS and RHS and has an equality sign between them.
- 20) $2x - 3$

21) $2x + 18$

22) $10x - 3x = -7 - 28$

23) $7x = -35$

$$x = \frac{-35}{7} = -5$$

24) The highest power of this equation is 2, therefore it is not linear equation.

25) Algebraic equation.

III. Two mark questions:

26) $5x = 3x + 6$

$$5x - 3x = 6$$

$$2x = 6$$

$$x = \frac{6}{2} = 3$$

27) $x + 7 = 8x$

$$7 = 8x - x$$

$$7 = 7x$$

$$x = \frac{7}{7} = 1$$

28) $6m - 5 = 4m + 11$

$$6m - 4m = 11 + 5$$

$$2m = 16$$

$$m = \frac{16}{2} = 8$$

29) $4(2p - 1) = 3p + 6$

$$8p - 4 = 3p + 6$$

$$8p - 3p = 6 + 4$$

$$5p = 10$$

$$p = \frac{10}{5} = 2$$

$$30) \frac{15}{4} - 7x = 9$$

$$7x = \frac{15}{4} - 9$$

$$7x = \frac{15-36}{4}$$

$$7x = \frac{-21}{4}$$

$$x = \frac{-21}{28} = \frac{-3}{4}$$

$$31) 3n - 5n = \frac{8}{3}$$

$$-2n = \frac{8}{3}$$

$$n = \frac{1}{-2} \times \frac{8}{3} = \frac{-4}{3}$$

IV. Three mark questions:

$$32) \frac{2}{5}y + \frac{1}{2} = y - 3\frac{1}{2}$$

$$\frac{2}{5}y - y = \frac{-7}{2} - \frac{1}{2}$$

$$\frac{2y-5y}{5} = \frac{-7-1}{2}$$

$$\frac{-3y}{5} = \frac{-8}{2}$$

$$-3y = \frac{-8}{2} \times 5 \quad y = 20/3$$

$$33) \frac{2}{3}n - \frac{3}{2} = \frac{4}{3}n + \frac{5}{2}$$

$$\frac{2}{3}n - \frac{4}{3}n = \frac{5}{2} + \frac{3}{2}$$

$$\frac{2n-4n}{3} = \frac{5+3}{2}$$

$$\frac{-2n}{3} = \frac{8}{2}$$

$$-2n = 12$$

$$n = \frac{12}{-2} = -6$$

$$34) \frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$$

$$\frac{3t-2}{4} - \frac{2t+3}{3} + t = \frac{2}{3}$$

$$\frac{3(3t-2)-4(2t+3)+12t}{12} = \frac{2}{3}$$

$$\frac{9t-6-8t-12+12t}{12} = \frac{2}{3}$$

$$\frac{13t-18}{12} = \frac{2}{3}$$

$$13t - 18 = \frac{2 \times 12}{3}$$

$$13t - 18 = 8$$

$$13t = 8 + 18 \quad 13t = 26$$

$$t = \frac{26}{13} = 2$$

35) Let the length of the field be l

Let the breadth be b , then $2l + 2b = 154$, whereas $l = b + 2$

$$2(b + 2) + 2b = 154$$

$$2b + 4 + 2b = 154$$

$$4b + 4 = 154$$

$$4b = 154 - 4$$

$$4b = 150$$

$$b = \frac{150}{4}$$

$$b = 37.5\text{m}$$

Since $l = b + 2$

$$l = 37.5 + 2 = 39.5\text{m}$$

36) Let the two numbers be x and $x + 15$

$$x + x + 15 = 95$$

$$x + x + 15 = 95$$

$$2x = 95 - 15$$

$$2x = 80$$

$$x = \frac{80}{2} = 40$$

$$x = 40$$

$$y = x + 15$$

$$y = 40 + 15$$

$$y = 55$$

37) Let the three consecutive numbers be x , $x + 1$, $x + 2$

$$\text{Then } x + x + 1 + x + 2 = 51$$

$$3x + 3 = 51$$

$$3x = 51 - 3$$

$$3x = 48$$

$$x = \frac{48}{3} = 16$$

The three consecutive numbers are 16, 17 and 18.

IV. Four marks questions:

$$38) \text{ i) } \frac{6x+1}{3} + 1 = \frac{x-3}{6}$$

$$\frac{6x+1}{3} - \frac{x-3}{6} = -1$$

$$\frac{2(6x+1)-(x-3)}{6} = -1$$

$$\frac{12x+2-x+3}{6} = -1$$

$$11x + 5 = -6$$

$$11x = -6 - 5$$

$$11x = -11,$$

$$x = \frac{-11}{11} = -1$$

$$\text{ii) } m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$$

$$m - \frac{m-1}{2} + \frac{m-2}{3} = 1$$

$$\frac{6m-3(m-1)+2(m-2)}{6} = 1$$

$$6m - 3(m - 1) + 2(m - 2) = 6$$

$$6m - 3m + 3 + 2m - 4 = 6$$

$$5m - 1 = 6$$

$$5m = 6 + 1$$

$$5m = 7$$

$$m = \frac{7}{5}$$

$$39) \text{ i) } 15(y - 4) - 2(y - 9) = 5(y + 6)$$

$$15y - 60 - 2y + 18 = 5y + 30$$

$$13y - 42 = 5y + 30$$

$$13y - 5y = 30 + 42$$

$$8y = 72$$

$$y = \frac{72}{8}$$

$$y = 9$$

$$\text{ii) } 3(5z - 7) - 2(9z - 11) = 4(8z - 13) - 17$$

$$15z - 21 - 18z + 22 = 32z - 52 - 17$$

$$15z - 18z - 32z = -69 - 1$$

$$-35z = -70$$

$$z = \frac{-70}{-35} = 2$$

40) Let the angles ratio is $1x : 2x : 3x$

$$1x + 2x + 3x = 180$$

$$6x = 180$$

$$x = \frac{180}{6}$$

$$x = 30^\circ$$

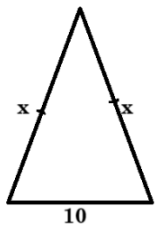
The angles are

$$x = 30^\circ$$

$$2x = 2(30) = 60^\circ$$

$$3x = 3(30) = 90^\circ$$

41)



Let the equal sides of triangles be x

$$2x + 10 = 36$$

$$2x = 36 - 10$$

$$2x = 26$$

$$x = \frac{26}{2}$$

$$x = 13\text{cm}$$

42) Let the age of father be x

$$\text{Then the age of son is } = \frac{1}{3}x$$

$$= \frac{1}{3} \times 48$$

$$\text{Present age of the son is } = 16\text{years}$$

$$\text{Age of his sister} = \text{Age of son} - 2$$

$$= 16 - 2$$

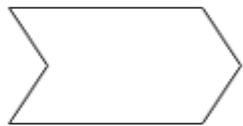
$$= 14\text{years}$$

3 . Understanding Quadrilaterals

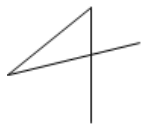
I. MCQ:

1. (A) polygon

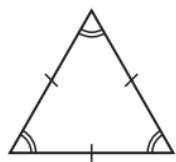
2. (D)



3. (A)



4. (D)



5. (D) infinite

6. (C) 3

7. (C) heptagon

8. (A) square as well as Rectangle

9. (B) 360°

10. (D) 60°

11. (C) 180°

12. (D) 360°

13. (B) Square

14. (A) Regular polygon

15. (C) 180°

16. (A) 90°

17. (B) A rectangle

18. (C) 190°

19. (A) $(n-2) \times 180^\circ$

20. (C) 90°

21. (A) 0

II. One Mark questions:

22. A simple closed curve made up of only line segments is called a polygon.
23. A quadrilateral is a closed two-dimensional shape with four sides, four angles and four vertices.
24. A regular polygon is a polygon having sides of equal length and angles of equal measure.
25. $720^\circ - (150^\circ + 95^\circ + 80^\circ + 135^\circ + 125^\circ)$

$$720^\circ - (585) = 135^\circ$$

26. Number of diagonals in a polygon $= \frac{n(n-3)}{2} = \frac{6(6-3)}{2} = \frac{18}{2} = 9$

In hexagon $n=6$

27. Given that, Exterior angle $= 24^\circ$

Let number of sides $= n$

$$n = \frac{360}{24} = 15 \text{ sides}$$

28. Given interior angle of a polygon $= 165^\circ$

The angle which is exterior of the polygon $= 180^\circ - 165^\circ = 15^\circ$

Hence the number of sides $= \frac{360}{15} = 24$

29. Measure of each interior angle $= \frac{[(n-2) \times 180^\circ]}{n}$

$$= \frac{540^\circ}{5}$$

$$= 108^\circ$$

30. 60°

31. 120°

32. In a Parallelogram opposite angles are equal.

Thus Angle opposite to 60° is 60°

In a parallelogram adjacent angles are supplementary.

Thus adjacent angle to $60^\circ = 180^\circ - 60^\circ = 120^\circ$

III. Two mark questions:

33. A convex polygon has all interior angles less than 180° and have no portions of their diagonals in the exterior.

A concave polygon has at least one interior angle greater than 180° and have portions of their diagonals in the exterior.

34. A regular polygon has all sides of equal length and all interior angles of equal measure.

An irregular polygon has sides of unequal lengths or interior angles of unequal measures (or both).

35. Kite

- i) There are exactly two distinct consecutive pairs of sides of equal length.
- ii) Its diagonals intersect at a right angle.

36. Rectangle

- i) Each of the angles is a right angle.
- ii) The opposite sides are parallel and equal to each other.

37. Square

- i) All four interior angles are equal to 90° .
- ii) All four sides of the square are equal to each other.

38. Diagonals: AC and BD

39. i) Opposite sides: AB and CD or BC and AD

ii) Opposite angles: $\angle A$ and $\angle C$ or $\angle B$ and $\angle D$

iii) Adjacent sides: AB and BC or AD and DC

iv) Adjacent angles: $\angle A$ and $\angle B$ or $\angle B$ and $\angle C$

40. Exterior angle of a Regular Polygon = $360^{\circ} / \text{Total number of sides}$. $\Rightarrow n \times 60^{\circ} = 360^{\circ}$
 $n = 6$.

$\therefore$ The polygon is hexagon.

41. Opposite angles of a parallelogram are equal

So, the angle opposite the given 70° angle is also 70°

$$180 - 70 = 110^{\circ}$$

and the measure of remaining two angles are 110° and 110°

42. Given that the adjacent angles of a parallelogram are in the ratio 3:2.

Thus, the angles are $3x$ and $2x$ respectively.

We know that the sum of the measures of adjacent angles is 180° for a parallelogram.

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

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

$$5x = 180^\circ$$

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

$$x = 36^\circ$$

Thus, one of the angle = $3x$

$$3(36^\circ) = 108^\circ$$

The other angle is $2x$

$$2(36^\circ) = 72^\circ$$

The other two angles are 72° and 108° since opposite angles of a parallelogram are equal.

Thus, the measures of the angles of the parallelogram are 108° , 72° , 108° , and 72°

IV. Three marks questions:

43. A regular polygon is a polygon with equal sides and equal angles.

i) Equilateral triangle

ii) Square

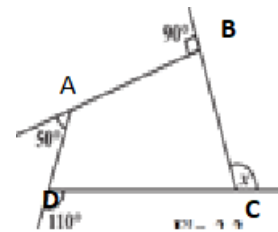
iii) Regular hexagon

44. when a ray stands on a line, then the sum of adjacent angles are 180°

From fig $\angle DAB = 180^\circ - 50^\circ = 130^\circ$

$$\angle CDA = 180^\circ - 110^\circ = 70^\circ$$

$$\angle ABC = 180^\circ - 90^\circ = 90^\circ$$



Sum of interior angles of a quadrilateral is 360°

$$\therefore \angle DCB = 360^\circ - (130^\circ + 70^\circ + 90^\circ) = 360^\circ - 290^\circ = 70^\circ$$

$$x = 180^\circ - 70^\circ = 110^\circ$$

$$45) \quad \overset{\wedge}{HOP} = \overset{\wedge}{HEP} = x$$

$$\overset{\wedge}{HOP} + \overset{\wedge}{POM} = 180^0$$

$$\overset{\wedge}{HOP} + 70^0 = 180^0$$

$$\overset{\wedge}{HOP} = 180^0 - 70^0$$

$$\overset{\wedge}{HOP} = 110^0$$

$$\overset{\wedge}{HEP} = \overset{\wedge}{HOP} = x = 110^0$$

In triangle HEP

(sum of interior angles of a triangle)

$$110^0 + 40 + \overset{\wedge}{EPH} = 180^0$$

$$\angle EPH = 180 - 150 = 30^0$$

$$Z = \angle EPH = 30^0 \text{ (Alternate angles, EP } \parallel \text{ HO)}$$

$$Y = \angle EHP = 40^0 \text{ (Alternate angles, EH } \parallel \text{ PO)}$$

46.

$$AO = OC$$

$$5y + 1 = 6y - 1$$

$$1 + 1 = 6y - 5y$$

$$y = 2$$

$$BO = OD$$

$$3x - 1 = 2(x + 1)$$

$$3x - 1 = 2x + 2$$

$$3x - 2x = 2 + 1$$

$$x = 3$$

47. Let's assume x is the common factor of the angles of the quadrilateral.

Given, the angles A, B, C and D are in ratio 1:2:3:4.

$$\therefore \angle A = 1x$$

$$\angle B = 2x$$

$$\angle C = 3x \text{ and}$$

$$\angle D = 4x.$$

We know that the sum of all interior angles of a quadrilateral is equal to 360° .

$$\therefore \angle A + \angle B + \angle C + \angle D = 360^\circ$$

$$\Rightarrow 1x + 2x + 3x + 4x = 360^\circ$$

$$\Rightarrow 10x = 360^\circ$$

$$\Rightarrow x = \frac{360}{10}$$

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

$$\text{Hence, } \angle A = 1x = 1 \times 36 = 36^\circ$$

$$\angle B = 2x = 2 \times 36 = 72^\circ$$

$$\angle C = 3x = 3 \times 36 = 108^\circ \text{ and}$$

$$\angle D = 4x = 4 \times 36 = 144^\circ.$$

48) let the common ratio be x

$$3x + 4x + 5x + 6x = 360^\circ \text{ (sum of interior angles of a quadrilateral)}$$

$$18x = 360^\circ$$

$$\Rightarrow x = \frac{360}{18}$$

$$\Rightarrow x = 20$$

$$\text{Hence four angles are } 3x = 3 \times 20 = 60^\circ$$

$$4x = 4 \times 20 = 80^\circ$$

$$5x = 5 \times 20 = 100^\circ$$

$$6x = 6 \times 20 = 120^\circ$$

49. Given: The ratio of an exterior angle to an interior angle is $2:7$.

The sum of an interior and exterior angle of a polygon is 180°

The sum of exterior angles of a polygon is 360°

Let the exterior angle be $2x$ and the interior angle be $7x$

The sum of the interior and exterior angles is

$$2x + 7x = 180^\circ$$

$$9x = 180^\circ$$

$$x = \frac{180^\circ}{9}$$

$$x=20^\circ$$

$$\text{Exterior angle} = 2x = 2(20^\circ) = 40^\circ$$

$$\text{Number of sides} = \frac{360^\circ}{40^\circ} = 9$$

The polygon has 9 sides.

50. Given that

$$\text{Exterior angle} = 45^\circ$$

Let number of sides = n

$$n = \frac{360}{45} = 8$$

51. The sum of an interior angle of a regular polygon of n sides is $= (n - 2)180^\circ$

$$= (15 - 2)180^\circ$$

$$= 13(180^\circ)$$

$$= 2340^\circ$$

IV. Four marks questions:

52. Data: All sides are equal in a Rhombus

$$AB=BC=CD=DA$$

Diagonals AC and BD intersecting at point O

To prove: $AO=OC$ and $BO=OD$

Proof: In $\triangle AOB$ and $\triangle COD$

$$AB=CD \text{ (sides of a rhombus)}$$

$$\angle ABO = \angle CDO \text{ (alternate interior angles), } AB \parallel CD$$

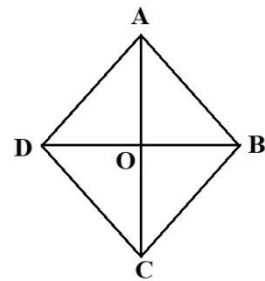
$$\text{Similarly } \angle BAO = \angle DCO, AD \parallel BC$$

By ASA congruence criterion $\triangle AOB \cong \triangle COD$

Thus $BO=DO$ (sides of corresponding triangle)

$$\text{Similarly } \triangle AOD \cong \triangle BOC \Rightarrow AO = CO$$

This proves that the diagonals of a rhombus bisect each other.



53. Adjacent angles of a parallelogram $= 180^\circ$

$$\Rightarrow (3x-4)^\circ + (3x+10)^\circ = 180^\circ$$

$$6x + 6 = 180^\circ$$

$$6x = 174$$

$$\Rightarrow x = \frac{174}{6} = 29^\circ$$

Angles are $(3(29) - 4)^\circ = 87 - 4 = 83^\circ$

$$(3(29) + 10)^\circ = 97^\circ$$

Sum of opposite angles of a parallelogram = 180°

Therefore, remaining 2 angles are

$$\Rightarrow 180^\circ - 83^\circ = 97^\circ \text{ and}$$

$$180^\circ - 97^\circ = 83^\circ$$

54. let the three angles be $4x, 6x$ and $3x$ and given 4th angle = 100°

Sum of interior angles of a quadrilateral = 360°

$$\Rightarrow 4x + 6x + 3x + 100 = 360$$

$$13x = 260$$

$$x = \frac{260}{13} = 20$$

Thus three angles are $4x = 4(20) = 80^\circ$

$$6x = 6(20) = 120^\circ \text{ and}$$

$$3x = 3(20) = 60^\circ.$$

55. Let a be the length of one side of a rectangle = 3cm

And b be the length of the other side.

The diagonal d of the rectangle is given as 5cm.

According to the Pythagorean theorem:

$$d^2 = a^2 + b^2$$

Substituting the given values: $5^2 = 3^2 + b^2$

$$\Rightarrow 25 = 9 + b^2$$

$$b^2 = 25 - 9 = 16$$

$$b = 4\text{cm}$$

Perimeter of a rectangle $P = 2(a + b)$

$$= 2(3 + 4)$$

$$= 2(7)$$

$$= 14\text{cm}$$

56. In a parallelogram,

From fig, adjacent angles, $z + 110^\circ = 180^\circ \Rightarrow z = 70^\circ$ -----(1)

Also Adjacent angles are supplementary

$$\Rightarrow x + z = 180^\circ$$

$$\Rightarrow x + 70^\circ = 180^\circ$$

$$\therefore x = 110^\circ \quad \{\text{from (1)}\}$$

$$x + p = 180^\circ$$

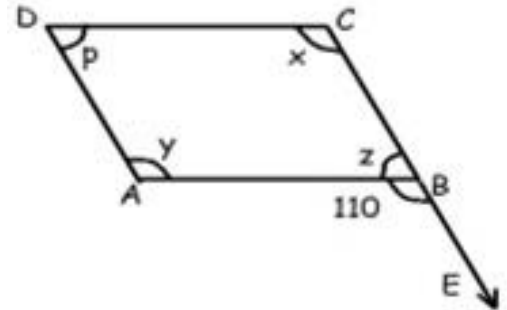
$$\Rightarrow 110^\circ + p = 180^\circ$$

$$\therefore p = 70^\circ$$

opposite angles are equal (from fig)

$$\Rightarrow x = y = 110^\circ$$

$$p = z = 70^\circ$$



4. DATA HANDALING

I. MCQ:

1. (B) investigator himself
2. (D) all of these
3. (D) 150 students
4. (B) pictograph
5. (A) bar graph
6. (D) double bar graph
7. (D) double bar graph
8. (C) circle graph
9. (D) 360°
10. (D) 360°
11. (A) 2
12. (A) 1
13. (A) Taxi
14. (B) 2
15. (D) 6
16. (A) $\frac{1}{2}$
17. (A) 3
18. (A) $\frac{4}{8}$

II. One marks questions:

19. A pictorial representation of data using symbols is known as Pictograph.
20. A display of information using bars of uniform width, their heights being proportional to the respective values is known as Bar graph.
21. A bar graph showing two sets of data simultaneously is known as double bar graph.
22. A graph shows the relationship between a whole and its parts is known as Circle graph.
23. Bar heights give the quantity for each category.
24. Double bar graph.
25. Represents information related to each division.
26. A random experiment is one whose outcome cannot be predicted exactly in advance.

27. {Head or Tail}

28. {1, 2, 3, 4, 5 or 6}

29. Probability of an event = $\frac{\text{Number of outcomes that make an event}}{\text{Total number of outcomes of the experiment}}$

30. One or more outcomes of an experiment make an event.

31. Scooter will either successfully start or fail to start.

32. {A, B, C}

33. {W, R, B, G, Y}

III. Two mark questions:

34. i) Bars(rectangles) are of equal width with equal gaps in between.

ii) Bar heights give the quantity for each category.

35. The sale is maximum on Tuesday of the week.

 = 2 fan

 Therefore, sale on Tuesday = 8 fan

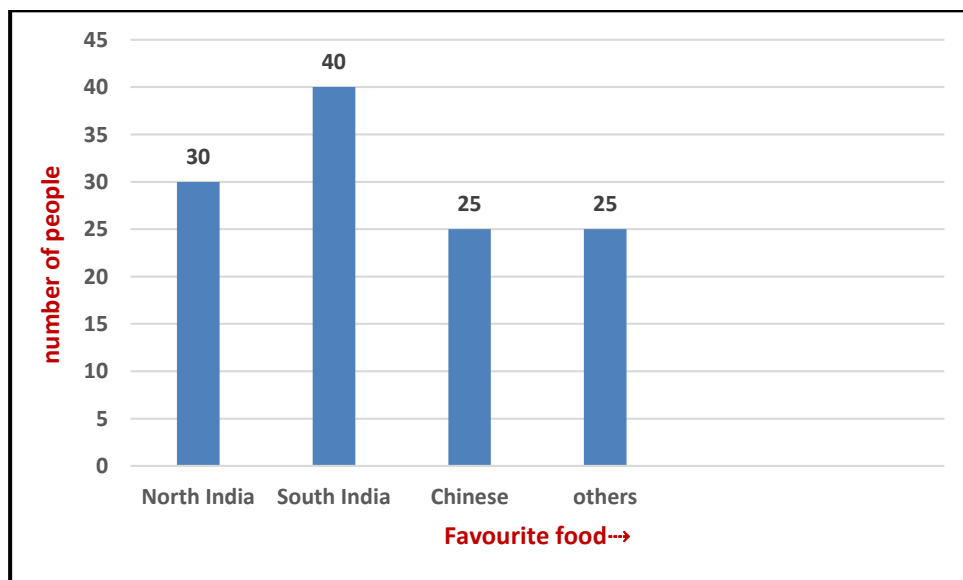
$$\Rightarrow 8 \times 2 = 16 \text{ fans}$$

36. From the given Pictograph

i) 250 cars were produced in the month of July.

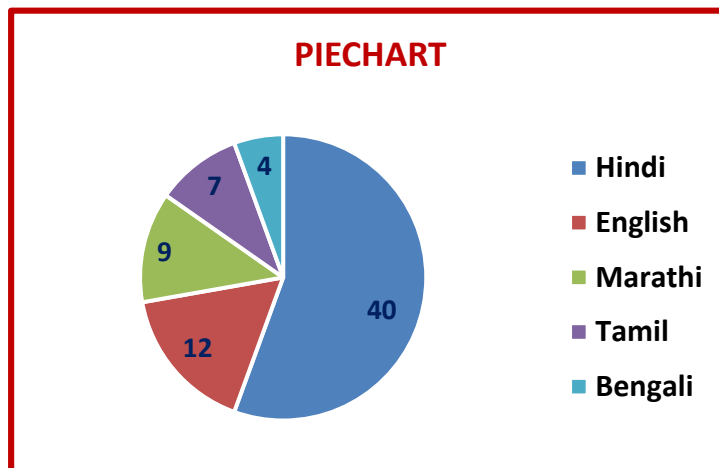
ii) Maximum number of cars produced in the month of September.

37.



38.

Language	40	$\frac{40}{72} \times 360 = 200^\circ$
Hindi	12	$\frac{12}{72} \times 360 = 60^\circ$
English	9	$\frac{9}{72} \times 360 = 45^\circ$
Marati	7	$\frac{7}{72} \times 360 = 35^\circ$
Tamil	4	$\frac{4}{72} \times 360 = 20^\circ$
Total	72	360



39. Total number of outcomes when a dice is thrown, $S = (1, 2, 3, 4, 5, 6)$

$$\therefore n(S) = 6$$

Prime numbers are, $A = (2, 3, 5)$

$$\Rightarrow n(A) = 3$$

$$\text{Probability, } P(A) = \frac{n(A)}{n(S)} = \frac{3}{6} = \frac{1}{2}$$

40. Total number of outcomes, $S = (4 \text{ Red}, 2 \text{ yellow})$ $n(S) = 6$

Red balls $n(A) = 4$

$$\text{Probability of getting a red ball: } P(A) = \frac{n(A)}{n(S)} = \frac{4}{6} = \frac{2}{3}$$

Yellow balls: $n(B) = 2$

$$\text{Probability of getting a yellow ball: } P(B) = \frac{n(B)}{n(S)} = \frac{2}{6} = \frac{1}{3}$$

Since $\frac{2}{3}$ is greater than $\frac{1}{3}$, the probability of getting a red ball is higher.

41. The probability that it will rain tomorrow $P(E) = 0.85$.

Then the probability that it will not rain tomorrow is

$$P(\overline{E}) = 1 - P(E) = 1 - 0.85 = 0.15$$

42. $S = \{3\text{green}, 1\text{ blue}, 1\text{ red}\} \therefore n(S) = 5$

The probability of getting a green sector:

$$n(A) = 3$$

$$P(A) = \frac{n(A)}{n(S)} = \frac{3}{5}$$

The probability of getting a non blue sector:

$$\Rightarrow n(B) = 3\text{Green} + 1\text{ Red} = 4$$

$$\text{Probability: } P(B) = \frac{n(B)}{n(S)} = \frac{4}{5}$$

IV. Three marks questions:

43. i) Number of green sector on this wheel is $n(A) = 5$

Number of a nongreen sector on this wheel is $n(B) = 3$

ii) Number of total outcomes $n(S) = 8$

Number of green sector on this wheel $n(A) = 5$

Probability of getting a green sector on this wheel: $P(A) = \frac{n(A)}{n(S)} = \frac{5}{8}$

iii) Number of a non-green sector on this wheel $n(B) = 3$

Probability of getting a non-green sector on this wheel: $P(B) = \frac{n(B)}{n(S)} = \frac{3}{8}$

44. i) Expenditure is maximum on food.

ii) Expenditure on Education of children is the same as the savings of the family.

iii) Monthly savings of a family = Rs3000 = 15%

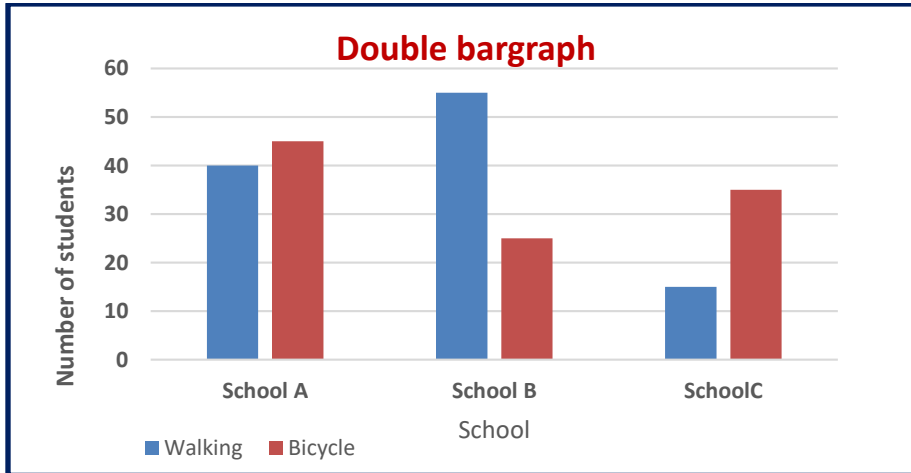
$$\text{let } x \text{ Rs be the total income} \Rightarrow \frac{15}{100} \times x = ₹3000$$

$$X = \frac{3000 \times 100}{15} = ₹20,000$$

$$10\% \text{ of } x \text{ is expense on clothes} = \frac{10 \times 20000}{100} = ₹2,000$$

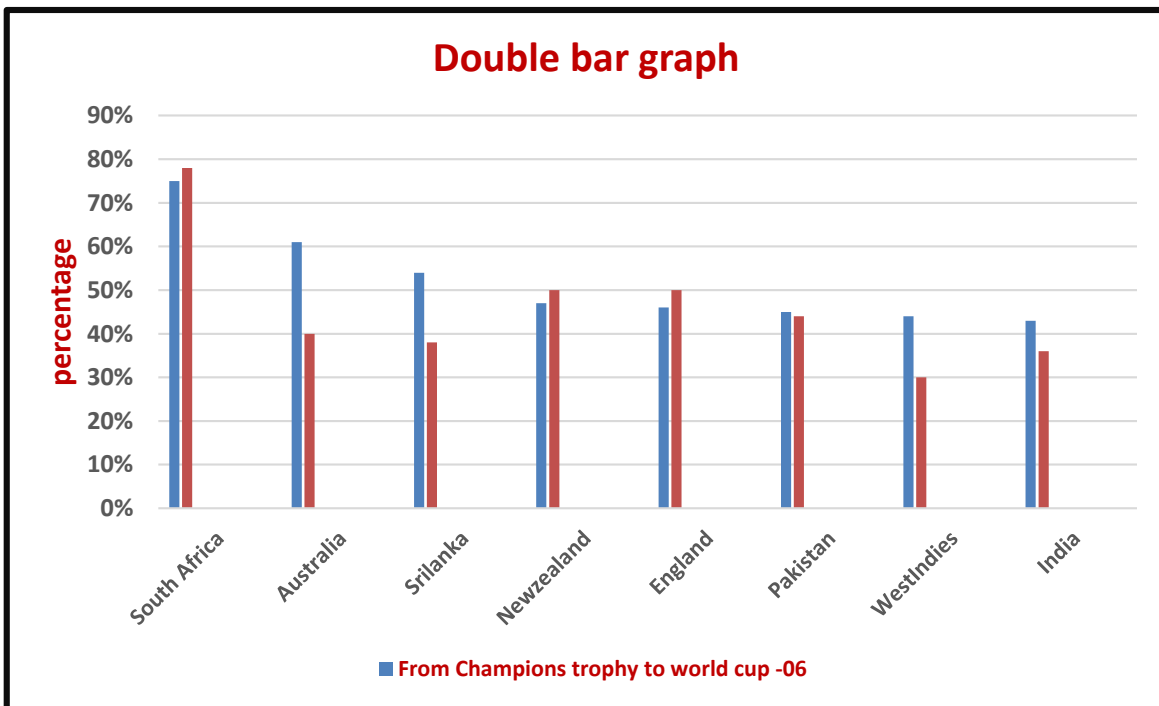
Thus the monthly expenditure on clothes is ₹2,000.

45.



V. Four marks questions:

46.



47. Total outcome: $s = \{1, 2, 3, 4, 5, 6\}$

$$n(s) = 6$$

i) Getting Prime numbers: $A = (2, 3, 5) \Rightarrow n(A) = 3$

$$\therefore P(A) = \frac{n(A)}{n(S)} = \frac{3}{6} = \frac{1}{2}$$

ii) Getting which are not a prime number: $B = (1, 4, 6) \Rightarrow n(B) = 3$

$$\therefore P(B) = \frac{n(B)}{n(S)} = \frac{3}{6} = \frac{1}{2}$$

iii) Getting a number greater than 5: $C = \{6\} \Rightarrow n(C) = 1$

$$\therefore P(C) = \frac{n(C)}{n(S)} = \frac{1}{6}$$

iv) Getting a number not greater than 5: $D = \{1, 2, 3, 4, 5\} \Rightarrow n(D) = 5$

$$\therefore P(D) = \frac{n(D)}{n(S)} = \frac{5}{6}$$

48. $S = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} \Rightarrow n(S) = 10$

i) Getting a number 6: $A = \{6\} \Rightarrow n(A) = 1$

$$\therefore P(A) = \frac{n(A)}{n(S)} = \frac{1}{10}$$

ii) Getting a number less than 6: $B = \{1, 2, 3, 4, 5\} \Rightarrow n(B) = 5$

$$\therefore P(B) = \frac{n(B)}{n(S)} = \frac{5}{10}$$

iii) Getting a number greater than 6: $C = \{7, 8, 9, 10\} \Rightarrow n(C) = 4$

$$\therefore P(C) = \frac{n(C)}{n(S)} = \frac{4}{10} = \frac{2}{5}$$

iv) Getting a 1 - digit number: $D = \{1, 2, 3, 4, 5, 6, 7, 8, 9\} \Rightarrow n(D) = 9$

$$\therefore P(D) = \frac{n(D)}{n(S)} = \frac{9}{10}$$

49. A) Village B has the maximum number of bullock carts.

B) Village D has the minimum number of bullock carts.

C) 8 bullock carts in Village B

5 bullock carts in Village C

$\therefore$ Village B has 3 more bullock carts than village C.

D) 30 bullock carts.

5. SQUARES AND SQUARE ROOTS

I. MCQ:

1. (C) n^2
2. (B) 169
3. (C) 25
4. (C) 49
5. (D) 64
6. (C) 36
7. (B) 64
8. (A) 0.3
9. (B) 121
10. (D) 3 or 7
11. (C) 4
12. (A) 1
13. (B) 25
14. (C) (3, 4, 5)
15. (B) 17
16. (B) $\sqrt{\quad}$
17. (B) odd number
18. (C) 5
19. (B) 961
20. (A) 17
21. (C) 25m
22. (B) 12m
23. (B) 240m

II. One mark questions:

24. The smallest perfect square number is 1.
25. A number can be expressed as the product of the number with itself.
26. 64
27. 0, 1, 4, 5, 6, 9.
28. 2061 is not a perfect square number.

$$2061 = 3 \times 3 \times 229$$

Here the factor 229 doesn't occur in pairs.

29. 121

30. The natural numbers between n^2 and $(n + 1)^2$ is $2n$.

$\therefore$ The natural numbers between the squares of 6 and 7 is $2(6) = 12$.

31. $1 + 3 + 5 + 7 = 16$

32. $49 = 1 + 3 + 5 + 7 + 9 + 11 + 13$

33. $7^2 = 49 = 24 + 25$

34. $m^2 - 1$ and $m^2 + 1$

35. 9

36. $(3 + 4)^2 = 49$

37. Side of a square is 12cm.

38. $(\sqrt{9})^2 = 9$

39. 11

40. $x = 6$

41. 12.

42. $(0.6)^2 = 0.36$

43. 1024

III. Two mark questions:

44. Given $2m = 8 \Rightarrow m = 4$

$$m^2 - 1 = 4^2 - 1 = 15$$

$$m^2 + 1 = 4^2 + 1 = 17$$

$\therefore$ The Pythagorean triplets are **8, 15 and 17**.

45. From the figure,

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

$$x^2 + 9 = 25$$

$$x^2 = 25 - 9 = 16$$

$$x = 4$$

46. $12^2 = 144$

$$= 2 \times 2 \times 2 \times 2 \times 3 \times 3$$

47. $196 = 2 \times 2 \times 7 \times 7 = (2 \times 7)^2$

$$\sqrt{196} = 2 \times 7$$

$$= 14$$

$$\begin{array}{r|l} 2 & 196 \\ \hline 2 & 98 \\ \hline 7 & 49 \\ \hline & 7 \end{array}$$

$$48. 9408 = \underline{2 \times 2} \times \underline{2 \times 2} \times \underline{2 \times 2} \times 3 \times \underline{7 \times 7}$$

$\therefore$ 3 is the smallest number that should be divided
to 9408 to make it a perfect square.

$$49. \text{LCM of 4, 9 and 10 is} = 180$$

$$180 = 2 \times 2 \times 3 \times 3 \times 5$$

Here factor 5 does not have in pairs.

$$180 \times 5 = 900$$

$\therefore$ 900 is the least perfect square which is divisible by 4, 9 and 10.

$$50. \begin{array}{r} \\ 4 \overline{) 2304} \\ +4 \underline{16} \\ 88 \underline{704} \\ \underline{704} \\ 0 \end{array}$$

$$\sqrt{2304} = 48$$

$$51. 180 = \underline{2 \times 2} \times \underline{3 \times 3} \times 5$$

Here the factor 5 is not in pair.

$\therefore$ The least number that should be multiplied to 180
to make it a perfect square is 5.

$\therefore 180 \times 5 = 900$, which is a perfect square number.

$$52. 396 = \underline{2 \times 2} \times \underline{3 \times 3} \times 11$$

Here the factor 11 is not in pair.

$\therefore$ the least number that should be divided from 396
to make it a perfect square is 11.

$\therefore \frac{396}{11} = 36$, which is a perfect square number.

$$53. \text{Given: } 2m = 12 \Rightarrow m = 6$$

$$m^2 - 1 = 6^2 - 1 = 35$$

$$m^2 + 1 = 6^2 + 1 = 37$$

$\therefore$ The Pythagorean triplets are **12, 35 and 37**.

$$\begin{array}{r} 2 \overline{) 9408} \\ 2 \overline{) 4704} \\ 2 \overline{) 2352} \\ 2 \overline{) 1176} \\ 2 \overline{) 588} \\ 2 \overline{) 294} \\ 7 \overline{) 147} \\ 7 \overline{) 21} \\ 3 \end{array}$$

$$\begin{array}{r} 2 \overline{) 180} \\ 2 \overline{) 90} \\ 3 \overline{) 45} \\ 3 \overline{) 15} \\ 5 \end{array}$$

$$\begin{array}{r} 2 \overline{) 396} \\ 2 \overline{) 198} \\ 3 \overline{) 99} \\ 3 \overline{) 33} \\ 11 \end{array}$$

54. Given side of a playground is 25m.

$$AB = BC = CD = AD = 25\text{m}$$

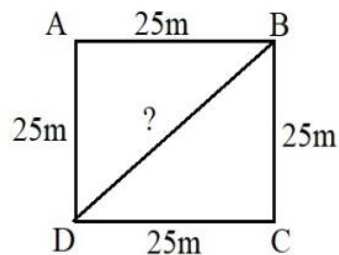
In triangle BCD, by applying Pythagoras theorem,

$$BD^2 = BC^2 + CD^2$$

$$BD^2 = 25^2 + 25^2$$

On simplifying, we get $BD = 25\sqrt{2}$

$\therefore$ The length of the diagonal is $25\sqrt{2}$ m



55. In $\triangle ABC$, $\angle B = 90^\circ$

From Pythagoras theorem,

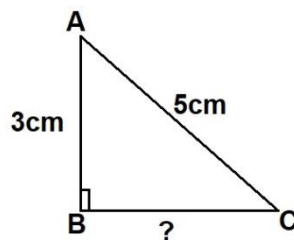
$$AC^2 = AB^2 + BC^2$$

$$5^2 = 3^2 + BC^2$$

$$BC^2 = 16$$

$$BC = \sqrt{16} = 4\text{cm}$$

The length of the other side of triangle is 4cm



56.

$$\begin{array}{r} 27 \\ 2 \overline{) 729} \\ \underline{+2} \\ 47 \\ \underline{329} \\ 329 \\ \underline{0} \end{array}$$

$$\sqrt{729} = 27$$

57.

$$\begin{array}{r} 1.6 \\ 1 \overline{) 2.56} \\ \underline{+1} \\ 26 \\ \underline{156} \\ 156 \\ \underline{0} \end{array}$$

$$\sqrt{2.56} = 1.6$$

58. Let the number of students in the class be 'a'

Each student donated amount equal to number of students.

$$\therefore a \times a = 2401$$

$$a^2 = 2401$$

$$a = \sqrt{2401}$$

$$a = 49$$

The number of students in the class is 49 and each student donated ₹49.

$$\begin{array}{r} 49 \\ 4 \overline{) 2401} \\ \underline{+4} \\ 89 \\ \underline{801} \\ 801 \\ \underline{0} \end{array}$$

59. Let the number of rows be 'k'

$\therefore$ the number of plants in each row is also = k

Total number of plants = 2025

$$k \times k = 2025$$

$$k^2 = 2025$$

$$k = \sqrt{2025}$$

$$k = 45.$$

The number of rows and number of plants in each row is = 45

$$\begin{array}{r|rr} & 4 & 5 \\ 4 & 20 & 25 \\ +4 & 16 & \\ \hline 85 & 42 & 5 \\ & 42 & 5 \\ \hline & 0 & \end{array}$$

IV. Three mark questions:

60. $121 - 1 = 120$

$$120 - 3 = 117$$

$$117 - 5 = 112$$

$$112 - 7 = 105$$

$$105 - 9 = 96$$

$$96 - 11 = 85$$

$$85 - 13 = 72$$

$$72 - 15 = 57$$

$$57 - 17 = 40$$

$$40 - 19 = 21$$

$$21 - 21 = 0$$

$$\therefore \sqrt{121} = 11$$

61. 2352 is not a perfect square.

$$2352 = \underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times 3 \times \underline{7} \times \underline{7}$$

Here the factor 3 is not in pair.

The least number that should be multiplied to 2352

to make it a perfect square is 3.

$\therefore$ The new number is $2352 \times 3 = 7056$

$$\sqrt{7056} = 2 \times 2 \times 3 \times 7 = 84$$

62. $2028 = \underline{2} \times \underline{2} \times 3 \times \underline{13} \times \underline{13}$

Here the factor 3 is not in pair.

The least number that should be multiplied to 2028 to make it a perfect square is 3.

$$\begin{array}{r|rr} 2 & 2352 \\ 2 & 1176 \\ 2 & 588 \\ 2 & 294 \\ 7 & 147 \\ 7 & 21 \\ & 3 \end{array}$$

∴ The new number is $2028 \times 3 = 6084$

$$\sqrt{6084} = 2 \times 3 \times 13$$

$$\sqrt{6084} = 78.$$

63. $2645 = 5 \times \underline{23} \times \underline{23}$

Here 5 is not in pairs.

The smallest number that should be divided to 2645 to make it a perfect square is 5.

∴ The new number is $\frac{2645}{5} = 529$

$$\sqrt{529} = 23.$$

64.

$$\begin{array}{r} \\ 5 \\ +5 \\ \hline 106 \\ 636 \\ 636 \\ \hline 0 \end{array}$$

$$\sqrt{3136} = 56$$

65. The least number that should be subtracted from 1989 to make it a perfect square is 53.

The square number is $= 1989 - 53 = 1936$

$$\sqrt{1936} = 44.$$

$$\begin{array}{r} \\ 4 \\ +4 \\ \hline 84 \\ 389 \\ 336 \\ \hline 53 \end{array}$$

66. Here $42^2 < 1825 < 43^2$

$$\begin{aligned} \therefore 43^2 - 1825 &= 1849 - 1825 \\ &= 24. \end{aligned}$$

The least number that should be added to 1825 to make it a perfect square is 24.

$$\begin{array}{r} \\ 4 \\ +4 \\ \hline 82 \\ 225 \\ 164 \\ \hline 61 \end{array}$$

67. Given, Area of the floor = 144 m^2

side of a square tile is 0.5m

$$\text{Area of one square tile} = a^2 = (0.5)^2 = 0.25 \text{ m}^2$$

$$\begin{aligned} \text{The number of tiles require to cover the floor is} &= \frac{\text{Area of the floor}}{\text{Area of one tile}} \\ &= \frac{144}{0.25} = 576 \end{aligned}$$

∴ The number of tiles require to cover the floor is **576 tiles**

68. Area of rectangular garden = length x breadth

$$= 18 \times 72 = 1296\text{m}^2$$

Given Area of the square garden = Area of rectangular garden.

$$\therefore \text{Area of square garden} = 1296\text{m}^2$$

$$\therefore \text{Length of the side} = \sqrt{1296}$$

$$\therefore \text{Length of the side} = 36\text{m}$$

$$\begin{array}{r} 36 \\ 3 \overline{) 1296} \\ \underline{9} \\ 396 \\ \underline{396} \\ 0 \end{array}$$

69. Here, $31^2 < 1000 < 32^2$

$$\therefore 32^2 - 1000 = 1024 - 1000$$

$$= 24$$

The minimum number of plants required more to plant in a square form is 24.

$$\begin{array}{r} 31 \\ 3 \overline{) 1000} \\ \underline{9} \\ 610 \\ \underline{610} \\ 0 \end{array}$$

V. Four mark questions:

70. Let the number of rows be 'x'.

$\therefore$ Number of saplings in a row is also = 'x'

Total number of saplings is = 2025

$$\therefore x^2 = 2025 \text{ or } x = \sqrt{2025}$$

$$\therefore x = 45$$

$\therefore$ The number of saplings in each row is = 45.

If 5 more rows to be added, then the total number of saplings required for planting is =

$$(45 + 5)^2 = 50^2 = 2500$$

$$\begin{array}{r} 45 \\ 4 \overline{) 2025} \\ \underline{16} \\ 850 \\ \underline{850} \\ 0 \end{array}$$

71. Given total number of students = 1464

number of rows = number of columns

Let us find the square root of 1464.

(i) Each row has 38 students.

(ii) 20 students are left out in the arrangement.

(iii) Number of students in forming a square arrangement is = $1464 - 20 = 1444$

$$\begin{array}{r} 38 \\ 3 \overline{) 1464} \\ \underline{9} \\ 684 \\ \underline{684} \\ 0 \end{array}$$

6. CUBES AND CUBE ROOTS

I. MCQ:

1. (D) 343
2. (A) 3
3. (A) 10
4. (C) 0.027
5. (C) 1000
6. (C) 100
7. (A) $\sqrt[3]{}$
8. (C) -27
9. (A) 2
10. (A) odd number
11. (A) 1
12. (C) 6
13. (C) 9
14. (A) 5
15. (B) 9
16. (A) 6
17. (C) 8
18. (D) 32
19. (C) 30
20. (C) 343cm^3
21. (B) 0.08
22. (A) 5

II. One mark questions:

23. The smallest perfect cube greater than 1 is 8.
24. $1^3 = 1$, $2^3 = 8$, $3^3 = 27$, $4^3 = 64$, $5^3 = 125$
25. $a = 4$
26. $2^3 = 8 = 3 + 5$
27. $15 = 3 \times 5$
28. 125
29. $\sqrt[3]{64 \times 27} = 4 \times 3 = 12$.
30. The digit present in units place of the cube of 24 is 4.
31. 5^2 or 25
32. $8^3 - 7^3 = 512 - 343 = 169$

III. Two mark questions:

33. $512 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} = (2 \times 2 \times 2)^3$

$$\sqrt[3]{512} = 2 \times 2 \times 2$$

$$\sqrt[3]{512} = 8$$

$$\begin{array}{r|l} 2 & 512 \\ \hline 2 & 256 \\ \hline 2 & 128 \\ \hline 2 & 64 \\ \hline 2 & 32 \\ \hline 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline & 2 \end{array}$$

34. $4^3 = 4 \times 4 \times 4 = 64$

$$= 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15$$

35. $216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$

$$216 = 2^3 \times 3^3$$

$$\begin{array}{r|l} 2 & 216 \\ \hline 2 & 108 \\ \hline 2 & 54 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline & 3 \end{array}$$

36. Number 243 is not a cube number.

$$243 = \underline{3 \times 3 \times 3} \times 3 \times 3$$

Here the factors of 243 are not in triplets.

37. $81 = \underline{3 \times 3 \times 3} \times 3$

The smallest number that should be multiplied to

81 to make it a perfect cube is $3 \times 3 = 9$

38. The volume of the cube = $a^3 = 6^3 = 216\text{cm}^3$

39. No. 392 is not a perfect cube.

$$392 = \underline{2 \times 2 \times 2} \times 7 \times 7$$

The smallest number that should be multiplied to 392

to make it a perfect cube is 7.

$$\begin{array}{r|l} 2 & 392 \\ \hline 2 & 196 \\ \hline 2 & 98 \\ \hline 7 & 49 \\ \hline & 7 \end{array}$$

40. Volume of cuboid = $l \times b \times h = 5 \times 2 \times 5 = 50\text{cm}^3$

$$\text{Volume of cube} = 5^2 \times 2 \times 2^2 \times 5 = 2^3 \times 5^3 = 1000\text{cm}^3$$

$$\text{The number of cuboids required is} = \frac{1000}{50} = 20 \text{ cuboids.}$$

41. $13824 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3}$

$$= (2 \times 2 \times 2 \times 3)^3$$

$$\sqrt[3]{13824} = 2 \times 2 \times 2 \times 3$$

$$\sqrt[3]{13824} = 24$$

$$\begin{array}{r|l} 2 & 13824 \\ \hline 2 & 6912 \\ \hline 2 & 3456 \\ \hline 2 & 1728 \\ \hline 2 & 864 \\ \hline 2 & 432 \\ \hline 2 & 216 \\ \hline 2 & 108 \\ \hline 2 & 54 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline & 3 \end{array}$$

IV. Three mark questions:

$$\begin{array}{ccccc} 42. 1^3 = 1 & 2^3 = 8 & 3^3 = 27 & 4^3 = 64 & 5^3 = 125 \\ 6^3 = 216 & 7^3 = 343 & 8^3 = 512 & 9^3 = 729 & 10^3 = 1000 \end{array}$$

43. Number 53240 is not a perfect cube.

$$53240 = \underline{2 \times 2 \times 2} \times 5 \times \underline{11 \times 11 \times 11}$$

The smallest natural number that should be divided from 53240 to make it a perfect cube is 5

$$\begin{array}{r|l} 2 & 53240 \\ 2 & 26620 \\ 2 & 13310 \\ 5 & 6655 \\ 11 & 1331 \\ 11 & 121 \\ & 11 \end{array}$$

44. No. 68600 is not a perfect cube.

$$68600 = \underline{2 \times 2 \times 2} \times 5 \times 5 \times \underline{7 \times 7 \times 7}$$

The smallest natural number that should be multiplied to 68600 to make it a perfect cube is 5

$$\begin{array}{r|l} 2 & 68600 \\ 2 & 34300 \\ 2 & 17150 \\ 5 & 8575 \\ 5 & 1715 \\ 7 & 343 \\ 7 & 49 \\ & 7 \end{array}$$

45. Volume of each cube = 8cm^3

$$\text{Volume of 64 such cubes is} = 64 \times 8 = 512\text{cm}^3$$

$$\therefore \text{Volume of larger cube} = a^3$$

$$512 = a^3$$

$$a = \sqrt[3]{512}$$

$$a = 8\text{cm}$$

$$\therefore \text{The length of the side of new cube is } 8\text{cm}.$$

V. Four mark questions:

46. (a) Volume of cube 1 = $9^3 = 729\text{cm}^3$

$$\text{Volume of cube 2} = 10^3 = 1000\text{cm}^3$$

(b) The total volume of metal melted = $729 + 1000 = 1729\text{cm}^3$

But, 1cm^3 of metal is wasted while recast.

$$\therefore \text{The total volume of the bigger cube is} = 1729 - 1 = 1728\text{cm}^3$$

$$\text{The side length of the bigger cube is} = \sqrt[3]{1728} = 12\text{cm}$$

7. COMPARING QUANTITIES

I. MCQ:

1. (D) $A = P\left(1 + \frac{R}{100}\right)^n$
2. (B) 6 : 5
3. (B) 1 : 4
4. (A) 1 : 2
5. (C) ₹200
6. (C) 125 : 1
7. (D) ₹75
8. (A) 24 : 5
9. (B) 40%
10. (A) 12
11. (C) 20%
12. (D) 4% decrease
13. (C) ₹ 36,800
14. (C) ₹1160
15. (A) ₹ 1,120

II. One Mark questions:

16. Discount is a reduction given on the marked price of the article.
17. G.S.T – **Goods and Services Tax.**
18. From July 1, 2017 Government of India introduced GST.
19. Value Added Tax
20. $A = P\left(1 + \frac{R}{100}\right)^n$
21. $CI = \text{Amount} - \text{Principal}$
22. $\frac{4}{5} \times 100 = 80\%$
23. $\frac{3}{4} \times 100 = 75\%$
24. $\text{Discount} = M.P - S.P = 80 - 72 = \text{₹}8$
25. 80 % of amount
$$= \frac{80}{100} \times 200 = \text{₹} 160$$
$$\text{Remaining amount} = 200 - 160$$
$$= \text{₹}40$$

26. Marked price = ₹40

Selling price = ₹32

Discount = ₹8

$$\text{Discount percentage} = \frac{8}{40} \times 100 = 20\%$$

III. Two Mark questions:

27. 20% of the students got tamarind saplings.

No of students got tamarind saplings = 24

$$\text{Total number of students} = \frac{24}{20} \times 100 = 120 \text{ students.}$$

28. Given VAT = 12%

If Marked price ₹100 then VAT = ₹12

Selling Price = ₹112

When Selling price is ₹112 then Marked price is ₹100

$$\text{Selling price is ₹14560 then Marked price is } = \frac{100}{112} \times 14560 = ₹13,000$$

$$29. A = P \left(1 + \frac{R}{100} \right)^n$$

$$A = 1,63,600 \left(1 + \frac{5}{100} \right)^2$$

$$A = 1,63,600 \times \frac{105}{100} \times \frac{105}{100}$$

$$A = ₹1,80,369$$

30. M.P = ₹1000

Discount = 10% of 1000

Discount = ₹100

S.P = ₹1000 - ₹100

S.P = ₹900

C.P = ₹800

Profit = ₹100

31. When MP is ₹100 then GST is = ₹28

$$\text{When MP is ₹40000 then GST} = \frac{28}{100} \times 40000 = ₹11200$$

32. Change in cost = 65 – 50 = ₹15

$$\text{Percentage of increase} = \frac{\text{Change in cost}}{\text{Original cost}} \times 100 = \frac{15}{50} \times 100 = 30\%$$

$$33. \text{Amount} = P \times \left(1 + \frac{R}{100} \right)^n = 1000 \times \left(1 + \frac{10}{100} \right)^1 = ₹1100$$

IV. Three Mark questions:

34. $A = P + CI$

$$A = 1500 + 315$$

$$A = ₹1,815$$

$$A = P\left(1 + \frac{R}{100}\right)^n$$

$$1815 = 1500 \left(1 + \frac{R}{100}\right)^2$$

$$\frac{1850}{1500} \times 100 \times 100 = (100 + R)^2$$

$$12100 = (100 + R)^2$$

$$110 = (100 + R)$$

$$110 - 100 = R$$

$$R = 10\%$$

35. C.P = ₹480

$$\text{Profit percentage} = 20\%$$

$$SP = CP + (20\% \text{ of } CP)$$

$$= ₹480 + 96$$

$$SP = ₹576$$

Since 25% discount was given, let us find the M.P

$$SP = MP - (25\% \text{ of } MP)$$

$$₹576 = MP - (0.25 \times MP)$$

$$576 = 0.75 \times MP$$

$$MP = \frac{576}{0.75}$$

$$MP = ₹768$$

36. $A = P\left(1 - \frac{R}{100}\right)^n$

$$= 32000\left(1 - \frac{10}{100}\right)^2$$

$$= 32000 \times \frac{90}{100} \times \frac{90}{100}$$

$$= 32000 \times \frac{81}{100}$$

$$A = ₹25,920$$

37. Given Selling price = ₹3,200 and Rate of discount = 20%

Let the marked price of watch be 'x'

Selling price = M.P – discount

$$3200 = x - 20 \% \text{ of } x$$

$$3200 = x - \frac{20}{100} x$$

On simplifying we get, $x = ₹4,000$

The Marked price of the watch is = **₹4,000**

$$38. \text{ Discount} = 15\% \text{ of } 6000 = \frac{15}{100} \times 6000 = ₹ 900$$

Selling price = M.P – Discount

$$= 6000 - 900$$

$$= ₹510$$

Sales tax = 10% of ₹5100

$$= \frac{10}{100} \times 5100 = ₹ 510$$

Total amount paid = S.P + sales tax

$$= 5100 + 510$$

$$= ₹5610$$

39. The situations where we use the formula to find the compound interest are

(a) Savings account and investment.

(b) The value of an item, if its price increase or decrease in the intermediate years.

(c) Increase (or decrease) in population.

(d) The growth of the bacteria if the rate of growth is known.

(Any suitable situations)

40. Marked price = $x + 25\% \text{ of } x$

$$= x + 0.25 x$$

$$= 1.25 x$$

Selling price at $12\frac{1}{2}\%$ profit = $x + 12\frac{1}{2}\% x$

$$= x + 0.125 x$$

$$= 1.125 x$$

Discount = marked price – selling price

$$= 1.25 x - 1.125 x$$

$$= 0.125 x$$

$$\text{Discount percentage} = \frac{0.125 x}{1.25 x} \times 100 = 10\%$$

V. Four mark questions:

41. $A = P\left(1 + \frac{R}{100}\right)^n$

$$16872.96 = P\left(1 + \frac{4}{100}\right)^3$$

$$16872.96 = P (1.04)^3$$

$$16872.96 = P (1.124864)$$

$$P = \frac{16872.96}{1.124864}$$

$$P = \text{₹}15,0000$$

42. Let Principal be $P = \text{₹}100$, $R = 5\%$ and $n = 3$ years.

$$\text{Simple interest, } I = \frac{P \times T \times R}{100} = \frac{100 \times 3 \times 5}{100} = \text{₹}15$$

$$\text{Amount in Compound interest, } A = P\left(1 + \frac{R}{100}\right)^n$$

$$A = 100\left(1 + \frac{5}{100}\right)^3$$

$$= 100(1.05)^3 = 100 \times 1.157625$$

$$A = \text{₹}115.76$$

$$\text{Compound interest} = \text{₹}115.76 - \text{₹}100 = \text{₹}15.76$$

$$\text{Compound interest} - \text{Simple interest} = \text{₹}15.76 - \text{₹}15 = \text{₹}0.76$$

If the difference between compound interest and simple interest is ₹0.76, then the principal is ₹100.

$$\text{If the difference is ₹228 then principal} = \frac{100}{0.76} \times 228 = \text{₹}30,000.$$

43. Original S.P = $x + 5\%$ of x (gain of 5%)

$$= x + 0.05 x$$

$$= 1.05 x$$

When the S.P is reduced by ₹50, it becomes a loss of 5%

$$\text{New S.P} = 1.05 x - 50$$

$$= x - 5\% \text{ of } x \text{ (loss of 5\%)}$$

$$= x - 0.05 x$$

$$= 0.95 x$$

Equating the two expressions for new S.P

$$1.05 x - 50 = 0.95 x$$

$$0.1 x = 50$$

$$x = 500$$

$$\text{original S.P} = 1.05 x$$

$$= 1.05 \times 500 = 525$$

$$\therefore \text{original S.P of the article} = \text{₹}525$$

44. Selling price of each article = ₹25,920

$$\text{C.P of article when sold at 8\% gain} = \frac{100}{108} \times 25,290 = ₹24,000.$$

$$\text{C.P of article when sold at 4\% loss} = \frac{100}{96} \times 25,920 = ₹27,000$$

$$\text{S.P of two articles} = 25920 \times 2 = ₹51,840.$$

$$\text{C.P of two articles} = 27,000 + 24,000 = ₹51,000$$

$$\text{Profit} = \text{S.P} - \text{C.P}$$

$$= 51,840 - 51,000$$

$$= ₹840.$$

$$\text{Profit percentage} = \frac{\text{profit}}{\text{C.P}} \times 100 = \frac{840}{51840} \times 100 = 1.6\%$$

The overall gain percentage in the whole transaction is 1.6%

VI. Five mark questions:

45. (a) Toothpaste price = ₹180

$$\text{Sales tax} = 8\% \text{ of } 180 = \frac{8}{100} \times 180 = 0.08 \times 180 = ₹14.40$$

$$\text{Purchase price} = 180 + 14.40 = ₹194.40$$

(b) price of three tennis balls = $3 \times ₹250 = ₹750$

$$\text{Sales tax} = 8\% \text{ of } 750 = \frac{8}{100} \times 750 = 0.08 \times 750 = ₹60$$

$$\text{Purchase price} = 750 + 60 = ₹810$$

(c) Price of two umbrellas = $2 \times 300 = ₹600$

$$\text{Sales tax} = 8\% \text{ of } 600 = \frac{8}{100} \times 600 = 0.08 \times 600 = ₹48$$

$$\text{Purchase price} = 600 + 48 = ₹648$$

46. (i) For the first year,

$$\text{Principal} = ₹15,000 \text{ and amount} = ₹16,350$$

$$I = A - P = 16,350 - 15,000$$

$$I = ₹1,350$$

$$\text{Rate of interest per annum} = \frac{I \times 100}{P \times T} = \frac{1350 \times 100}{15,000 \times 1} = 9\%$$

(ii) For the second year, principal $P = ₹16,350$, $R = 9\%$ and $T = 1$ year

$$I = \frac{P \times T \times R}{100} = \frac{16,350 \times 1 \times 9}{100} = ₹1471.5$$

$$\text{Amount} = P + I = 16,350 + 1471.5$$

$$A = ₹17821.5$$

(iii) For the third year,

Principal $P = ₹17821.5$, $R = 9\%$ and $T = 1\text{ year}$

$$I = \frac{P \times T \times R}{100} = \frac{17821.5 \times 1 \times 9}{100} = ₹1603.935$$

$$A = P + I = 17821.5 + 1603.935$$

$$A = ₹19,425.435$$

47. Selling price at 4% profit = $x + 4\%$ of x

$$= x + 0.04x$$

$$= 1.04x$$

Selling price at 5% profit = $x + 5\%$ of x

$$= x + 0.05x$$

$$= 1.05x$$

The difference between the two selling price is ₹6

$$1.05x - 1.04x = ₹6$$

$$0.01x = 6$$

$$x = 600$$

$$\begin{aligned} \text{a. Selling price at 4\% profit} &= 600 + \frac{4}{100} \times 600 \\ &= 600 + 24 \\ &= ₹624 \end{aligned}$$

$$\begin{aligned} \text{b. Selling price at 5\% profit} &= 600 + \frac{5}{100} \times 600 \\ &= 600 + 30 \\ &= ₹630 \end{aligned}$$

$\therefore$ cost price of the shirt is ₹600, and the two selling prices are ₹624 and ₹630

48. Let the cost price of one table be ₹ x

Cost price of other table = ₹ $(3120 - x)$

S.P of 1st table = $x - 15\%$ of x

$$= x - 0.15x$$

$$= 0.85x$$

S.P of 1st table = $(3120 - x) + 36\%$ of $(3120 - x)$

$$= (3120 - x) + 0.36(3120 - x)$$

$$= 1.36(3120 - x)$$

Since the selling prices are equal

$$0.85x = 1.36(3120 - x)$$

$$0.85x = 4243.2 - 1.36x$$

$$2.21 x = 4243.2$$

$$x = 1920$$

$$\begin{aligned}\text{Cost price of the other table} &= 3120 - x \\ &= 3120 - 1920 \\ &= 1200\end{aligned}$$

∴ The cost prices of the two tables are ₹1920 and ₹1200

$$49. \text{ Total cost price of 3 items} = ₹ 450 \times 3 = ₹ 1350$$

One item is sold at a loss of 10%

$$\text{Loss} = 10\% \text{ of } 450 = ₹45$$

$$\text{S.P} = ₹450 - ₹45 = ₹405$$

Total S.P required for 20% gain on whole transaction

$$\begin{aligned}\text{Total S.P} &= ₹1350 + 20\% \text{ of } ₹1350 \\ &= ₹1350 + ₹270 = ₹1620\end{aligned}$$

$$\begin{aligned}\text{S.P of the other two items} &= \text{total S.P} - \text{S.P of first item} \\ &= 1620 - 405 \\ &= ₹1215\end{aligned}$$

$$\text{C.P of the other two items} = ₹ 450 \times 2 = ₹ 900$$

$$\begin{aligned}\text{Gain on the other two items} &= 1215 - 900 \\ &= 315\end{aligned}$$

$$\text{Gain \% on the other two items} = \frac{315}{900} \times 100 = 35\%$$

8. ALGEBRAIC EXPRESSION

I. MCQ:

1. (D) Polynomial
2. (A) Like terms
3. (D) Look for like terms and add them
4. (C) Monomial
5. (B) Need not be the same
6. (B) Binomial
7. (C) $30a^3$
8. (C) ab^2, bc^2, ca^2
9. (B) $m^2 - n^2$
10. (D) k and $(k+1)$
11. (A) $(x + 1)^2(x - 1)$
12. (A) ₹ $(7x + 40)$

II. Two mark questions:

13. An algebraic expression that contains only one term is known as a monomial.
14. An algebraic expression that contains two terms is known as a binomial.
15. An algebraic expression that contains three terms is known as a trinomial.
16. An algebraic expression having one or more terms with non-zero coefficient is called as a polynomial.
17. Terms are $3xyz$ and $-8y$
Numerical coefficient = 3 and -8
18. 9 subtracted from twice a number x .
19. $140xyz$.
20. Solution : $(8 \times 6 \times 4) a^{1+2+3} \times b^{1+2+3}$
 $= 192a^6 b^6$
21. Area of rectangle = $l \times b$
 $= 2x^2y \times 3yz^2$
 $= 6x^2y^2z^2$
22. $(2a - 3b) \times 2a = 4a^2 - 6ab$
23. $(-6s^2t) \times 2st^2 = -12s^3t^3$
24. Let 'a' be a number. 'Twice a number is subtracted from 5'

$$\therefore 5 - 2a$$

$$25. \text{ The total cost of articles is } = ₹(a + b) \times c = ₹(ac + bc)$$

III. Two mark questions:

$$\begin{aligned} 26. (a + b + c)(a - b - c) &= a(a - b - c) + b(a - b - c) + c(a - b - c) \\ &= a^2 - ab - ac + ab - b^2 - bc + ac - bc - c^2 \\ &= a^2 - b^2 - c^2 - ab + ab - ac + ac - bc - bc \\ &= a^2 - b^2 - c^2 - 2bc \end{aligned}$$

$$27. (q + 4)(q - 4) + 16 = q^2 - 16 + 16 = q^2$$

$$\begin{aligned} 28. &= x(x^2 - y) - y^2(x^2 - y) \\ &= x^3 - xy - x^2y^2 + y^3 \end{aligned}$$

$$\begin{aligned} 29. (8x^3 + 0x^2 - 2x + 8) + (9x^2 + 5x - 10) \\ &= 8x^3 + 9x^2 + 3x - 2 \end{aligned}$$

$$\begin{aligned} 30. (8ab + 3bc - 7ca) + (6bc + 3ca + 8b) + (-ac + 10c - 3ab) \\ &= (5ab + 9bc - 5ca + 8b + 10c) \end{aligned}$$

$$\begin{aligned} 31. \text{ Volume of cuboid } &= l \times b \times h \\ &= 3ab \times 6bc \times 4ca \\ &= (3 \times 6 \times 4)(a \times a \times b \times b \times c \times c) \\ &= 72 a^2 b^2 c^2 \end{aligned}$$

$$\begin{aligned} 32. 6x(5x^2 + 2x^3 - 8) &= 6x \times 5x^2 + 6x \times 2x^3 - 6x \times 8 \\ &= 30x^3 + 12x^4 - 48x \\ &= 12x^4 + 30x^3 - 48x \end{aligned}$$

$$\begin{aligned} 33. 12a - 9ab + 5b - 3 - (4a - 7ab + 3b + 12) \\ &= 8a - 2ab + 2b - 15 \end{aligned}$$

$$\begin{aligned} 34. -8p \times (-6p + 4q + r) &= (-8p)(-6p) + (-8p)(4q) + (-8p)(r) \\ &= 48p^2 - 32pq - 8pr \end{aligned}$$

$$\begin{aligned} 35. (x - y)(3x + 5y - 2z) - (4x + 3y)z \\ &= x(3x + 5y - 2z) - y(3x + 5y - 2z) - 4zx - 3yz \\ &= 3x^2 + 5xy - 2xz - 3xy - 5y^2 + 2zy - 4zx - 3yz \\ &= 3x^2 - 5y^2 + 2xy - yz - 6xz \end{aligned}$$

$$\begin{aligned} 36. \text{ The volume of a cuboid } &= l \times b \times h \\ &= u^2 \times u \times (2u + 1) = (2u^4 + u^3) \text{ cubic units} \end{aligned}$$

37. Volume of cuboid = length $\times$ breadth $\times$ height

$$= 15a \times 2b \times 12c$$

$$= 360abc \text{ cubic units.}$$

38. The area of the rectangular black board = length $\times$ breadth

$$= (2x + 3)(x - 1)$$

$$= (2x^2 + x - 3) \text{ square units.}$$

39. Distance travelled = speed $\times$ time

$$\text{Distance travelled by the object} = (v + 5)(t - 2)$$

$$= (vt - 2v + 5t - 10) \text{ m}$$

40. Area of the garden = length²

$$= (3p - 2)^2 = (3p)^2 - 2(3p)(2) + 2^2$$

$$\text{Area of the garden} = (9p^2 - 12p + 4) \text{ square units}$$

IV. Three mark questions:

41. Any suitable two examples for each.

42. (1) $6ab$ (2) $28y^3$ (3) $15ab^2c$

43. Initial Price = x rupees / kg

$$\text{Initial quantity} = y \text{ kg}$$

$$\text{Initial amount} = x y \text{ rupees}$$

$$\text{New price} = (x - 4) \text{ rupees / kg}$$

$$\text{New quantity} = (y - 7) \text{ kg}$$

$$\text{New amount} = ₹ (x - 4)(y - 7)$$

$$\text{Amount to be paid} = ₹ (xy - 7x - 4y + 28)$$

44. $7x(3x - 2) + 3x(x + 2) - 80$ for $x = 2$

$$= 21x^2 - 14x + 3x^2 + 6x - 80$$

$$= 24x^2 - 8x - 80$$

$$= 24(2)^2 - 8(2) - 80$$

$$= 96 - 16 - 80$$

$$= 96 - 96$$

$$= 0$$

45. Sol. $= \frac{1}{6} x^3(3x^4 - \frac{1}{12} y^3) + 4y^2(3x^4 - \frac{1}{12} y^3)$

$$= \frac{1}{2} x^7 - \frac{1}{72} x^3 y^3 + 12 x^4 y^2 - \frac{1}{3} y^5$$

V. Four mark questions:

46. (1) Volume of rectangular box , $V = l \times b \times h$

$$= 5a \times 3b \times 2c = 30abc$$

(2) Volume of rectangular box , $V = l \times b \times h$

$$= 2q \times 4q^2 \times 8q^3 = 64q^6$$

(3) Volume of rectangular box , $V = l \times b \times h$

$$= (x y) \times (3yz) \times (4z x)$$

$$= 12 x^2 y^2 z^2$$

(4) Volume of rectangular box , $V = l \times b \times h$

$$= (-2m) \times (4nm) \times (-8n^2m)$$

$$= 64m^3n^3$$

47. $9x^2(2x - 4) + 6 = 18x^3 - 36x^2 + 6$

i. If $x = 4$, $18x^3 - 36x^2 + 6 = 18(4)^3 - 36(4)^2 + 6 = 1152 - 576 + 6 = \mathbf{582}$

ii. If $x = 6$, $18x^3 - 36x^2 + 6 = 18(6)^3 - 36(6)^2 + 6 = 3888 - 1296 + 6 = \mathbf{2598}$

VI. Five mark questions:

48.

	First expression	Second expression	Product
(i)	a	$b + c + d$	$ab + ac + ad$
(ii)	$x + y - 5$	$5xy$	$5x^2y + 5xy^2 - 25xy$
(iii)	p	$6p^2 - 7p + 5$	$6p^3 - 7p^2 + 5p$
(iv)	$4p^2q^2$	$p^2 - q^2$	$4p^4q^2 - 4p^2q^4$
(v)	$a + b + c$	abc	$a^2bc + ab^2c + abc^2$

9. MENSURATION

I. Multiple choice questions:

1) C) $A = \frac{1}{2} \times b \times h$

2) A) $A = \frac{1}{2}(a + b)h$

3) B) 8cm

4) B) $A = \frac{1}{2}(d_1 \times d_2)$

5) A) $2\pi rh$

6) B) $2\pi r(r + h)$

7) C) $\pi r(2h + r)$

8) B) $2h(l + b)$

9) A) πr^2

10) C) πd

11) B) 2cm

12) B) $500 \pi r^2$

13) A) 4

14) B) $16a^2$

II. One mark questions:

15) Amount of space occupied by a three dimensional object is called its volume.

16) $A = l \times b$

17) $A = a^2$

18) $A = 6 a^2$

19) $A = 4 a^2$

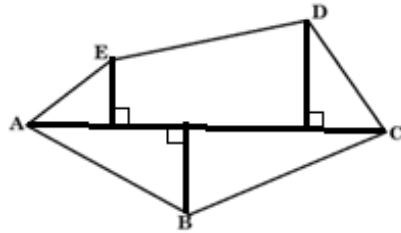
20) $A = 2(lb + lh + bh)$

21) $V = l \times b \times h$

22) Cuboid

III. Two mark questions:

23)



$$24) A = \frac{1}{2}(d_1 \times d_2)$$

$$A = \frac{1}{2}(8 \times 5)$$

$$A = 20 \text{ cm}^2$$

$$25) \text{Area of } \triangle ADC = \frac{1}{2} \times 25 \times 12$$

$$= 150 \text{ m}^2$$

$$\text{Area of } \triangle ABC = \frac{1}{2} \times 25 \times 8$$

$$= 100 \text{ m}^2$$

Area of play ground is 250 m^2

26) The surface area of solid formed is

$$= 5a^2 + 5a^2$$

$$= 10 a^2$$

$$= 10 \times 6^2$$

$$= 10 \times 36 = 360 \text{ cm}^2$$

27) $l = 12$, $b = 10$ and $h = 3$

Surface area of soap box is $A = 2(lb + lh + bh)$

$$A = 2(12 \times 10 + 12 \times 3 + 10 \times 3)$$

$$A = 2(120 + 36 + 30)$$

$$A = 2(186) = 372 \text{ cm}^2$$

28) $l = 16$, $b = 4$ and $h = 4$

Card board required to make tooth paste box $A = 2(lb + lh + bh)$

$$A = 2(16 \times 4 + 16 \times 4 + 4 \times 4)$$

$$A = 2(64 + 64 + 16)$$

$$A = 2(144) = 288 \text{ cm}^2$$

29) Volume refers to the amount of space occupied by an object.

Capacity refers to the quantity that a container holds.

IV. Three mark questions:

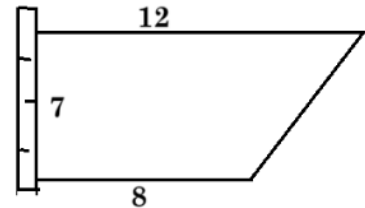
30) The lines and the wall looks like trapezium

$$A = \frac{1}{2}(a + b)h$$

$$A = \frac{1}{2}(12 + 8)7$$

$$A = \frac{1}{2}(20)7$$

$$A = 70 \text{ m}^2$$



31) The surface area of the table looks like combination of two equal trapeziums

$a = 100\text{cm}$, $b = 50\text{cm}$ and $h = 40\text{cm}$

$$\text{Area surface of Table } A = 2 \times \frac{1}{2}(a + b)h$$

$$A = (a + b)h$$

$$A = (100 + 50)40$$

$$A = 150 \times 40$$

$$A = 6000 \text{ cm}^2$$

32) $a = 20\text{cm}$, $b = 18\text{cm}$ and $h = 10\text{cm}$

$$\text{Area of the paper is } A = \frac{1}{2}(20 + 18)10$$

$$A = \frac{1}{2}(38)10$$

$$A = 190 \text{ cm}^2$$

Area of triangle piece is $A = \frac{1}{2} \times b \times h$ (here $b = 2\text{cm}$ and $h = 10\text{cm}$)

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

$$A = 10\text{cm}^2$$

33) $l = 9\text{inch}$, $b = 4\text{inch}$ and $h = 3\text{inch}$

Volume of the brick $V = lbh$

$$V = 9 \times 4 \times 3$$

$$V = 108 \text{ cubic inch}$$

The volume of wall that can be built by 80 bricks is $= 108 \times 80$

$$= 8640 \text{ cubic inch}$$

34) $V = 9000 \text{ cubic feet}$

$l = 5\text{feet}$, $b = 4\text{feet}$ and $h = 3\text{feet}$

The volume of steel box placed in the container $= l b h$

$$= 5 \times 4 \times 3$$

$$= 60 \text{ cubic feet}$$

The number of such boxes placed in the container $= \frac{\text{Volume of the Container}}{\text{Volume of each steel box}}$

$$= \frac{9000}{60}$$

$$= 150$$

35) $d = 14\text{m}$

$r = 7\text{m}$, (depth) ($h = 20\text{m}$) Since the water is filled half $h = 10\text{m}$

Volume of the water in the well is $= \pi r^2 h$

$$= \frac{22}{7} \times 7^2 \times 10$$

$$= 22 \times 7 \times 10$$

$$= 1540 \text{ m}^2$$

36) $d = 28\text{m}$

$r = 14\text{m}$, $h = 50$

Volume of the vessel is $V = \pi r^2 h$

$$= \frac{22}{7} \times 14^2 \times 50$$

$$= \frac{22}{7} \times 14 \times 14 \times 50$$

$$= 30,800\text{cm}^2$$

$$37) r = 1\text{m}, h = 3.5\text{m}$$

$$\text{Surface area of Pillar is} = 2 \pi r h$$

$$= 2 \times \frac{22}{7} \times 1 \times 3.5$$

$$= 22 \text{ m}^2$$

$$\text{Surface area of four such Pillars is } 4 \times 22 = 88\text{m}^2$$

$$\text{The cost of painting the pillars at the rate ₹200} = 88 \times 200$$

$$= ₹17,600$$

V. Four marks questions:

$$38) l = 12\text{feet}, b = 9\text{feet and } h = 8\text{feet}$$

$$\text{Lateral surface of the room to be painted} = 2h(l + b)$$

$$= 2 \times 8(12 + 9)$$

$$= 16(21)$$

$$= 336 \text{ sq. feet}$$

$$\text{The cost of painting the walls of the room at ₹50 per sq. feet} = 336 \times 50$$

$$= ₹16,800$$

$$39) l = 50\text{cm}, b = 25\text{cm and } h = 30\text{cm}$$

$$\text{The area of glass required to make Aquarium without top covered} = 2h(l + b) + lb$$

$$= 2 \times 30(50 + 25) + 50 \times 25$$

$$= 60(75) + 1250$$

$$= 4500 + 1250$$

$$= 5750 \text{ cm}^2$$

$$40) l = 100\text{cm}, b = 60\text{cm and } h = 50\text{cm}$$

$$\text{The card board required to make partition along the length} = lh$$

$$= 100 \times 50$$

$$= 5000 \text{ cm}^2$$

$$\text{The card board required to make partition along the length} = bh$$

$$= 60 \times 50$$

$$= 300 \text{ cm}^2$$

$$\text{Total area of cardboard required} = 5000 + 300$$

$$= 5300 \text{ cm}^2$$

$$41) r = 7\text{cm}, h = 16\text{cm}$$

$$\text{The area of label is curved surface area of cylinder} = 2 \pi r h$$

$$= 2 \times \frac{22}{7} \times 7 \times 16$$

$$= 44 \times 16$$

$$= 704 \text{ cm}^2$$

$$42) \text{ breadth of metal sheet} = \text{height of the cylinder} = 20\text{cm}$$

$$\text{Length of the sheet} = \text{perimeter of the circular base} = 44\text{cm}$$

$$2 \pi r = 44$$

$$2 \times \frac{22}{7} \times r = 44$$

$$r = \frac{44 \times 7}{2 \times 22} = 7\text{cm}$$

$$\text{Volume of the cylinder} = \pi r^2 h$$

$$= \frac{22}{7} \times 7^2 \times 20$$

$$= 3080\text{cm}^3$$

VI. Five mark questions:

$$43) r = 1\text{m}, h = 3.5\text{m}$$

$$\text{The area covered by a roller when one rotation is completed}$$

$$= \text{Curved surface area of cylinder}$$

$$= 2 \pi r h$$

$$= 2 \times \frac{22}{7} \times 1 \times 3.5$$

$$= 22 \text{ m}^2$$

$$\text{The number of rotations made by roller to cover } 2640 \text{ sq. m} = \frac{\text{Area covered by roller}}{\text{Area covered in one rotation}}$$

$$= \frac{2640}{22}$$

$$= \mathbf{120 \text{ rotations}}$$

10. EXPONENTS AND POWERS

I. MCQ:

1. (B) a^{m+n}
2. (B) 8
3. (C) -1
4. (B) 1
5. (B) 3
6. (D) 10^{-6}
7. (A) 1
8. (C) 2
9. (A) $\frac{1}{7}$
10. (A) 2^6
11. (B) $\frac{1}{16}$
12. (B) y^8
13. (B) $27x^{10}$
14. (C) $m^{\frac{1}{2}}$
15. (B) 4
16. (A) - 4
17. (D) 1.6×10^{-5}
18. (D) 3×10^8
19. (A) -3^2
20. (A) 2^{12}
21. (C) 1
22. (B) 1
23. (C) 5^6
24. (D) 4
25. (B) 4^2
26. (C) 2^9
27. (A) 3.84467×10^8
28. (A) 0.00006m

II. One mark questions:

29. 2^7
30. Base = 5
31. $3^4 = 3 \times 3 \times 3 \times 3 = 81$
32. $3^{-2} = \frac{1}{3^2} = \frac{1}{9}$
33. $a^4b^3c^2$
34. $a^5 \times a^3 = a^{5+3} = a^8$
35. $125 = 5 \times 5 \times 5 = 5^3$
36. $3^{-4} = \frac{1}{3^4}$
37. $(3x)^2 = 3^2 \times x^2 = 9x^2$
38. $0.000001 = 1 \times 10^{-6}$
39. $9^0 = 1$
40. $5^0 + 6^1 = 1 + 6 = 7$
41. $2^3 \times 3^2 = 8 \times 9 = 72$

III. Two mark questions:

42. $(3^2 - 2^3) \times (4^0 + 1^4) = (9 - 8) \times (1 + 1) = 1(2) = 2$
43. i) 3.5×10^{-5}
ii) 4.05×10^6
44. $(-2a^2b^3)^2 = (-2)^2 \times (a^2)^2 \times (b^3)^2 = 4a^4b^6$
45. i) $3.52 \times 10^5 = 352000$
ii) $3 \times 10^5 = 300000$
46. $a^b + b^a = (2)^{-1} + (-1)^2$
$$= \frac{1}{2} + 1 = \frac{1+2}{2} = \frac{3}{2}$$

47. $\left(\frac{2}{3}\right)^{-2} = \frac{(2)^{-2}}{(3)^{-2}} = \frac{3^2}{2^2} = \frac{9}{4}$

IV. Three mark questions:

48.
i) $3.02 \times 10^{-6} = 0.00000302$
ii) $5123 \times 10^{-8} = 0.00005123$

$$\text{iii)} \quad 4.35 \times 10^9 = 4350000000$$

$$49. \quad 5^{2x+1} = 625$$

$$5^{2x+1} = 5^4$$

$$\therefore 2x + 1 = 4$$

$$2x = 4 - 1 = 3$$

$$x = \frac{3}{2}$$

$$\begin{aligned} 50. \quad \left(\frac{2}{3}\right)^{-2} \times \left(\frac{9}{4}\right)^2 &= \frac{2^{-2}}{3^{-2}} \times \frac{(3^2)^2}{(2^2)^2} \\ &= \frac{3^2}{2^2} \times \frac{3^4}{2^4} \\ &= \frac{3^{2+4}}{2^{2+4}} \\ &= \frac{3^6}{2^6} = \frac{729}{64} \end{aligned}$$

$$\begin{aligned} 51. \quad \left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-2} \\ &= 2^2 + 3^2 + 4^2 \\ &= 4 + 9 + 16 \\ &= 29 \end{aligned}$$

$$\begin{aligned} 52. \quad \frac{12^4 \times 9^3 \times 4}{6^3 \times 8^2 \times 27} &= \frac{(3 \times 4)^4 \times (3^2)^3 \times 2^2}{(2 \times 3)^3 \times (2^3)^2 \times 3^3} \\ &= \frac{3^4 \times 2^8 \times 3^6 \times 2^2}{2^3 \times 3^3 \times 2^6 \times 3^3} \\ &= 3^4 \times 2 \\ &= 162 \end{aligned}$$

$$(a^m)^n = a^{m \times n}$$

V. Four mark questions:

$$53. \quad \text{(i)} \quad a^m \times a^n = a^{m+n}$$

$$\text{(ii)} \quad \frac{a^m}{a^n} = a^{m-n}$$

$$\text{(iii)} \quad (a^m)^n = a^{m \times n}$$

$$\text{(iv)} \quad (a \times b)^m = a^m \times b^m$$

$$\text{(v)} \quad \left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

$$\text{(vi)} \quad a^0 = 1$$

$$(vii) a^{-m} = \frac{1}{a^m}$$

$$54. (i) \frac{25 \times t^{-4}}{5^{-3} \times 10 \times t^{-8}}$$

$$= \frac{5^2 \times t^{-4}}{5^{-3} \times 5 \times 2 \times t^{-8}}$$

$$= \frac{5^2 \times t^8 \times 5^3}{5 \times 2 \times t^4}$$

$$= \frac{5^4 \times t^4}{2} = \frac{625 t^4}{2}$$

$$(ii) \frac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}}$$

$$= \frac{3^{-5} \times (2 \times 5)^{-5} \times 5^3}{5^{-7} \times (2 \times 3)^{-5}}$$

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

$$= \frac{5^7 \times 2^5 \times 3^5 \times 5^3}{3^5 \times 2^5 \times 5^5}$$

$$= 5^5$$

55. (a) Area of the plot $A_1 = a^2$ sq. units

(b) If the side is tripled, then the area is $A_2 = (3a)^2 = 9a^2$ sq. units

(c) Ratio of increased area:

The increase in area is the difference between the new area and the original area:

$$9a^2 - a^2 = 8a^2.$$

The ratio of the increased area to the original area is $8a^2 : a^2$, which simplifies to 8:1.

11. Direct and Inverse proportion

I. MCQ:

1. C) $xy = k$
2. D) their product is a constant
3. A) a constant
4. D) halves
5. B) 15
6. C) 3
7. A) 120km
8. D) 40 days
9. D) $x \times y$ remains constant
10. A) 8 days
11. B) ₹108
12. C) 225km
13. D) 120
14. B) 2500 gm

II. One mark questions:

15. Two quantities x and y are set to be in direct proportion if they increase (decrease) together in such a manner that the ratio of their corresponding values remains constant.
16. Two quantities x and y are said to be in inverse proportion if an increase in x causes a proportional decrease in y (and vice versa) in such a manner that the product of their corresponding values remains constant.
17. ₹45
18. ₹84
19. ' x ' and ' y ' are directly proportional.
20. $a = 9$
21. $x \propto y$

III. Two mark questions:

22.

Height (m)	14	x
Shadow length (m)	10	20

$$\frac{x}{20} = \frac{14}{10}$$

$$x = 28m$$

23.

Number of sheets	12	x
Weight	40 gm	2500 gm

$$\frac{x}{2500} = \frac{12}{40}$$

$$x = 750 \text{ sheets}$$

24.

Number of pipes	6	5
Duration	80 min	x

$$x \times 5 = 6 \times 80$$

$$x = 96 \text{ min}$$

25.

Model	9 cm	x
Actual	12 m	28

$$\frac{x}{28} = \frac{9}{12}$$

$$x = 21 \text{ cm}$$

26.

Number of students	100	125
Duration	20 days	x

$$x \times 125 = 20 \times 100$$

$$x = 16 \text{ days}$$

27.

Number of Machines	42	x
Duration	63 days	54 days

$$x \times 54 = 42 \times 63$$

$$x = 49 \text{ Machines}$$

28. Given: $t_1 = 3hr, d_1 = 120km, t_2 = ?, d_2 = 160km$

$$\frac{t_2}{d_2} = \frac{t_1}{d_1} (\because \text{Directly proportional})$$

$$\frac{t_2}{160} = \frac{3}{120}$$

$$t_2 = 4hr.$$

29. Given: $V \propto \frac{1}{P} \Rightarrow PV = \text{constant}, P_1 = 100pa, V_1 = 8l, V_2 = ?, P_2 = 200pa,$

$$P_1 V_1 = P_2 V_2 (\because \text{Inversely proportional})$$

$$100 \times 8 = 200 \times V_2$$

$$4l = V_2$$

30. Given: $n_1 = 120, t_1 = 8h, n_2 = ?, t_2 = 12h.$

$$\frac{n_2}{t_2} = \frac{n_1}{t_1} (\because \text{Directly proportional})$$

$$\frac{n_2}{12} = \frac{120}{8}$$

$$n_2 = 180$$

31. Given: $t_1 = 20, s_1 = 600, t_2 = 30, s_2 = ?$

$$\frac{s_2}{t_2} = \frac{s_1}{t_1} (\because \text{Directly proportional})$$

$$\frac{s_2}{30} = \frac{600}{20}$$

$$s_2 = 900$$

32.

Number of periods	8	9
Duration	45 min	x

$$9 \times x = 8 \times 45 \quad (\because \text{Inversely proportional})$$

$$x = 40 \text{ min/period}$$

33.

Speed (km/h)	60	80
Duration (h)	2	x

$$80 \times x = 2 \times 60 \quad (\because \text{Inversely proportional})$$

$$x = 1.5 \text{ hours}$$

34.

Enlarged length	3 cm	x
Magnification	60000	1

$$\frac{x}{1} = \frac{3}{60000}$$

$$x = \frac{1}{2 \times 10^4}$$

$$x = 0.5 \times 10^{-4} m \text{ (OR) } x = 0.00005 m$$

35.

Number of Laddus each gets	4	x
Number of Children	30	24

$$x \times 24 = 4 \times 30$$

$$x = 5 \text{ laddus/child}$$

IV. Three mark questions:

36.

Number of winners	1	2	4	5	8	10	20
Prize (₹)	100000	50000	25000	20000	12500	10000	5000

$$1 \times 100000 = 2 \times 50000 = 4 \times 25000 = 5 \times 20000 = 8 \times 12500 = 10 \times 10000 = 20 \times 5000$$

Prize money given to an individual winner is inversely proportional.

37. Number of Students (n_1) = 50,

Food available for(t_1) 20 - 5 = 15 days,

Number of students (n_2) = 60,

Number of days remain(t_2) = ?

$$n_2 \times t_2 = n_1 \times t_1$$

$$60 \times t_2 = 50 \times 15$$

$$t_2 = 12.5 \text{ more days}$$

38.

Number of persons	2	1	y
Duration	3	x	1

i) $1 \times x = 2 \times 3 = 6 \text{ days.}$

ii) $y \times 1 = 2 \times 3 = 6 \text{ persons.}$

39. Number of soldiers (x_1) = 900, Food available for (t_1) = 20 - 4 = 16 days

Let, (x_2) = x , (t_2) = 24days

$$x_1 \times t_1 = x_2 \times t_2$$

$$900 \times 16 = x_2 \times 24$$

$$600 = x_2$$

Number Soldiers remain in the barrack is 600.

Number of soldiers left the barrack = 900 - 600 = 300.

40. Time taken by 4 goats = time taken by 6 sheep = 40 days

Time taken 4 goats + 14 sheep = time taken by 6 sheep + time taken by 14 sheep
 = time taken 20 sheep.

Number of days	40	T
Number of sheep	6	20

$$t \times 20 = 40 \times 6$$

$$t = 12$$

V. Four mark questions:

41.

Sugar weight (kg)	2	$5\frac{1}{2}$	1.2
Number of crystals	9×10^6	x	y

$$\text{i) } \frac{2}{9 \times 10^6} = \frac{5.5}{x}$$

$$x = 2.25 \times 10^7 \text{ crystals}$$

$$\text{ii) } \frac{2}{9 \times 10^6} = \frac{1.2}{x} \Rightarrow x = 5.4 \times 10^6 \text{ crystals}$$

42.

Height (m)	5.6	10.5	h
Shadow length (m)	3.2	x	5

$$\text{i) } \frac{5.6}{3.2} = \frac{10.5}{x} \quad (\because \text{Directly proportional})$$

$$x = 6 \text{ m}$$

$$\text{ii) } \frac{5.6}{3.2} = \frac{h}{5} \quad (\because \text{Directly proportional})$$

$$h = 8\text{m } 75 \text{ cm}$$

43.

x	x_1	5	7	x_2	11
y	12	20	y_1	48	y_2

$$x \propto y$$

$$\frac{x}{y} = \frac{5}{20} = \frac{1}{4} \quad (\text{constant})$$

$\frac{x_1}{12} = \frac{1}{4}$ $x_1 = 3$	$\frac{x_2}{48} = \frac{1}{4}$ $x_1 = 12$	$\frac{7}{y_1} = \frac{1}{4}$ $y_1 = 28$	$\frac{11}{y_2} = \frac{1}{4}$ $y_2 = 44$
---	--	---	--

44. Given: $a_1=?$, $t_1=10$, $a_2=?$, $t_2=25$, $a_3=90^\circ$, $t_2=?$, $a_4=150^\circ$, $t_4=?$,

$$\frac{t_1}{a_1} = \frac{t_2}{a_2} = \frac{t_3}{a_3} = \frac{t_4}{a_4} = \frac{5}{30} = \frac{1}{6} \quad (\because \text{Directly proportional})$$

Using this ratio, we can fill the blanks.

Angle	60°	150°	90°	270°
Time(min)	10	25	15	45

45. Given: $n_1=4$, $t_1=12\text{min}$,

i) $n_2=?$, $t_2=6\text{min}$.

$$n_1 \times t_1 = n_2 \times t_2$$

$$4 \times 12 = n_2 \times 6$$

$$8 \text{ taps} = n_2$$

ii) $n_3=2$, $t_3=?$

$$n_1 \times t_1 = n_3 \times t_3$$

$$4 \times 12 = 2 \times t_3$$

$$24\text{min} = t_3$$

46.

Number of spokes	4	6	8	10	12
Angle	90°	60°	45°	36°	30°

i) Yes.

ii) $15 \times a = 4 \times 90^\circ$

$$a = 24^\circ$$

iii) $n \times 40^\circ = 4 \times 90^\circ$

$$n = 9 \text{ spokes}$$

12. FACTORISATION

I. MCQ:

1. (D) x
2. (A) 12
3. (C) 1
4. (B) $x^2 - y^2$
5. (D) $(m - 3)(m + 3)$
6. (B) $(m - 5)^2$
7. (D) $2xy$
8. C) $(x - a)(x - b)$
9. (D) $3ab(2a - 3b^2)$
10. (B) $3, 5, x, x + 2$
11. (C) $(a + 1)(x - 1)$
12. (B) $m^2 - 2mn + n^2$
13. (A) 3
14. (B) $3x$
15. (C) $-3x^2$
16. (C) $2y$

II. One mark questions:

17. Expressing given algebraic expression as a product of its factors is called as its factorization.
18. $2y$
19. b
20. 2
21. 1
22. $3(t - 2)$
23. $x^2 - 4 = x^2 - 2^2 = (x + 2)(x - 2)$
24. $25 - k^2 = 5^2 - k^2 = (5 + k)(5 - k)$
25. 1, x and $(9x + 1)$
26. $3(pq - 3)$
27. $x^2 + 2x + 4$ and 1
28. $x(1 - y)$
29. $2pq^2$

$$30. 2(2 + h + 3z)$$

$$31. 7t(2 - t)$$

$$32. m(5 - 6n)$$

$$\begin{aligned} 33. 2x^3 + 6x^2 - 4x - 12 \\ &= 2x^2(x + 3) - 4(x + 3) \\ &= (x + 3)(2x^2 - 4) \\ &= (x + 3) \cdot 2(x^2 - 2) \end{aligned}$$

$$\begin{aligned} 34. 2ax^2 + 3axy - 2nxy - 3ny^2 \\ &= ax(2x + 3y) - ny(2x + 3y) \\ &= (2x + 3y)(ax - ny) \end{aligned}$$

$$35. 4m$$

$$36. 3p^3q^2$$

$$\begin{aligned} 37. (36y^2 - 27y) \div 9y \\ &= 9y(4y - 3) \div 9y \\ &= (4y - 3) \end{aligned}$$

$$38. 5b(2a + b)$$

III. Two mark questions:

$$\begin{aligned} 39. 6x^2y, \\ 4x^3y^2 + 2xy^2 = 2xy^2(2x^2 + 1) \\ \text{Common factors are } x^2y \text{ and } 2xy. \end{aligned}$$

$$\begin{aligned} 40. 3n^3 + 2n^2 - 3n - 2 \\ &= n^2(3n + 2) - 1(3n + 2) \\ &= (3n + 2)(n^2 - 1) \\ &= (3n + 2)(n + 1)(n - 1) \end{aligned}$$

$$\begin{aligned} 41. y^2 + 5y + 6 \\ &= y^2 + 2y + 3y + 6 \\ &= y(y + 2) + 3(y + 2) \\ &= (y + 2)(y + 3) \end{aligned}$$

$$42. t^2 - 7t + 12$$

$$= t^2 - 3t - 4t + 12$$

$$= t(t - 3) - 4(t - 3)$$

$$= (t - 3)(t - 4)$$

$$43. a^2 + a - 20$$

$$= a^2 + 5a - 4a - 20$$

$$= a(a + 5) - 4(a + 5)$$

$$= (a + 5)(a - 4)$$

$$44. n^2 - 3n - 18$$

$$= n^2 - 6n + 3n - 18$$

$$= n(n - 6) + 3(n - 6)$$

$$= (n + 3)(n - 6)$$

$$45. p^2 - 18p + 81$$

$$= p^2 - 2(p)(9) + 9^2$$

$$= (p - 9)^2$$

$$46. 4x^2 + 12x + 9$$

$$= (2x)^2 + 2(2x)(3) + 3^2$$

$$= (2x + 3)^2$$

$$47. 6m^2 + 9m - 2m - 3$$

$$= 3m(2m + 3) - 1(2m + 3)$$

$$= (2m + 3)(3m - 1)$$

$$48. 4x^2 - x - 3$$

$$= 4x^2 - 4x + 3x - 3$$

$$= 4x(x - 1) + 3(x - 1)$$

$$= (x - 1)(4x + 3)$$

$$49. 8x + 3x^2 + 4$$

$$= 3x^2 + 8x + 4$$

$$= 3x^2 + 6x + 2x + 4$$

$$= 3x(x + 2) + 2(x + 2)$$

$$= (x + 2)(3x + 2)$$

$$50. (p^2 - 6p - 2p + 12) \div (p - 6)$$

$$= (p - 6)(p - 2) \div (p - 6)$$

$$= (p - 2)$$

$$51. 9x^3 - 4x$$

$$= x(9x^2 - 4)$$

$$= x[(3x)^2 - 2^2]$$

$$= x[(3x + 2)(3x - 2)]$$

$$52. 8x - 4y - 2x^3 + x^2y$$

$$= 4(2x - y) - x^2(2x - y)$$

$$= (4 - x^2)(2x - y)$$

$$= (2 + x)(2 - x)(2x - y)$$

$$53. (6x^2 + x - 15) \div (3x + 5)$$

$$= (6x^2 + 10x - 9x - 15) \div (3x + 5)$$

$$= [2x(3x + 5) - 3(3x + 5)] \div (3x + 5)$$

$$= (3x + 5)(2x - 3) \div (3x + 5)$$

$$= (2x - 3)$$

$$54. (x + 6)(x + 5)$$

$$= x^2 + 5x + 6x + 30$$

$$= x^2 + 11x + 30$$

IV. Three mark questions:

$$\begin{aligned} 55. & m^3 - m^2 - m + 1 \\ &= m^2(m - 1) - 1(m - 1) \\ &= (m - 1)(m^2 - 1) \\ &= (m - 1)(m + 1)(m - 1) \\ &= (m - 1)^2(m + 1) \end{aligned}$$

$$\begin{aligned} 56. & x^2 - 6x + 9 - 4y^2 \\ &= x^2 - 2(x)(3) + 3^2 - (2y)^2 \\ &= (x - 3)^2 - (2y)^2 \\ &= (x - 3 + 2y)(x - 3 - 2y) \end{aligned}$$

$$\begin{aligned} 57. & y^2 - (x^2 - 2xz + z^2) \\ &= y^2 - (x - z)^2 \\ &= [(y) + (x - z)][(y) - (x - z)] \\ &= (x + y - z)(y - x + z) \end{aligned}$$

$$\begin{aligned} 58. & x^2 + 8y + 4xy + 4y^2 + 4x \\ &= x^2 + 4xy + 4y^2 + 4x + 8y \\ &= x^2 + 2(x)(2y) + (2y)^2 + 4(x + 2y) \\ &= (x + 2y)^2 + 4(x + 2y) \\ &= (x + 2y)(x + 2y + 4) \end{aligned}$$

$$\begin{aligned} 59. & 4ab - a^2 - 4b^2 + c^2 \\ &= -[-2(2)(2b) + a^2 + (2b)^2] + c^2 \\ &= c^2 - (a - 2b)^2 \\ &= (c + a - 2b)(c - a + 2b) \end{aligned}$$

$$60. a^4 - b^4$$

$$= (a^2)^2 - (b^2)^2$$

$$= (a^2 + b^2)(a^2 - b^2)$$

$$61. 1 - y^4$$

$$= 1^2 - (y^2)^2$$

$$= (1 + y^2)(1 - y^2)$$

$$= (1 + y^2)(1 + y)(1 - y)$$

$$62. 12y(16x^4y - 36yx^2) \div 2xy^2(2x + 3)$$

$$= 12y \times 4x^2y(4x^2 - 9) \div 2xy^2(2x + 3)$$

$$= 48x^2y^2[(2x)^2 - 3^2] \div 2xy^2(2x + 3)$$

$$= 24x(2x + 3)(2x - 3) \div (2x + 3)$$

$$= 24x(2x - 3)$$

$$63. (4x^3 - 12x^2 + 9x) \div (2x - 3)$$

$$= x[(2x)^2 - 2(2x)(3) + 3^2] \div (2x - 3)$$

$$= x(2x - 3)^2 \div (2x - 3)$$

$$= x(2x - 3)$$

$$64. (r^4 - 16) \div (r + 2)$$

$$= [(r^2)^2 - 4^2] \div (r + 2)$$

$$= (r^2 + 4)(r^2 - 4) \div (r + 2)$$

$$= (r^2 + 4)(r + 2)(r - 2) \div (r + 2)$$

$$= (r^2 + 4)(r - 2)$$

V. Four mark questions:

$$65. i) (l - m)^2 + 4lm$$

$$= (l + m)^2$$

$$ii) a^2 + \frac{1}{a^2} + 2 \times a \times \frac{1}{a}$$

$$= (a + \frac{1}{a})^2$$

$$\begin{aligned}
66. (9q + 3p)(4q^4 - 3p^2q^2 - p^4) &\div (3q + p)(q - p) \\
&= 3(3q + p)(4q^4 - 4p^2q^2 + p^2q^2 - p^4) \div (3q + p)(q - p) \\
&= 3[4q^2(q^2 - p^2) + p^2(q^2 - p^2)] \div (q - p) \\
&= 3(q^2 - p^2)(4q^2 + p^2) \div (q - p) \\
&= 3(q - p)(q + p)(4q^2 + p^2) \div (q - p) \\
&= 3(q + p)(4q^2 + p^2)
\end{aligned}$$

$$\begin{aligned}
67. 10xy(81x^4 - 16) &\div (6x^2 + 4x) \\
&= 10xy[(9x^2)^2 - 4^2] \div 2x(3x + 2) \\
&= 5y(9x^2 + 4)(9x^2 - 4) \div (3x + 2) \\
&= 5y(9x^2 + 4)[(3x)^2 - 2^2] \div (3x + 2) \\
&= 5y(9x^2 + 4)(3x + 2)(3x - 2) \div (3x + 2) \\
&= 5y(9x^2 + 4)(3x - 2)
\end{aligned}$$

13. Introduction to Graphs

I. MCQ:

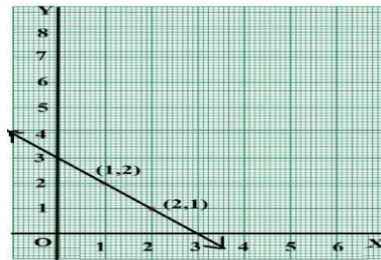
1. C) line graph
2. A) y - axis
3. B) x - axis
4. C) (0,3)
5. A) (5,3)
6. D) 200m

II. One mark questions:

7. (0,0)
8. 2 units
9. 5 units
10. 4 units

III. Two mark questions:

11.



12. A(1, 20) & B(3, 60).

From point B if moved 2 units right & then 1 unit up we get another point whose coordinates are (5, 70).

13. i) 37.5°C

ii) at 11am

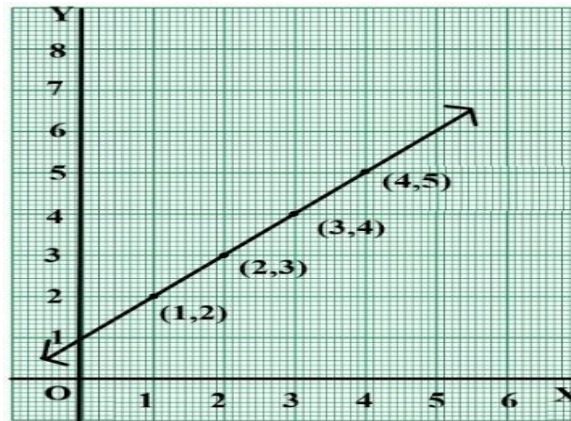
14. a) i) ₹6 crores ii) ₹8 crores

b) ₹10 crores - ₹7 crores = ₹3 crores.

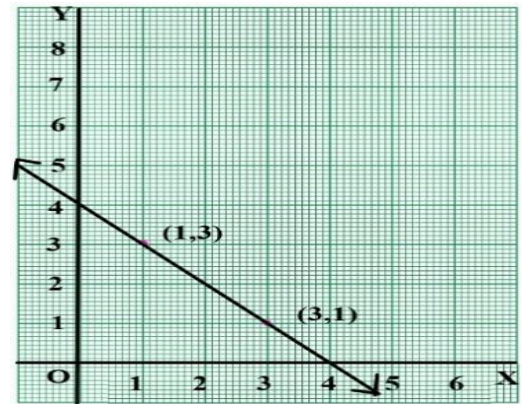
15. a) 35°C b) 15°C

IV. Three mark questions:

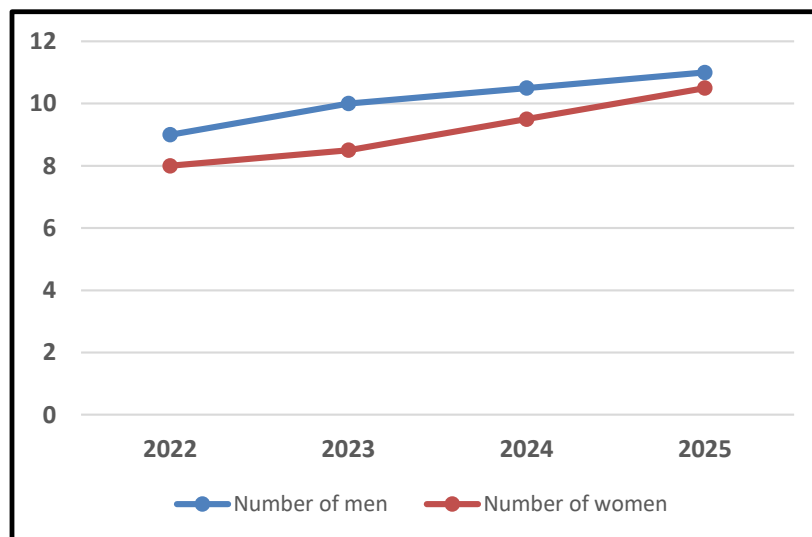
16. (1, 2), (2, 3), (3, 4) & (4, 5) these points lie on the same line.



17. The co-ordinates of the points at which this line meets the x -axis and y -axis are (4, 0) & (0, 4) respectively.



18.



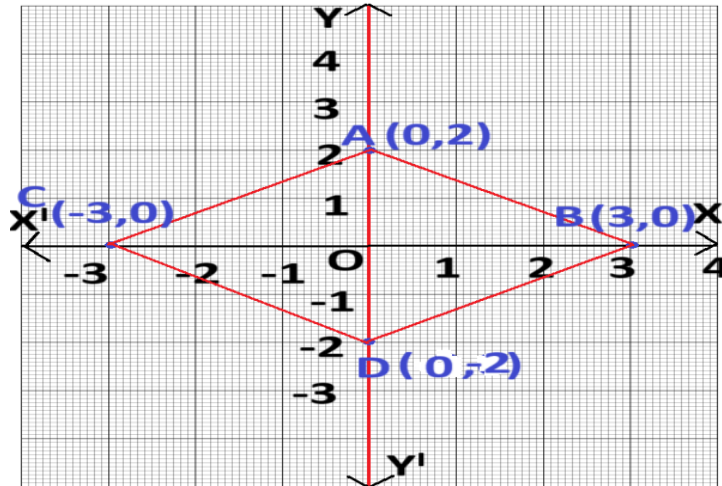
19. (a) True.

(b) True.

(c) False.

V. Four mark questions:

20. a)



b) Joined A, B, D & C

c) The figure obtained by joining these points is a Rhombus.

d) $\text{Area} = \frac{1}{2} \times d_1 \times d_2$
 $= \frac{1}{2} \times 4 \times 6 = 12 \text{ square units.}$

21. (i) 300km.

(ii) 6 am

(iii) The car had stopped at C for an hour.

(iv) $\text{speed} = \frac{s}{t} = \frac{100}{2} = 50 \text{ kmh}^{-1}.$

22. i) 4 millions.

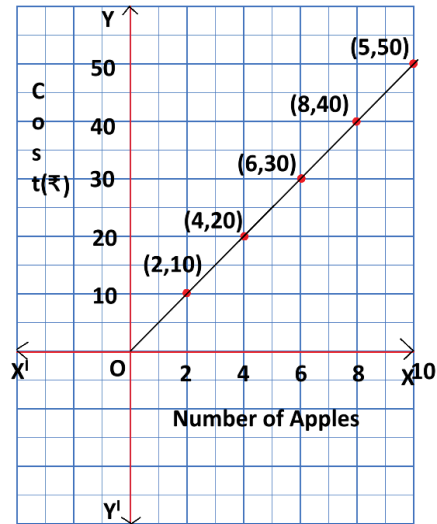
ii) In 2024 sales were highest. The sales number was 12 million in that year.

iii) In 2022 sales were least.

iv) In 2022 & 2025 sales were decreasing compared to previous year.

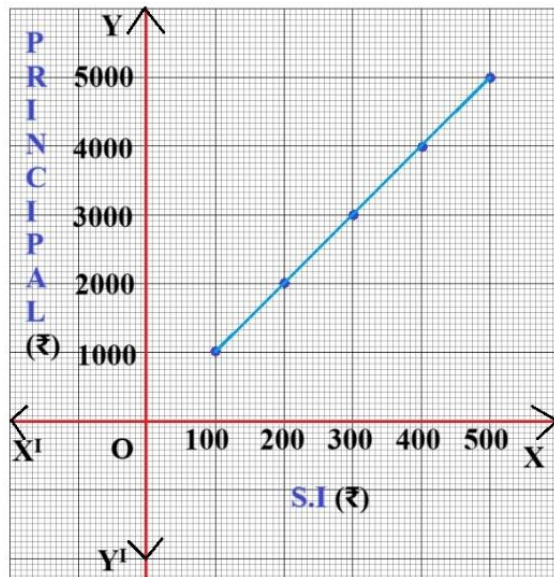
23.

- a) The cost of 5 apples is ₹25.
- b) 9 apples can be purchased.



24)

- i) ₹ 350
- ii) ₹ 8000



V. Five mark questions:

25) a) 1 cm = 2 km

b) $3\frac{1}{2}$ hour

c) 22 km

d) 16 km

e) yes, From 10 am to 10:30 am.

26)

a) yes.

b) ₹280

c) ₹ 4500

