

KENDRIYA VIDYALAYA SANGATHAN



CBA TEST ITEMS



MATHEMATICS

CLASS 8



**ZONAL INSTITUTE OF EDUCATION AND TRAINING
MYSURU**

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DIRECTOR'S MESSAGE.....



It is with profound delight and utmost pride that we present the Competency Based Assessment question bank for **CLASS 8** which was prepared by TGT(Mathematics) of the feeder regions during the 03 – day workshop on “**Competency Based Assessment in Mathematics: Design of test items**” It’s my firm belief that access to quality education should know no boundaries, transcending social and economic constraints. Our collective vision is to empower all students and teachers with the tools for success and intellectual growth.

With their steadfast dedication, the TGT(Mathematics) from the feeder Regions namely Bangalore, Chennai, Ernakulam and Hyderabad have invested their knowledge and expertise in preparation of the CBA test items.

It is with pleasure that I place on record my commendation for the commitment and dedication of the team of TGT(Mathematics) from the four Regions, Shri. Siby Sebastian, Principal KV INS Dronacharya, Kochi, Ernakulam Region & Associate Course Director, the Resource persons Mr. M. S. Kumar Swamy, TGT(Maths), KV Gachibowli, Hyderabad & Ms P S Kavitha, TGT(Maths), K V DRDO Bengaluru and Mr. D. Sreenivasulu, Training Associate (Mathematics) from ZIET Mysore who has been the Coordinator of this assignment.

Wishing you all the very best in your academic journey!

MENAXI JAIN
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CHAPTER 1 - RATIONAL NUMBERS
MULTIPLE CHOICE QUESTIONS

Q1) The expression $\frac{-2}{3} + \frac{5}{8} = \frac{5}{8} + \frac{-2}{3}$ shows that: (AO1)

- (a) Rational Numbers are closed under multiplication
- (b) Rational Numbers are closed under addition
- (c) Addition is commutative for Rational Numbers
- (d) Addition is associative for Rational Numbers

Q2) Which of these statements is true about the rational number $\frac{a}{b}$? (AO1)

- (a) The additive identity of rational number $\frac{a}{b}$ is $\frac{b}{a}$
- (b) The additive identity of rational number, $\frac{a}{b}$ is $\frac{-b}{a}$
- (c) The additive identity of rational number, $\frac{a}{b}$ is $\frac{-a}{b}$
- (d) The additive identity of rational number, $\frac{a}{b}$ is 0

Q3) The Rational Number that does not have a reciprocal is: (AO2)

- (a) 1 (b)-1 (c) 0 (d) No such rational Number

Q4) The product of two Rational numbers is 5. If one of them is $\frac{1}{5}$, the other number is: (AO2)

- (a) 1 (b)5 (c) 25 (d) $\frac{1}{25}$

Q5) Multiplicative inverse(reciprocal) of $-2\frac{1}{3}$: (AO1)

- (a) $\frac{3}{7}$ (b) $\frac{3}{7}$ (c) $-\frac{7}{3}$ (d) $\frac{7}{3}$

Q6) If an integer is added to its multiplicative inverse(reciprocal) , we get (AO1)

- (a) An integer (b) a Rational Number (c) 1 (d) -1

Q7) Consider the equation $\frac{4}{5} (x-y) = 1$ (AO2)

Which of these can be the values of x and y?

- (a) $x = \frac{1}{4}$ and $y = 1$
- (b) $x = \frac{1}{4}$ and $y = -1$
- (c) $x = -\frac{1}{4}$ and $y = 1$
- (d) $x = 2$ and $y = \frac{1}{4}$

Q8) If the multiplicative identity of a rational number $\frac{p}{q}$ is x, then x is : (AO2)

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

ASSERTION AND REASON QUESTIONS

REASON AND ASSERTION BASED QUESTIONS

Direction: In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

- (a) Both Assertion (A) and Reason(R) are true and Reason(R) is the correct explanation of Assertion (A).
- (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
- (c) Assertion (A) is true but Reason (R) is false.
- (d) Assertion (A) is false but Reason (R) is true.

Q9) ASSERTION: Sum of $\frac{5}{4}$ and $\frac{1}{10}$ is a rational number
REASON: Rational Numbers are closed under addition. (AO1)

Q10) ASSERTION: Rational numbers are not closed under division (AO2)
REASON: Division by zero, is not defined.

Q11) ASSERTION: The number Zero is a rational number. (AO1)
REASON: A rational number is a number that is in the form of p/q , where p and q are Integers and q is not equal to 0.

Q12) ASSERTION: $\frac{12}{35}$ is the additive inverse of $\frac{-12}{35}$ (AO1)
REASON: $\frac{12}{35} + \frac{-12}{35} = 0$

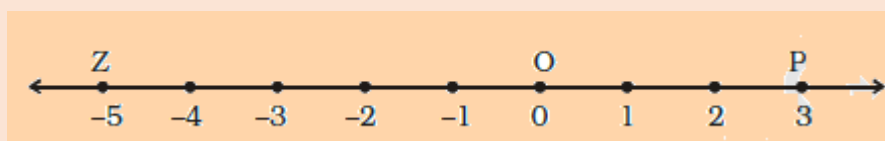
2 MARK QUESTIONS

Q13) From a ribbon of length $3\frac{1}{2}$ m, $\frac{6}{5}$ m of ribbon is cut, find the length of remaining ribbon.
Can you take one more piece of $\frac{6}{5}$ m ribbon Justify (AO1)

Q14) Simplify: $\frac{5}{4} \times \frac{-3}{8} + \frac{1}{8}$ (AO1)

Q15) Every rational number has a reciprocal. Is it true or false? Justify with an example (AO2)

Q16) A number between x and y is $\frac{x+y}{2}$. In the following number line, Q is a point between O and P and R is a point between O and Z.



Find the numbers represented by Q and R (AO2)

Q17) Using suitable rearrangement find the sum: (AO1)

$$\frac{3}{8} + \frac{-5}{12} + \frac{-7}{8} + \frac{7}{12}$$

3 MARK QUESTIONS

Q18) Find the value using properties: Mention which property is used (AO2)

$$\frac{-3}{5} \times \frac{4}{7} \times \frac{10}{21} \times \frac{35}{16}$$

Q19)) Find the value using properties: Also Mention which property is used (AO2)

$$\frac{-3}{5} \times \frac{4}{7} + \frac{10}{-21} \times \frac{-3}{5}$$

Q20) In a test there were negative markings for wrong answers. Three students scored following marks, $-1/5$, $3/20$ and $21/40$. Find their total score. Find the difference between highest and lowest score.

(AO1)

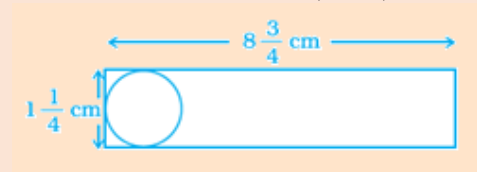
Q21) In a class, $1/5$ th of the students are gifted, $2/3^{\text{rd}}$ are average and the remaining are below average. (AO2)

- (i) What fraction of the children are below average?
- (ii) What percentage of children are below average?

Q22) Shalini has to cut out circles of diameter $1 \frac{1}{4}$ cm from an aluminum strip of dimensions $8 \frac{3}{4}$ cm by $1 \frac{1}{4}$ cm. (AO2)

(i) How many full circles can Shalini cut?

(ii) Also calculate the wastage of the aluminum strip.



5 MARKS QUESTIONS

Q23) Simplify using properties and write the properties used at those steps. (AO2)

$$\frac{-5}{7} \times \frac{3}{4} + \frac{2}{3} + \frac{5}{7} \times \frac{2}{3}$$

Q24) A student was giving a test to his friend. His friend solved the below question as shown. Find the mistake done by his friend and write the correct solution (AO2)

Question given was: Find the value using properties:

$$\frac{-3}{5} \times \frac{4}{7} + \frac{10}{-21} \times \frac{-3}{5}$$

Solution of his friend: $\frac{-3}{5} \times \frac{4}{7} + \frac{10}{-21} \times \frac{-3}{5}$

$$\begin{aligned} &= \frac{-3}{5} \times \left(\frac{4}{7} + \frac{-10}{21} \right) \\ &= \frac{-3}{5} \times \left[\frac{4+(-10)}{21} \right] \\ &= \frac{-3}{5} \times \left(\frac{-6}{21} \right) = \frac{18}{105} = \frac{6}{35} \end{aligned}$$

Q25) (i) Write the following rational numbers in ascending order. (AO2)

- $\frac{-5}{11}$, $\frac{1}{-2}$, $\frac{-5}{9}$, $\frac{-7}{3}$, $\frac{-3}{4}$
(ii) Write the difference between largest and smallest among these.

CASE STUDY QUESTIONS

Q26) A Teacher uses flash cards to create interest in the children in learning properties of Rational numbers and to test them (AO2)

Card A displayed the number $\frac{-2}{5}$,

Card B had the number $\frac{9}{2}$,

Card C with number $\frac{-5}{2}$,

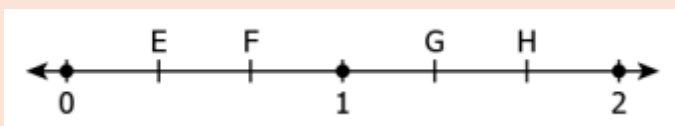
Card D displays number $\frac{-9}{2}$,

Card E with the number 0

She asks the children to use any of these cards and come up with properties of rational numbers. (AO2)

- (i) Gita takes the cards B and E
Explain how and which property she can explain
- (ii) Sita takes cards B and D
Explain how these numbers are related to each other
- (iii) Lata takes cards. A and C
Which property of rational numbers, she can explain ? explain how?
OR
- (iv) Meera takes cards A and B and finds their sum. Which property can be explained ?
Justify your answer.

Q27) Look at the number line given below: (AO2)



- (a) Which Rational number is represented by the letter F?
- (b) Which Rational number is represented by the letter G?
- (c) Find the difference between these two rational numbers
OR
- (d) Add the rational Numbers represented by E and G

Q28) In a class there are 24 boys and 28 girls. On her birthday, Rani wants to give 2 chocolates each, to her classmates.(AO2)

- (i) Find the number of chocolates required for boys and the number of chocolates required for girls.Hence the total number of chocolates required.
- (ii) Now Find the total number of students and hence the total number of chocolates required.
- (iii) Is the number of chocolates required same in question (i) and (ii) above? Represent the above situation using distributive property of multiplication over addition.

OR

- (iv) Find the value using properties:

$$\frac{-1}{5} \times \frac{4}{7} + \frac{1}{5} \times \frac{-3}{8}$$

Q29) $\frac{2}{5}$ of total number of students of a school come by car while, $\frac{1}{4}$ of the students come by bus to school. All the other students walk to school of which $\frac{1}{3}$ walk on their own and the rest are escorted by their parents.

- (i) What fraction of total students are coming to school either by bus or by car? (AO1)
- (ii) What fraction of total students are walking? (AO2)
- (iii) What fraction of the total students are escorted by parents?(AO2)

OR

- (iv) If there are 300 students, how many walk on their own?

Q30) Anjali is doing a little woodwork for a school project. She had a piece of wood 4 feet long. She cuts off a piece that was 2 and $\frac{5}{8}$ feet long.

- (i) What length of wood is left? (AO1)
- (ii) If she needs 5 more pieces that are each $\frac{3}{10}$ of a foot long, does she need more wood?
- (iii) If so how much? Explain by actual calculations (AO2)

SOLUTIONS: RATIONAL NUMBERS
MULTIPLE CHOICE QUESTIONS

Q1) c Q2)d Q3)c Q4)c Q5)b Q6)b Q7)b Q8) d

ASSERTION and REASON QUESTIONS

Q9)a Q10)a Q11)a Q12) a

2 MARK QUESTIONS

Q13) **Solution** : Remaining Ribbon = $3\frac{1}{2} - \frac{6}{5} = \frac{7}{2} - \frac{6}{5} = \frac{35-12}{10} = \frac{23}{10}$ m

Now, $\frac{6}{5} = \frac{12}{10}$ which is smaller than $\frac{23}{10}$. So, one more piece can be cut.

Q14) **Solution** : $\frac{5}{4} \times \frac{-3}{8} + \frac{1}{8} = \frac{-15}{32} + \frac{1}{8} = \frac{-15+4}{32} = \frac{-11}{32}$

Q15) Ans. False. Rational number 0 has no reciprocal, as reciprocal of 0 = 1/0, which is not defined

Q16) Ans: Q = $\frac{0+3}{2} = \frac{3}{2}$ and R = $\frac{0-5}{2} = \frac{-5}{2}$

Q17) Solution: $\frac{3}{8} + \frac{-5}{12} + \frac{-7}{8} + \frac{7}{12} = \frac{3}{8} + \frac{-7}{8} + \frac{-5}{12} + \frac{7}{12}$
 $= \frac{3-7}{8} + \frac{-5+7}{12}$
 $= \frac{-4}{8} + \frac{2}{12}$
 $= \frac{-12+4}{24} = \frac{-8}{24} = \frac{-1}{3}$

3 MARK QUESTIONS

Q18) SOLUTION: $\frac{-3}{5} \times \frac{4}{7} \times \frac{10}{21} \times \frac{35}{16}$
 $= \left(\frac{-3}{5} \times \frac{10}{21} \right) \times \left[\frac{4}{7} \times \frac{35}{16} \right]$ - COMMUTATIVITY AND ASSOCIATICITY
 $= \frac{-2}{7} \times \frac{5}{4} = \frac{-10}{28} = \frac{-5}{14}$

Q19) SOLUTION : $\frac{-3}{5} \times \frac{4}{7} + \frac{10}{-21} \times \frac{-3}{5}$
 $= \frac{-3}{5} \times \left(\frac{4}{7} + \frac{-10}{21} \right) = \frac{-3}{5} \times \left[\frac{12+(-10)}{21} \right] = \frac{-3}{5} \times \left(\frac{2}{21} \right) = \frac{-2}{35}$

Q20) Solution: Total score = $\frac{-1}{5} + \frac{3}{20} + \frac{21}{40} = \frac{-8+6+21}{40} = \frac{19}{40}$

Difference between highest and lowest score = $\frac{21}{40} - \frac{-1}{5} = \frac{21+8}{40} = \frac{29}{40}$

Q21) Solution:

(i) $\frac{1}{5} + \frac{2}{3} = \frac{13}{15}$

Below average = $1 - \left(\frac{13}{15} \right) = \frac{2}{15}$

(ii) $\left(\frac{2}{15} \right) \times 100 = 13.33\%$ are below average.

Q22) Solution:

(i) no of full circles that can be cut = length / breadth

$= \frac{35}{4} \div \frac{5}{4} = \frac{35}{4} \times \frac{4}{5} = 7$

(ii) Wastage of strip = area of strip – area of circles removed

$$= \frac{35}{4} \times \frac{5}{4} - 7 \times \frac{22}{7} \times \frac{5}{8} \times \frac{5}{8}$$

$$= \frac{175}{16} - \frac{550}{64} = \frac{700-550}{64} = \frac{150}{64} = \frac{75}{32} = 2\frac{11}{32} \text{ cm}^2$$

5 MARKS QUESTIONS

Q23) SOLUTION: $\frac{-5}{7} \times \frac{3}{4} + \frac{2}{3} + \frac{5}{7} \times \frac{2}{3}$

$$= \frac{-5}{7} \times \left(\frac{3}{4} + \frac{-2}{3}\right) + \frac{2}{3}$$

$$= \frac{-5}{7} \times \left(\frac{9-8}{12}\right) + \frac{2}{3}$$

$$= \frac{-5}{7} \times \left(\frac{1}{12}\right) + \frac{2}{3}$$

$$= \frac{-5}{84} + \frac{2}{3} = \left(\frac{-5+56}{84}\right) = \frac{51}{84} = \frac{17}{28}$$

Q24) Solution of his friend: $\frac{-3}{5} \times \frac{4}{7} + \frac{10}{-21} \times \frac{-3}{5}$

$$= \frac{-3}{5} \times \left(\frac{4}{7} + \frac{-10}{21}\right) = \frac{-3}{5} \times \left[\frac{4+(-10)}{21}\right]$$

$$= \frac{-3}{5} \times \left(\frac{-6}{21}\right) = \frac{18}{105} = \frac{6}{35}$$

Q25) Solution: The given numbers can be written as

$$\frac{-5}{11}, \frac{-1}{2}, \frac{-5}{9}, \frac{-7}{3}, \frac{-3}{4}$$

LCM of 4, 9 and 11 = 396

$$\frac{-5}{11} = \frac{-180}{396}, \quad \frac{-1}{2} = \frac{-198}{396}, \quad \frac{-5}{9} = \frac{-220}{396}, \quad \frac{-7}{3} = \frac{-924}{396}, \quad \frac{-3}{4} = \frac{-297}{396}$$

In ascending order: $\frac{-7}{3}, \frac{-3}{4}, \frac{-5}{9}, \frac{-1}{2}, \frac{-5}{11}$

Difference between largest and smallest = $\frac{-5}{11} - \frac{-7}{3} = \frac{-180}{396} - \frac{-924}{396} = \frac{-180+924}{396}$

$$= \frac{744}{396} = \frac{-15+77}{33} = \frac{62}{33}$$

CASE STUDY QUESTIONS

Q26) Solution:

- (i) $\frac{9}{2} + 0 = \frac{9}{2}$, 0 is additive identity element of R.No.
- (ii) $\frac{9}{2} + \frac{-9}{2} = 0$, $\frac{9}{2}$ and $\frac{-9}{2}$ are additive inverse of each other
- (iii) $\frac{-2}{5} \times \frac{-5}{2} = 1$, $\frac{-2}{5}$ and $\frac{-5}{2}$ are reciprocal of each other

OR

$$\frac{-2}{5} + \frac{9}{2} = \frac{-4+45}{10} = \frac{41}{10}$$

Rational Numbers are closed under Addition

Q27) Solution: (a) $\frac{2}{3}$ (b) $\frac{4}{3}$ (c) $\frac{4}{3} - \frac{2}{3} = \frac{2}{3}$ (d) $\frac{1}{3} + \frac{4}{3} = \frac{5}{3}$

Q28) Solution

(i) no. of chocolate required for boys = $2 \times 24 = 48$ and for girls = $2 \times 28 = 56$

Total chocolates required = 104

(ii) Total No. of students = $24 + 28 = 52$

Total chocolates required = $52 \times 2 = 104$

(iii) Yes . $2 \times 24 + 2 \times 28 = 2 \times (24 + 28)$ or $a \times b + a \times c = a \times (b + c)$

$$\begin{aligned} \text{(iv)} \quad \frac{-1}{5} \times \frac{4}{7} + \frac{1}{5} \times \frac{-3}{8} &= \frac{-1}{5} \left[\frac{4}{7} + \frac{3}{8} \right] \\ &= \frac{-1}{5} \times \left(\frac{32+21}{56} \right) = \frac{-1}{5} \times \frac{53}{56} = \frac{-53}{280} \end{aligned}$$

Q29) Solution: (i) $\frac{13}{20}$

(ii) $\frac{7}{20}$

(iii) $\frac{53}{60}$

(iv) 35

Q30) Solution:

(i) $4 - 2\frac{5}{8} = \frac{11}{8}$ feet left

(ii) $5 \times \frac{3}{10} = \frac{3}{2}$ feet = $\frac{12}{8}$, available is $\frac{11}{8}$, she needs more

(iii) $\frac{3}{2} - \frac{11}{8} = \frac{12-11}{8} = \frac{1}{8}$ of a foot more wood required.

CHAPTER 2 - LINEAR EQUATIONS IN ONE VARIABLE

MULTIPLE CHOICE QUESTIONS

- Q1) Which of the following is a linear equation in one variable? (AO1)
(a) $x^2 + 2 = 4$ (b) $x + y = 5$ (c) $2x - 7 = 9$ (d) $x = y$
- Q2) Five less than twice a number gives the result 97, then the number is: (AO1)
(a) 46 (b) 48 (c) 51 (d) 100
- Q3) If $x = 3$ is a solution of the linear equation $3x = 2k - 19$, then the value of k is: (AO1)
(a) 14 (b) 5 (c) -5 (d) 28
- Q4) Present age of karan's father is 4 times that of his son. 5 years ago, his age was 7 times that of his son's age at that time. Find their present ages. (AO2)
(a) 44 years, 11 years (b) 32 years, 8 years (c) 60 years and 15 years (d) 40 years, 10 years

Q5) Anita has ₹2400 with her in the first week and saves ₹800 each week thereafter to buy a new guitar that costs ₹20000. If n represents the number of additional weeks, she needs to save to buy the guitar, which equation represents the situation and what will be the value of n ? (AO1)

- (a) $2400 + 800n = 20000$; $n = 23$
(b) $2400 + 800n = 20000$; $n = 17$
(c) $2400n + 800 = 20000$; $n = 16$
(d) $2400 + 800n = 20000$; $n = 22$

Q6) Consider the equation as shown. (AO2)
$$x^{m-3} + 2y^{2n-2} = 0$$

What should be the value of m and n such that the above equation is a linear equation in one variable?

- (a) $m = 3, n = 3$
(b) $m = 3, n = 1.5$
(c) $m = 4, n = 2$
(d) $m = 4, n = 1$

Q7) Radha takes some flowers in a basket and visits three temples one by one. At each temple, she offers one half of the flowers from the basket. If she is left with 3 flowers at the end, find the number of flowers she had in the beginning. (AO2)

- (a) 20 (b) 16 (c) 24 (d) 48

Q8) Hamid has three boxes of different fruits. Box A weighs $2\frac{1}{2}$ kg more than Box B and Box C weighs $10\frac{1}{4}$ kg more than Box B. The total weight of the three boxes is $48\frac{3}{4}$ kg.

How many kilograms (kg) does Box A weigh? (AO2)

- (a) $12\frac{1}{4}$ (b) 14.5 (c) 10 (d) None of these

ASSERTION AND REASON BASED QUESTIONS

Direction: In the following questions 9 - 12, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
- (c) Assertion (A) is true but Reason (R) is false.
- (d) Assertion (A) is false but Reason (R) is true.

Q9) ASSERTION: -8 is the solution of the equation $2x - 7 = 23$ (AO1)
REASON: Solution of an equation is the value of the variable, which satisfies the equation

Q10) ASSERTION: $(x-1)^2 + 2 = x^2$, is a linear equation in one variable. (AO2)
REASON: A linear equation in one variables has degree 1.

Q11) ASSERTION The solution of the equation $ax + b = 0$ is: $-\frac{b}{a}$ (AO1)
REASON : Solution of an equation is value of the variable which reduces it to zero

Q12) ASSERTION: If $x = a$, then $kx = ka$ for any value of k , where k is a real number (AO1)
REASON: If we add, subtract, multiply or divide (except by 0) both sides of the equation by the same value., the equation still remains balanced.

2 MARKS QUESTIONS

- Q13) If four times , 10 more than a number is equal to five times the number, find the number.(AO2)
- Q14) Find the value of x for which the expressions $3x - 4$ and $2x + 1$ become equal. (AO2)
- Q15) What can be the possible values of 'x 'if perimeter of a regular polygon with sides less than 10 is 84 cm (AO2)
- Q16) Solve the equation: $2x - 5 = 3(x-1) + 4$ (AO1)
- Q17) Consecutive integers always increase by 1. It is given that sum of three consecutive integers is 372. If first integer is x , find the three integers. (AO2)

3 MARKS QUESTIONS

- Q18) A garden has a perimeter of 70 m. If length is 5m more than its breadth, find the dimensions of the garden. If fencing is to be done around garden, what is the total cost of wire,if 1m of wire costs Rs 50? (AO2)
- Q19) If $\frac{5x}{3} - 4 = \frac{2x}{5}$, find the value of $19x + 3$ (AO1)
- Q20) At a retail store, the cost of a plastic pot is ₹50 more than the cost of a broomstick. If the ratio of the cost of two pots to the cost of three broomsticks is 5:6, what is the cost of the pot? (AO2)

Q21) If length of a notebook is $(2x+5)$ cm and breadth is $(x-2)$ cm, then give an expression to find the length of the colour tape required to put a border around it. .If breadth is 18 cm , find the length of tape required. (AO2)

Q22) Solve: $\frac{15}{2} - \frac{5x}{2} = 4 + \frac{x}{3}$ (AO2)

5 MARKS QUESTIONS

Q23)Solve the following equations and check your result: (AO1)

$$\frac{x}{2} - \frac{1}{4} = \frac{x}{3} - \frac{1}{5}$$

Q24) Rohan solves a linear equation. His works is as shown below (AO1)

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

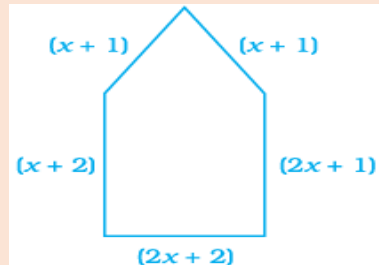
Or, $2(2x-3) = x-5$ step 1

Or, $4x-6 = x-5$ step 2

Or, $4x-x = 6-5$ Step 3

Or, $3x = 1$ Step 4

Or, $x = \frac{1}{3}$



(a) In which step did he make a mistake?

(b) Write that step correctly

(c) Solve the equation

OR

Verify whether $x = 2$ can be the solution.

Q25) Solve and check the result: (AO2)

$$3 (5x - 7) + 2 (9x - 11) = 4 (8x - 13)$$

CASE STUDY QUESTIONS

Q26) Peer tutoring is a strategy in which students support each other in the learning process. Two children Ritu and Sanika were discussing the chapter on Linear equation in two variables, which was going to come in their periodic test. Ritu being a bright student gives a test to Sanika and Sanika answers all of them correctly. So what are the answers given by Sanika to the following questions asked by Ritu. (AO1)

- (i) In a linear equation, the highest power of the variable appearing in the equation is _____.
- (a) 4 (b) 3 (c) 2 (d) 1
- (ii) On subtracting 8 from x, the result is 2. The value of x is _____
- (a) 6 (b) -6 (c) 10 (d) -10
- (iii) $3x - \underline{\hspace{2cm}} = -21$ has the solution (-2)
- (b) 15 (b) -15 (c) 18 (d) -18

OR

- (iv) Solution of the equation $5t - 3 = 3t - 5$ is:
- (a) 1 (b) 2 (c) -1 (d) -2

Q27) The auto and Taxi charge in a city comprise of fixed charge and the charge for the distance covered. Few situations are given below in the form questions. Find the correct option. (AO2)

- (i) If the fixed charge in a city is ₹x and charge per km is ₹20 and total fare is ₹230 then find the linear equation for the journey of 10 km.
- (a) $x + 200 = 230$
 (b) $x - 200 = 230$
 (c) $x + 200 = 200$
 (d) None of these
- (ii) Find the fixed charge in the above case
- (iii) Find the charge one need to pay to travel a distance of 20 km

OR

If amount paid is Rs 130, what is the distance travelled?

Q28) Vikas thinks of a number and he multiplies this number by 3. (AO1)

- (i) What is the result in above case, by using the variable as x?
 (ii) If he subtracts 2 from it what is the expression obtained now?
 (iii) If this expression is equal to 6 more than the number which Vikas had thought, find the number he thought.

OR

If this expression obtained in step (ii) is four more than twice the number he had thought of, find that number

Q29) The number of boys and girls in a class are in the ratio 7 : 5. Based on this answer the following guided questions (AO1)

- (i) If the number of boys is $7x$, what is the number of girls?
 (ii) If the number of boys is 8 more than the number of girls, what is the number of boys and girls?

(iii) If total strength is 60, and ratio is same, find the number of girls and boys

OR

If the total strength of the students is 55 and ratio of boys to girls is 3: 2, find the number of boys and girls

Q30) A teacher gives a HOTS (higher order thinking) question to the children, who have learnt to solve linear equations in one variable. The question is: (AO2)

After 12 years, Kanwar shall be 3 times as old as he was 4 years ago. We need to find his present age.

As no one could answer the question, she guides them in solving by asking them questions step by step. (AO1)

- (i) Take present age of Kanwar as x years. Then what is his age after 12 years?
- (ii) What was his age 4 years ago?
- (iii) From the given question, what equation do you get now? Write that equation and solve it.

OR

What is Karan's present age in the given question? and after how many years his age will be doubled?

SOLUTIONS: LINEAR EQUATIONS IN ONE VARIABLE

MULTIPLE CHOICE QUESTIONS

- Q1) c Q2) c Q3) a Q4) d Q5) d Q6) d Q7) c Q8) b
Q9) d Q10) a Q11) a Q12) a

2 MARKS QUESTIONS

- Q(13) $4(x + 10) = 5x \Rightarrow x = 40$
Q (14) $3x - 4 = 2x + 1 \Rightarrow x = 5$
Q(15) perimeter = $7x + 7 = 84 \Rightarrow x = 11$
Q (16) $2x - 5 = 3(x-1) + 4 \Rightarrow 2x - 5 = 3x + 1 \Rightarrow x = -6$
Q17) $x + x+1 + x + 2 = 372$
 $3x = 369$ or $x = 123$
Three integers are 123, 124, 125

3 MARKS QUESTIONS

- Q18) Let the breadth = x m, then length = $x + 5$
Perimeter = $2(l + b) = 2(x + 5 + x) = 70$ or $2(2x + 5) = 70$ or $x = 15$ m . $l = 20$ m $b = 15$ m
Cost of fencing = Rs $70 \times 15 =$ Rs 1050
Q19) $x = \frac{60}{19}$ and $19x + 3 = 63$
Q20) Ans Let cost of broomstick = Rs x then cost of a plastic pot = Rs($x + 50$)
Cost of two pots = Rs ($2x + 100$) and cost of 3 broomsticks = $3x$
As given $2x + 100 : 3x = 5 : 6$ which gives $x =$ Rs 200 and the cost of a pot = Rs 250
Q21) Solution: Perimeter of the notebook= $2(l + b) = 2(2x + 5 + x - 2) = 2(3x + 3)$
Length of color tape required = ($6x + 6$) cm
If breadth = $x - 2 = 18$, then $x = 20$ and hence length of tape required = $6 \times 20 + 6 = 120 + 6 =$
126 cm

Q22) Solutions: $\frac{15}{2} - 4 = \frac{x}{3} + \frac{5x}{2} \Rightarrow \frac{15-8}{2} = \frac{2x+15x}{6}$
 $\Rightarrow \frac{7}{2} = \frac{17x}{6} \Rightarrow x = \frac{21}{17}$

5 MARKS QUESTIONS

- Q23) Solution: $\frac{x}{2} - \frac{x}{3} = \frac{1}{4} - \frac{1}{5} \Rightarrow \frac{3x-2x}{6} = \frac{5-4}{20} \Rightarrow \frac{x}{6} = \frac{1}{20} \Rightarrow x = \frac{3}{10}$
Q24) Solution:
(a) Mistake is in ist step
(b) Correct step is: $2x - 3 = \frac{x-10}{2}$ or $2(2x-3) = x - 10$
(c) On solving, $x = \frac{-4}{3}$

Or

$$\text{If } x=2, \quad \text{LHS} = 2x - 3 = 2 \times 2 - 3 = 1 \quad \text{and} \quad \text{RHS} = 2/2 - 5 = 1 - 5 = -4$$

LHS \neq RHS Hence 2 is not a solution

Q25) Solution: $3(5x - 7) + 2(9x - 11) = 4(8x - 13)$

$$\Rightarrow 15x - 21 + 18x - 22 = 32x - 52$$

$$\Rightarrow 33x - 43 = 32x - 52 \quad \Rightarrow \quad x = -9$$

Check:

$$\text{LHS} = 3(-45-7) + 2(-81-11) = 3(-52) + 2(-92) = -156 - 184 = -340$$

$$\text{RHS} = 4(8x - 13) = 4(-72-13) = 4(-85) = -340$$

$$\text{LHS} = \text{RHS}$$

CASE STUDY QUESTIONS

Q26) (i) 1 (ii) 10 (iii) 15 (iv) -1

Q27) Solution: (i) option a (ii) $x = \text{Rs } 30$ (iii) $x + 20 \times 20 = 30 + 400 = \text{Rs } 430$

OR if amount paid is Rs 130, distance travelled = 5 km

Q28) Solution: Let the number Vikas thought = x

On multiplying by 3, he gets $3x$

On subtracting 2 he gets $3x - 2$

$$3x - 2 = x + 6 \quad \text{which on solving we get } x = 4$$

OR $3x - 2 = 2x + 4$ which gives $x = 6$

Q29) Solution:

Number of girls = $5x$

$$7x = 5x + 8, \text{ which gives us } x = 4$$

No. of boys = $7x = 28$ and No of girls = $5x = 20$

If total strength is 60 and ratio is same, no of boys = $7 \times 60 / 12 = 35$ and girls = 25

OR

If total strength is 55 and ratio is 3: 2, no. of boys = $(3/5) \times 55 = 33$ and girls = 22

Q30) (i) $x + 12$ (ii) $x - 4$ (iii) $x + 12 = 3(x - 4)$, which on solving we get $x = 12$

OR Karan's present age is 12 years and his age will be doubled(24years) after 12 years

CHAPTER 3- UNDERSTANDING QUADRILATERALS

MULTIPLE CHOICE QUESTIONS

- In parallelogram ABCD, $\angle D = 60^\circ$, which among the following is true? (A01)
(a) $\angle A = 100$ (b) $\angle C = 120$ (c) $\angle B = 100$ (d) $\angle C = 80$
- In a square all sides are equal. Which other quadrilateral owns this property? (A01)
(a) Parallelogram (b) trapezium (c) kite (d) rhombus
- If $\angle A$ and $\angle B$ are two adjacent angles of a parallelogram. If $\angle A = 70^\circ$, then $\angle B = ?$ (A01)
(a) 70 (b) 110 (c) 50 (d) 130
- When one angle of a parallelogram is a right angle, then which of the following can it be? (A01)
(a) rectangle (b) trapezium (c) kite (d) rhombus
- In parallelogram ABCD, the length of the diagonal $AC = 5\text{cm}$. What should be the value of the diagonal BD so that the ABCD becomes a rectangle? (A02)
(a) 6 cm (b) 2 cm (c) 5 cm (d) 3 cm
- In a square ABCD, the diagonals bisect each other at O. What kind of a triangle is $\triangle AOB$ (A02)
(a) Equilateral (b) Isosceles (c) Isosceles right angle (d) scalene
- Which of the following is not a quadrilateral? (A01)
(a) Square (b) Rectangle (c) Triangle (d) Parallelogram
8. Which of the following is not a regular polygon? (A01)
(a) Square (b) Equilateral triangle (c) Rectangle (d) Regular hexagon

ASSERTION AND REASON BASED QUESTIONS

Direction: In the following questions 9 - 12, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.
9. Assertion (A) – If two adjacent sides of a rectangle are equal, then it is a square (A01)
Reason (R) – A square is a quadrilateral with four right angles
10. Assertion (A) – The angle sum of a convex polygon with number of sides 7 is 900° . (A02)
Reason (R) – A convex polygon is a polygon that is the boundary of a convex set.
11. Assertion (A) – All the angles of a rectangle are equal. (A01)
Reason (R) – The opposite sides of a rectangle are not equal.
12. Assertion (A) – The measures of the three angles of a quadrilateral are 65° , 75° and 85° . The measure of the fourth angle is 135° . (A02)
Reason (R) – The sum of the interior angles of a quadrilateral is 360°

2 MARKS QUESTIONS

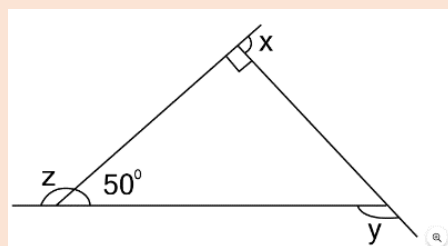
13. How many sides do a regular polygon have, if the measure of an exterior angle is given as 24° ? (A01)
14. What is the measure of each exterior angle of a regular polygon of 15 sides? (A01)

15. The perimeter of a parallelogram is 180 cm. If one side exceeds the other by 10 cm, find the length of its sides. (A02)

16. A few properties of quadrilaterals are listed below. Pick up the properties for the corresponding quadrilateral (A01)

Parallelogram	Opposite sides are equal
Rhombus	Every angle is a right angle
Rectangle	All sides are equal
	Diagonals are equal
	Diagonals are perpendicular to each other

17. Find x , y and z in the following figure. (A02)



3 MARKS QUESTIONS

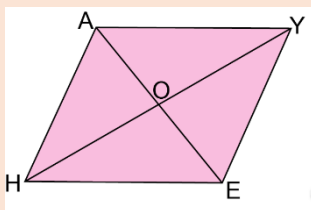
18. The opposite angles of a parallelogram are $(3x + 5)^\circ$ and $(61 - x)^\circ$. Find the measure of four angles. (A02)

19. Find the measure of all four angles of a parallelogram whose consecutive angles are in the ratio 1 : 3. (A02)

20. Each interior angle of a regular polygon is 150. how many sides does the polygon have? (A01)

21. The diagonal AC of Rhombus ABCD is equal to one of its side BC. Find all the angles of Rhombus. (A02)

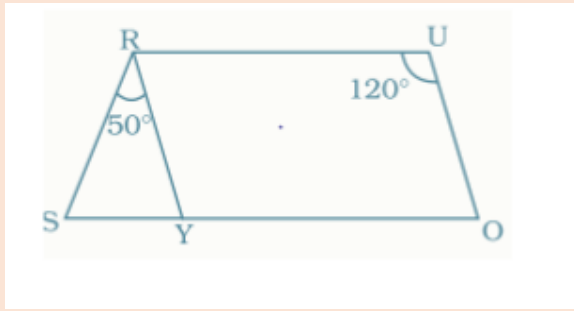
22. Figure HEYA shown below is a parallelogram its given $OE = 3\text{cm}$ and HY is 7 more than AE . Find OH (A02)



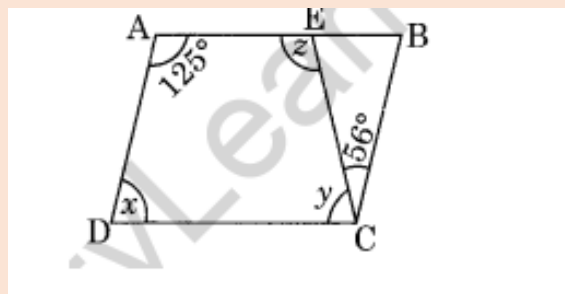
5 MARKS QUESTIONS

23. Adjacent sides of a rectangle are in the ratio 5: 12; if the perimeter of the given rectangle is 34 cm, find the length of the diagonal. (A02)

24. In the given parallelogram YOUR, $\angle RUO = 120^\circ$, $\angle RUO = 120^\circ$ and OY is extended to point S such that $\angle SRY = 50^\circ$, $\angle SRY = 50^\circ$. Find $\angle YSR$ (A02)



25. In the given figure, ABCD is a parallelogram. Find x , y and z .
(A02)



CASE BASED QUESTIONS

26. A quadrilateral having one pair of opposite sides parallel and the other pair of opposite side is non parallel is called a trapezium. If the non parallel sides are equal, it is called an isosceles trapezium. (A02)

Write the pair of co-interior angles of ABCD

(b) If the non parallel sides were to be parallel, what kind of quadrilateral would it be?

27. Four friends, Aryan, Bhavana, Chetan, and Divya, participated in a geometry project. They constructed a figure with four sides and made the following observations:
(A02)

1. The opposite sides of the figure are parallel.
2. The opposite angles of the figure are equal.
3. The figure has two pairs of equal adjacent sides.
4. the diagonals of the figure are equal

Based on this information, the students were asked to analyze the properties of the quadrilateral they constructed.

(a) What type of quadrilateral is formed in the above scenerio?

(b) What is the sum of the exterior angles of the above figure?

(c) List down any two additional properties of the above quadrilateral?

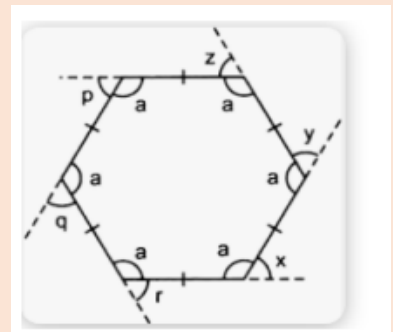
28. During Math Lab Activity each student was given four broomsticks of lengths 8cm, 8cm, 5cm,5cm to make different types of quadrilaterals. (A02)

(a) How many quadrilaterals can be formed using these sticks?

(b) Name the types of quadrilaterals formed ?

(c) In a trapezium ABCD, $DC \parallel AB$ and $\angle A = \angle B = 50^\circ$, the teacher asked the student to find $\angle D$

29. Arun was solving the mathematics problem. He was doing great in algebraic concepts but not in geometric concepts. He had to solve few questions from quadrilaterals. Questions were based on the following figure. (A02)



(a) Name the figure obtained

(b) What is the sum of the measures of its exterior angles?

(c) If all the interior angles in the given figure is equal to $x/2$, find the value of x .

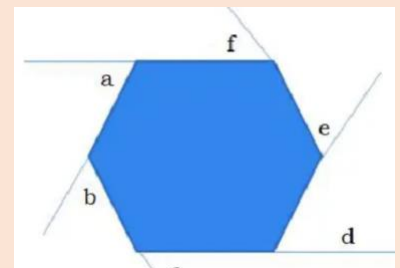
30. A snowflake is formed when water molecules join together to make a rigid shape. The water molecules combine more molecules, they extend and form a rigid crystal with 12 sides. (A02)

Consider a regular hexagon and answer the following questions:

(a) What is the sum of the exterior angles.

(b) What is the measure of each exterior angle

(c) Is a rectangle a regular polygon? Why?



SOLUTIONS: CHAPTER 3- UNDERSTANDING QUADRILATERALS

1. b 2. d 3. b 4. a 5. c 6. c 7. c 8. c

ASSERTION AND REASON BASED QUESTIONS

9. b 10. b 11. d 12. A

2 MARKS QUESTIONS

13. $360/24 = 15$

14. $360/15 = 24$

15. : Let one side be x cm

The other side is $x+10$ cm

$$X+x+10 +x+x+10 = 180$$

$$4x = 160$$

$$X = 40 \text{ cm}$$

Sides are 40 cm and 50 cm

16. parallelogram =i

Rhombus – i, iii, v

Rectangle – i.ii.iv

17. Linear pair: $180=x+90$ $x=90$
 $z+50=180$ $z=130$

$x+y+z=360$ (exterior angle property)

$$90+y+130= 360 \quad y= 140$$

3 MARKS QUESTIONS

18. $3x+5 = 61-x \Rightarrow x=14$

Angles are 47,133,47,133

19. The ratio of two consecutive angles of a parallelogram = 1 : 3

Let x and $3x$ be the two consecutive angles.

Therefore, $x + 3x = 180^\circ$

$$4x = 180^\circ$$

$$x = 180^\circ/4$$

$$x = 45^\circ$$

$$\Rightarrow 3x = 3(45^\circ) = 135^\circ.$$

Hence, the measure of all the four angles is $45^\circ, 135^\circ, 45^\circ,$ and 135° .

20. $180-150 = 30$

$$360/30 = 12$$

21. Since $AC = BC = AB$, ΔABC is equilateral.

Hence, every angle is 60

Therefore, $\angle B = \angle BAC = \angle ACB = 60$

Similarly, $\angle D = \angle DAC = \angle DCA = 60$

$$\text{So, } \angle A = \angle C = 120$$

$$22. \text{ AE} = 3+3 = 6 \text{ CM}$$

$$\text{HY} = 7+6 = 13 \text{ CM}$$

$$\text{OH} = \frac{1}{2} 13 = 7.5 \text{ CM}$$

5 MARKS QUESTIONS

23. The ratio of the adjacent sides of the rectangle is 5: 1

Let $5x$ and $12x$ be adjacent sides.

$$5x+12x+5x+12x=34\text{cm}$$

$$34x = 34$$

$$x = 1 \text{ cm}$$

Therefore, the adjacent sides of the rectangle are 5 cm and 12 cm,

$$\text{Length} = 12 \text{ cm}$$

$$\text{Breadth} = 5 \text{ cm}$$

$$\text{Length of the diagonal} = \sqrt{(l^2 + b^2)}$$

$$= \sqrt{(12^2 + 5^2)} = \sqrt{169} = 13 \text{ cm}$$

24. Since in parallelogram, opposite angles are equal

$$\angle RYO = 120^\circ \quad \angle RYO = 120^\circ$$

$$\text{Then } \angle RYS = 180 - 120 = 60^\circ \quad \angle RYS = 180 - 120 = 60^\circ$$

Now in a triangle RYS

$$\angle YSR + \angle RYS + \angle YRS = 180 \quad \angle YSR + \angle RYS + \angle YRS = 180$$

$$\angle YSR = 180 - 60 - 50 = 70^\circ \quad \angle YSR = 180 - 60 - 50 = 70^\circ$$

25. $\angle A + \angle D = 180^\circ$ (Adjacent angles)

$$\Rightarrow 125^\circ + \angle D = 180^\circ \Rightarrow \angle D = 180^\circ - 125^\circ$$

$$x = 55^\circ$$

$\angle A = \angle C$ [Opposite angles of a parallelogram]

$$\Rightarrow 125^\circ = y + 56^\circ \Rightarrow y = 125^\circ - 56^\circ$$

$$\Rightarrow y = 69^\circ$$

$\angle z + \angle y = 180^\circ$ (Adjacent angles)

$$\Rightarrow \angle z + 69^\circ = 180^\circ \Rightarrow \angle z = 180^\circ - 69^\circ = 111^\circ$$

Hence the angles $x = 55^\circ$, $y = 69^\circ$ and $z = 111^\circ$

CASE BASED QUESTIONS

26 a. $A + B = 180$

b. parallelogram

27. (a) square

(b) 360

(c) diagonals bisect each other

Every angle is a right angle

28. (a) 12

(b) parallelogram, rectangle

(c) 130

29. a) regular hexagon

b) $360/6 = 60$

c) $x = 120$

30. a) 360

b) 60

c) no, because all sides are not equal

12. **Assertion:** If a man takes a red card from a deck of card and its probability is $\frac{1}{2}$.

Reason: A deck of card contains 52 cards. (AO1)

2 MARKS QUESTIONS

13. What is the probability of sure event and impossible events? (AO1)

14. If Anamika got central angle 72° in a pie chart for apple and total weight of fruit box is 18kg. Find the total weight of apple. (AO2)

15. What will be the central angle in pie angle for boys, if total students are 180 and girls was 108 in these students? (AO2)

16. A man buys 1 kg of apple and he wants to take out an orange from it. What kind of event is it and what is the probability for this event? (AO2)

17. What are the possible outcomes, when a referee tosses a coin? (AO2)

3 MARKS QUESTIONS

18. Write any 3 conditions in which you can use pie chart to represent them. (AO1)

19. Write the probability of getting a card from deck of 52 cards:-

(a) Red card (b) Face card (AO1)

20. Manmohan has a dice containing number from 1 to 6 and find the probability of getting numbers given below

(a) Greater than 6 (b) Less than 3 (AO1)

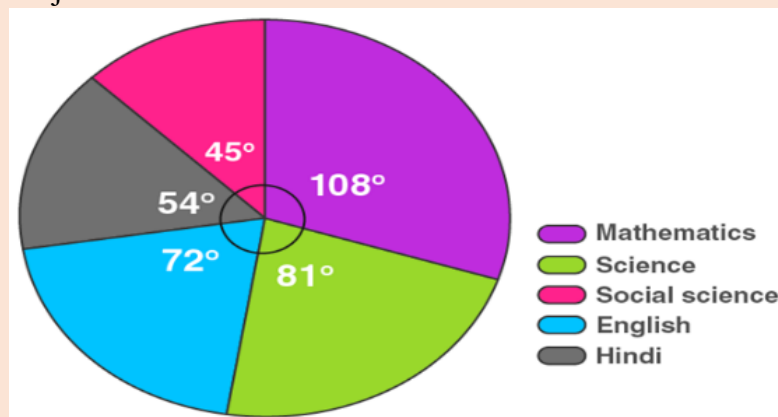
21. Draw a pie chart for the following data related to game and player given below :- (AO2)

Game	Hockey	Cricket	Football
Player	70	60	50

22. If the probability of getting a good bulb from box is $\frac{3}{5}$. Find the probability of getting a bad bulb from box. Also find the total number of bulbs if the good bulbs are 20 in this box (AO2)

5 MARKS QUESTIONS

23. In Figure, the pie chart shows the marks obtained by a student in an examination. If the student secures 440 marks in all, calculate his marks in each of the given subjects. (AO2)



24. The following data gives the amount spent on the construction of a house. Draw a pie diagram. (AO1)

Items	Cement	Timber	Steel	Labour
Expenditure (in thousand Rs)	60	30	45	45

25. A tyre manufacturing company kept a record of the distance covered before a tyre needed to be replaced. The table shows the results of 1000 cases.

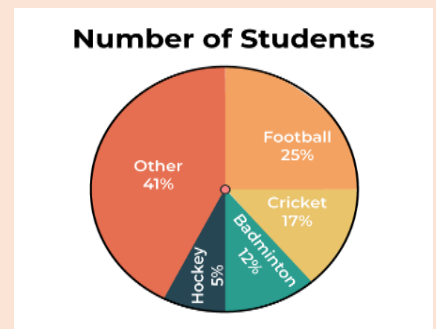
Distance(in km)	Less than 4000	4000 to 9000	9001 to 14000	More than 14000
Frequency	20	210	325	445

If a tyre is bought from this company, what is the probability that:

- (a) it has to be substituted before 4000 km is covered? (AO1)
 (b) it will last more than 9000 km? (AO2)
 (c) it has to be replaced after 4000 km and before 14000 km is covered by i (AO2)

CASE BASED QUESTIONS

26. Mathematics is an integral part of our daily lives. To help the children to understand this. Math exhibitions are organized at the schools. By taking this in to consideration, students of class VIII were asked to prepare charts, puzzles and working models based on the concepts to inculcate interest in Mathematics. As a part of this, Gita is making a model of a circle graph using a cardboard and a pointer at the centre 'O'. The teacher asks her a few questions which helps her at the time of demonstration.



- (a) Find the central angle that is formed in the sector of football and hockey. (AO2)
 (b) Find sum of the central angle that is formed by the sectors of cricket and badminton. (AO2)
27. Employees of a company have been categorized according to their religions as given below:

Religion	Hindu	Muslims	Sikh	Christians	Total
Workers	420	300	225	105	1080

Kashif draw a pie chart and he asked some question related to sectors formed for this information.

- (a) Which religion's sector occupy most area in circle? (AO1)
 (b) What will be central angle formed for Sikh and Hindu? (AO2)

28. The department of Computer Science and Technology is conducting an International Seminar. In the seminar, the number of participants in Mathematics, Science and Computer Science are 60, 84 and 108 respectively. The coordinator has made the arrangement such that in each room, the same number of participants are to be seated and all of them being in the same subject. Also, they allotted the separate room for all the official other than participants.

(a) Find the probability that science and mathematics participants will be in a same room. (AO1)

(b) When all participants comes to school ad stand randomly in a corridor and what will be probability that a random participant will not be a mathematics participant. (AO2)

29. An alumni association is an association of former students. These associations often organize social events, publish newsletters or magazines and raise funds for the organisation. The alumni meet of two batches of a college- batch A & batch B were held on the same day in the same hotel in two separate halls “Rose” and “Jasmine”. The rents were the ₹5000 for both the halls. 50 persons attended the meet in “Rose” hall, and the organisers had to pay ₹ 500 as entry charge. 25 guests attended the meet in “Jasmine” hall and the organisers had to pay ₹ 750 as entry charge.

(a) Find the amount received in each hall as entry fees. (AO1)

(b) What is the probability of a person that he belongs to Jasmine hall.

(AO1)

30. Ashutosh have a deck of playing cards and he tries to revise concept of probability with his friends. So he asked some question of probability related to cards.



(a) What is the probability of getting a red card of number 9? (AO1)

(b) What is the probability of getting a card of number 7? (AO1)

(c) What is the probability of not getting a face card? (AO2)

SOLUTIONS: CHAPTER 4 - DATA HANDLING

- 1) d- Cartesian graph 2) d- 1 3) a- 0 4) a- Bar graph
 5) d- 360° 6) b- 1/3 7) c-180° 8) b- 1/2

ASSERTION AND REASON QUESTIONS

- 9) a 10) d 11) a 12) b

2 MARKS QUESTIONS

- 13) Probability of sure event = 1
 Probability of impossible event = 0
 14) Weight of apple = $\frac{72}{360} \times 180 = 3.6$ kg
 15) Boys = 180-108 = 72
 Central angle = $\frac{72}{180} \times 360 = 144^\circ$
 16) It is an impossible event, so its probability is zero.
 17) Possible outcomes = Head & Tail

3 MARKS QUESTIONS

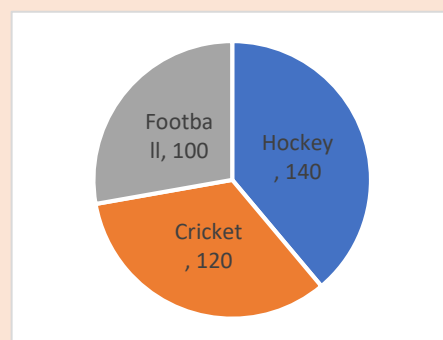
- 18) (a) Games liked by the class student.
 (b) Expenditure of a month.
 (c) Types of flowers in a park

- 19) (a) Red card = 26 P(E) = 26/52=1/2
 (b) Face card = 12 P(E) = 12/52= 3/13

- 20) (a) Number greater than 6 = 0 P(E) = 0
 (b) Number less than 3 = 2 (1,2) P (E) = 2/6=1/3

21)

Game	Player	Central angle
Hockey	70	$\frac{70}{180} \times 360 = 140^\circ$
Cricket	60	$\frac{60}{180} \times 360 = 120^\circ$
Football	50	$\frac{50}{180} \times 360 = 100^\circ$



- 22) Probability of getting good bulb = 3/5
 Probability of getting bad bulb = 1- 3/5 = 2/5
 Good bulbs = P(E) × Total bulbs = 3/5 × 20 = 12

5 MARKS QUESTIONS

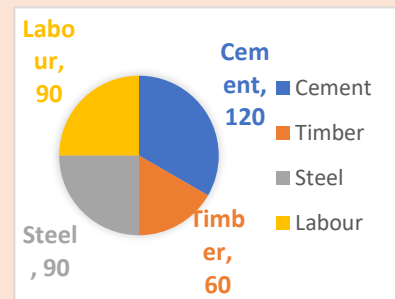
- 23) Marks in math = $\frac{108}{360} \times 440 = 132$
 Marks in social science = $\frac{45}{360} \times 440 = 55$
 Marks in hindi = $\frac{54}{360} \times 440 = 66$

$$\text{Marks in english} = \frac{72^\circ}{360^\circ} \times 440 = 88$$

$$\text{Marks in science} = \frac{81^\circ}{360^\circ} \times 440 = 99$$

24)

Items	Expenditure	Central Angle
Cement	60	$\frac{60}{180} \times 360^\circ = 120^\circ$
Timber	30	$\frac{30}{180} \times 360^\circ = 60^\circ$
Steel	45	$\frac{45}{180} \times 360^\circ = 90^\circ$
Labour	45	$\frac{45}{180} \times 360^\circ = 90^\circ$



25)(a) Less than 4000 = 20 P(E) = 20/1000 = 1/500

(b) More than 9000 = 325 + 425 = 750 P(E) = 750/1000 = 3/4

(c) After 4000 & before 14000 = 210 + 325 = 535 P(E) = 535/1000 = 107/200

CASE BASED QUESTIONS

26)(a) Central angle = $\frac{25+5}{100} \times 360^\circ = \frac{30}{100} \times 360^\circ = 108^\circ$

(b) Central angle = $\frac{17+12}{100} \times 360^\circ = \frac{29}{100} \times 360^\circ = 104.4^\circ$

27)(a) Hindu

(b) Central angle for Sikh = $\frac{225}{1080} \times 360^\circ = 75^\circ$

Central angle for Hindu = $\frac{420}{1080} \times 360^\circ = 84^\circ$

28) (a) P(E) = 0, Because it is impossible event.

(b) Total participant = 60 + 84 + 108 = 252

P(E) = 60/252 = 5/21

29) (a) Rose Hall = 50 × ₹ 500 = ₹ 25000

Jasmine Hall = 25 × ₹ 750 = ₹ 18750

(b) Total person = 50 + 25 = 75 P(E) = 25/75 = 1/3

30) (a) P(E) = 2/52 = 1/26

(b) P(E) = 4/52 = 1/13

(c) P(E) = 40/52 = 10/13

CHAPTER 5 - SQUARES AND SQUARE ROOTS

MULTIPLE CHOICE QUESTION

1. Mohan marked pole's sequence with a different way as 12^2 & 13^2 . How many number of poles are situated between these two poles ? (AO1)
a) 26 b) 31 c) 24 d) 25
2. What would be the possible one's digit of the square root of the number $5ab6$? (AO1)
a) 2,9 b) 1,8 c) 5,7 d) 4,6
3. Express 9^2 as the sum of two consecutive integers. (AO1)
a) $40+41$ b) $50+31$ c) $36+45$ d) $72+9$
4. What will be the number of zeroes in the square of 100? (AO1)
a) 2 b) 6 c) 4 d) 8
5. After telling concept of square's unit digit, teacher asked that which following number's square will be even? (AO1)
a) 27 b) 21 c) 35 d) 50
6. The smallest number by which 48 should be multiplied so as to get a perfect square? (AO2)
a) 2 b) 3 c) 4 d) 5
7. Which of the following is not a Pythagorean triplet ? (AO2)
a) 3,4,5 b) 6,8,10 c) 5,12,13 d) 2,3,4
8. If there are total 144 rose plants in a park in such a way that number of rows and columns are equal. How many rows of plants are there? (AO2)
a) 72 b) 12 c) 6 d) 144

ASSERTION AND REASON QUESTIONS

In the following question a statement of Assertion (A) is followed by a statement of reason (R), choose the correct answer out of the following cases

- A) Both A and R are true and R is the correct explanation of A.
- B) Both A and R are true and R is not the correct explanation of A.
- C) A is true and R is false.
- D) A is false and R is true.

9. **Assertion:** 328 will never be a perfect square.
Reason: A number ends with 2,3,8 will not be a perfect square. (AO1)
10. **Assertion:** If the $10^2 = 100$, then the square root of of 100 is 10.
Reason: The square root is the number that we need to multiply by itself to get the original number. (AO1)
11. **Assertion:** The unit digit in the square of 289 is 1.
Reason: Unit digit is the rightmost digit of the number. (AO1)
12. **Assertion:** Natural numbers lie between 12^2 & 13^2 are 24.
Reason: Natural numbers are the positive integers which start from 1 and ends to infinity. (AO1)

2 MARKS QUESTIONS

13. Write 5^2 as the sum of odd numbers. (AO1)
14. Write 125 as difference of the square of the two consecutive natural number. (AO2)
15. Find the value of each of $118^2 - 117^2$ without calculating. (AO2)

16. Find the square root of 81 using successive subtraction of the odd numbers starting from 1.

(AO2)

17. Find the square root of 441 using prime factorization.

(AO2)

3 MARKS QUESTIONS

18. One day Amit saw a pattern of match sticks in which there are 11 rows with 11 sticks in each row. Help Amit by telling total number of match sticks in that pattern. (AO1)

19. What is the square root of 51.84?

(AO1)

20. Check 4096 is a perfect square or not.

(AO1)

21. If the side of a square is 2.4 cm. What will be the area of that square.

(AO1)

22. If the area of a square garden is 144 cm^2 , find the perimeter of that garden. (AO2)

5 MARKS QUESTIONS

23. A student of class VIII has 579 plastic pieces of 1 cm^2 and he wants to make a square with these pieces. Find the maximum possible length of that square and also find remaining number of pieces. (AO1)

24. What is the possible minimum number which can be subtracted to get perfect square from 3460? Find also that perfect square number. (AO2)

25. Math's teacher make a square of area 2025 cm^2 and he ask his students to tell name of its largest length (side or diagonal). Also he wants to get the length of side as well as diagonal of square by students. (AO2)

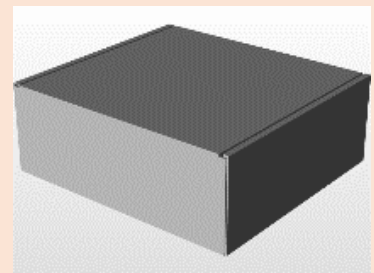
CASE BASED QUESTIONS

26. Ria wanted to design a square cardboard having an area of 2704 m^2 . She went to market and purchased a big cardboard. She had to cut the cardboard for making the square cardboard.

Based upon this information answer these following questions :-

a) What will be the each side of square ? (AO1)

b) If Ria needs to apply coloured ribbon on all across the cardboard, then which quantity she need to calculate and write the formula for that quantity. (AO2)



27. Smart watches are big innovation in the wearable industry, performing too many functions. The most common now a days is to be count the number of steps. This has a big impact on health.

Gunjan noticed the number of steps she walked on her smart watch in the evening and found it to be 25088.

Based on above information, answer the following question:

a) Is the given number a perfect square? Give reason.
(AO1)

b) What is the smallest number to be divided to make it a perfect square?
(AO2)



28. Once Rohan ask his teacher to suggest a simple way to get square of a number without direct multiplication. His teacher told him about the following algebraic identities to get square of numbers:

i) $(a+b)^2 = a^2 + 2ab + b^2$

ii) $(a-b)^2 = a^2 - 2ab + b^2$

Using above identities find the square of following numbers:

(AO2)

a) 101

b) 98

29. People have decided to plant 198 plants in their society.

30. They wanted to plant them in such a way that the

31. number of rows and number of columns remain same.



a) Find the maximum possible number of rows and columns, if they use only 198 plants.
(AO1)

b) Find the minimum number of plants they need more to use all plants.
(AO2)

32. Once upon a time, there was a magical pond. In this pond 01 lotus flower bloomed first day, 04 lotus flowers bloomed on second day, 09 lotus flowers bloomed on third day and so on. Then it is found number of flowers were equal to the square of that day.



Using this pattern find –

a) Number of flowers on the 28th day.

(AO1)

b) On which day, there were 2025 lotus flowers bloomed?

(AO1)

SOLUTIONS: CHAPTER 5 - SQUARES AND SQUARE ROOT

- | | | | |
|----------|-----------|-------------|----------|
| 1) c-24 | 2) d- 4,6 | 3) a- 40+41 | 4) c- 4 |
| 5) d- 50 | 6) b- 3 | 7) d- 2,3,4 | 8) b- 12 |

ASSERTION AND REASON QUESTIONS

- | | | | |
|------|-------|-------|-------|
| 9) a | 10) a | 11) b | 12) b |
|------|-------|-------|-------|

2 MARKS QUESTIONS

13) $5^2 = 1+3+5+7+9$

14) First number = $\frac{x^2-1}{2} = \frac{125-1}{2} = \frac{124}{2} = 62$

Second number = $\frac{x^2+1}{2} = \frac{125+1}{2} = \frac{126}{2} = 63$

Thus $125 = 63^2 - 62^2$

15) $118^2 - 117^2 = (118+117)(118-117) = 235$

16) $81-1=80$; $80-3=77$; $77-5=72$; $72-7=65$; $65-9=56$; $56-11=45$;
 $45-13=32$; $32-15=17$; $17-17=0$

Number of steps = 9

$\therefore \sqrt{81} = 9$

17) $\sqrt{441} = \sqrt{7 \times 7 \times 3 \times 3} = 7 \times 3 = 21$

3 MARKS QUESTIONS

18) Number of rows = 11

Number of sticks in each row = 11

Total number of matchsticks = $11 \times 11 = 11^2 = 121$

19) $\sqrt{51.84} = 7.2$

$$\begin{array}{r} 7.2 \\ \hline 7 \overline{) 51.84} \\ \underline{49} \\ 2 \\ \underline{142} \\ 2 \\ \underline{284} \\ 2 \\ \underline{284} \\ x \end{array}$$

CASE BASED QUESTIONS

26)(a) Area = 2704 m²

Side = $\sqrt{2704} = \sqrt{2 \times 2 \times 2 \times 2 \times 13 \times 13} = 2 \times 2 \times 13 = 52 \text{ m}$

(b) To get length of ribbon, she needs to calculate its perimeter.

Formula for perimeter of square = 4 × side

27)(a) 25088 is not a perfect square because its unit digit is 8 and we know that the numbers unit digit

2,3,7,8 never be a perfect square.

(b) $25088 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 7 \times 7$

Since in the prime factor of 25088, a single 2 is not in pair so we should divide 25088 by 2 to get the perfect square.

28) (a) $101^2 = (100+1)^2 = 100^2 + 2 \times 100 \times 1 + 1^2 = 10000 + 200 + 1 = 10201$

(b) $98^2 = (100-2)^2 = 100^2 - 2 \times 100 \times 2 + 2^2 = 10000 - 400 + 4 = 9604$

29) (a)

Handwritten long division showing the square root of 198. The quotient is 14 and the remainder is 02.

	14
1	<u>198</u>
1	-1
24	<u> 98</u>
4	-96
	<u> 02</u>

Maximum possible number of rows by using only 198 plants = 14

(b) since $14^2 < 198 < 15^2$

To get complete square with more plants, we require more plants = $15^2 - 198 = 225 - 198 = 27$

30) (a) Flower on 28th day = $28 \times 28 = 784$

(b) Day at which 2025 flowers will be = $\sqrt{2025} = 45$

CHAPTER 6- CUBES AND CUBE ROOTS
MULTIPLE CHOICE EQUATIONS

1. Which of the following is correct? (A01)
 - a) Cube of a negative number is always positive.
 - b) Cube of a negative number is always negative.
 - c) Cube of a negative number may be positive or negative.
 - d) All of the above

2. If the digit in one's place of a number is 2, then the last digit of its cube will be: (A01)
(a) 2 (b) 4 (c) 6 (d) 8

3. If the digit in one's place of a number is 3, then the last digit of its cube will be: (A01)
(a) 3 (b) 6 (c) 7 (d) 9

4. If the digit in one's place of a number is 6, then the last digit of its cube will be: (A01)
(a) 6 (b) 3 (c) 2 (d) 8

5. The volume of a cubical box is 64 cm^3 . Which of the following is its side? (A02)
(a) 2 cm (b) 4 cm (c) 6 cm (d) 8 cm

6. Which of the following is a perfect cube? (A01)
(a) 1000 (b) 243 (c) 343 (d) 270000

7. If a number is doubled then which of the following is a correct statement? (A01)
 - (a) Its cube is two times the cube of the given number.
 - (b) Its cube is three times the cube of the given number.
 - (c) Its cube is six times the cube of the given number.
 - (d) Its cube is eight times the cube of the given number.

8. Which of the following is equal to its own cube? (A01)
(a) -1 (b) -2 (c) -3 (d) -9

ASSERTION AND REASONING QUESTION

In the following question a statement of Assertion (A) is followed by a statement of reason (R), choose the correct answer out of the following cases

- A) Both A and R are true and R is the correct explanation of A.
- B) Both A and R are true and R is not the correct explanation of A.
- C) A is true and R is false.
- D) A is false and R is true.

9 Assertion (A) 125 is a perfect cube (A01)

Reasons (R) –The perfect cube is the result of multiplying the same integer three times.

10 Assertion(A): The cube of the number 12 is 1728 (A01)

Reason(R): if a number has 2 in its ones place, its cube has 8 in the place.

11 Assertion (A): $[(-1)^3 \times 2^3 \times (-3)^3 \times 4^3]$ is a positive number. (A01)

Reason (R): The cube of a negative number is negative while that of a positive number is positive

12 Assertion (A): If x and y are integers such that $x^2 > y^2$ then $x^3 > y^3$ (AO2)

Reason (R): Squares of negative integers are positive while their cubes are negative.

2 MARKS QUESTIONS

13. Find the volume of a cubical box whose surface area is 294 cm². (A01)

14. What is the volume of a cube whose each side is 4 cm? (A01)

15. What should we multiply in the “108” number so that it becomes a perfect cube? (A02)

16. Find the volume of a cube whose surface area is 216 square cm. (A02)

17. Find the cube root of 512 by the prime factorization method. (A01)

3 MARKS QUESTIONS

18. Is 392 a perfect cube? If not, find the smallest natural number by which 392 should be multiplied so that the product is a perfect cube. (A02)

19. Find the volume of a cube whose surface area is 150 m² (A02)

20. Find the smallest number by which 1600 must be divided so that the quotient is a perfect cube, further find its cube root (A02)

21. Check whether 1728 is a perfect cube by using prime factorisation. (A01)

22. Evaluate $3\sqrt{512} \times 343$ (A01)

5 MARKS QUESTIONS

23. Divide the number 8748 by the smallest number so that the quotient is a perfect cube. Also, find the cube root of the quotient. (A02)

24. Find the approximate length of the side of a cube whose volume is equal to a cuboid having dimensions 12m, 8m and 18m ? (A02)

25. Find the smallest number that must be subtracted from those numbers which are not perfect cubes so as to make them perfect cubes. What are the corresponding cube roots? (A01)

a) 130

b) 345

CASE BASED QUESTIONS

26. Difference of two perfect cube is 189.

If the cube root of the smaller of the two number is 3, find the cube root of the larger number. (A02)

27. A school decides to give prizes to its students in 3 categories discipline, academics and attendance the number of students getting the prize in each category is the ratio 3: 4: 5. If their product is 480,

(A02)

- (a) find the numbers.
- (b) Find the total number of students getting the prizes
- (c) If the value of each prize is 200, find the total cash prize
- (d) 28. Parikshit makes a cuboid of plasticine with sides 5 cm, 2 cm, and 5 cm. How many such cuboids will he need to form a cube? (A02)

29. Difference of two perfect cubes is 387. If the cube root of the greater of two numbers is 8, find the cube root of the smaller number. (A02)

30. Observe the following pattern:

$$1^3 = 1$$

$$1^3 + 2^3 = (1+2)^2$$

$$1^3 + 2^3 + 3^3 = (1+2+3)^2$$

Write the next three rows and calculate the value of $1^3 + 2^3 + 3^3 \dots + 9^3$ by the above pattern.

(A02)

SOLUTION: CHAPTER- 6 CUBES AND CUBE ROOTS

ANSWERS

- | | | | |
|------|------|------|-------|
| 1. B | 2. D | 3. C | 4. A |
| 5. B | 6. C | 7. D | 8. A. |

ASSERTION AND REASONING QUESTION

- | | | | |
|------|------|------|-------|
| 9. A | 10.B | 11 A | 12. D |
|------|------|------|-------|

2 MARKS QUESTIONS

13. $6a^2 = 294$

$A = 7, a^3 = 343$

14. Volume of cube = (side)³ = (4)³ = 64cubic cm.

15. $108 = 2 \times 2 \times 3 \times 3 \times 3$

108 must be multiplied by 2

16. $6a^2 = 216$

$a = 6$

$a^3 = 216$

17. $\sqrt[3]{512} = \sqrt[3]{2^3 \times 2^3 \times 2^3} = 8$

3 MARKS QUESTIONS

18. The prime factorisation of 392 gives:

$392 = 2 \times 2 \times 2 \times 7 \times 7$

We must multiply the 7 by the original number to make it a perfect cube.

Thus, $2 \times 2 \times 2 \times 7 \times 7 \times 7 = 2744$, which is a perfect cube, such as 23×73 or 143 .

19. side of cube = 5 cm, volume of cube = 125 cm³

20. $1600 = 23 \times 23 \times 52$

Divide 1600 by 25 = 64.

$\sqrt[3]{64} = 4$

21. Solution:

Prime factorisation of 1728 is

$1728 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$

Since all prime factors can be grouped in triplets.

Therefore, 1728 is a perfect cube.

22. By prime factorization,

$\sqrt[3]{512 \times 343} = \sqrt{(2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (7 \times 7 \times 7)} = (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (7 \times 7 \times 7)$
 $= 2 \times 2 \times 2 \times 7 = 2 \times 2 \times 2 \times 7 = 56$

5 MARKS QUESTIONS

23. $a^3 - b^3 = 189$

$$\sqrt[3]{b} = 3, b^3 = 27$$

$$a^3 = 189 + 27 = 216 = 6^3$$

24. Given, Three numbers are in the ratio 3:4:5, and their product = 480

Let's assume the numbers to be $3x$, $4x$ and $5x$, then we have

$$3x \times 4x \times 5x = 480$$

$$\Rightarrow 60x^3 = 480 \Rightarrow x^3 = 480/60 = 8 = (2)^3$$

$\therefore x = 2$ Thus, the numbers are $2 \times 3 = 6$, $2 \times 4 = 8$ and $2 \times 5 = 10$ (b) = 24 (c) = 4800

25. Solution:

Given, side of the cube is 5 cm, 2 cm and 5 cm.

Therefore, volume of cube = $5 \times 2 \times 5 = 50$

The prime factorisation of $50 = 2 \times 5 \times 5$

Here, 2, 5 and 5 cannot be grouped into triples of equal factors. Therefore, we will multiply 50 by $2 \times 2 \times 5 = 20$ to get perfect cube. Hence, 20 cuboid is needed.

CASE BASED QUESTIONS

26. The difference in two cubes = 387

And, the cube root of the greater number = 8

So, the greater number = $(8)^3 = 8 \times 8 \times 8 = 512$

Hence, the second number = $512 - 387 = 125$

Thus,

The cube root of 125 is

$$= \sqrt[3]{125} = \sqrt[3]{5 \times 5 \times 5} = 5$$

27. Solution:

According to the given pattern,

$$1^3 + 2^3 + 3^3 + \dots + 9^3$$

$$1^3 + 2^3 + 3^3 + \dots + n^3 = (1+2+3+\dots+n)^2$$

So when $n = 9$

$$1^3 + 2^3 + 3^3 + \dots + 9^3 = (1+2+3+\dots+9)^2$$
$$= (45)^2 = 2025$$

28. The given number is 8748

On prime factorising, we get

$$8748 = 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$$

Grouping of the equal factor in 3's, it's seen that $2 \times 2 \times 3$ is left without grouping.

$$8748 = 2 \times 2 \times 3 \times (3 \times 3 \times 3) \times (3 \times 3 \times 3)$$

Hence, on dividing the number 8748 by 12, we get 729

And, the cube root of 729 is $3 \times 3 \times 3 = 9$.

29. volume = $12 \times 8 \times 18$

$$A^3 = 1728$$

$$A = 12$$

30. a) $130 - 5 = 125$

$$\sqrt[3]{125} = 5$$

b) $343 - 2 = 343$

$$\sqrt[3]{343} = 7$$

CHAPTER 7- COMPARING QUANTITIES

MULTIPLE CHOICE QUESTIONS

1. 80 % of the 50 girls in class viii of a school are good in English. How many are weak in English? [AO2]
(a) 40 (b) 25 (c) 10 (d) 20
2. 5% of 2.5 lakh rupees is [AO1]
(a) 1.25 lakh rupees (b) 12500 rupees (c) 1250 rupees (d) 5000 rupees
3. A new movie was released on Thursday in a particular theatre. 150 tickets were booked that day. The next day, 180 tickets were booked. What was the percentage increase in the booking? [AO1]
(a) 20% (b) 30% (c) 18% (d) 15%
4. If 2% of a number is 18, what is that number? [AO1]
(a) 36 (b) 900 (c) 9 (d) 3600
5. 30% of 30 is [AO1]
(a) 30 (b) 90 (c) 9 (d) 1
6. The price of an umbrella of marked price Rs 350 after a discount of 10% is [AO1]
(a) Rs 300 (b) Rs 35 (c) Rs 300 (d) Rs 315
7. If 80= 10%, then 200= [AO2]
(a) 50% (b) 25% (c) 20% (d) 8%
8. The buying price of a packet of namkeen after 12% GST is Rs 100.80. then its price before gst is added is [AO2]
(a) Rs 80 (b) Rs 100 (c) Rs 88 (d) Rs 90

ASSERTION REASONING QUESTIONS

In the following question a statement of Assertion (A) is followed by a statement of reason (R), choose the correct answer out of the following cases

- A) Both A and R are true and R is the correct explanation of A.
- B) Both A and R are true and R is not the correct explanation of A.
- C) A is true and R is false.
- D) A is false and R is true.

9. ASSERTION: Dijo got a compound interest of Rs 2100 after one year for a principal of Rs 10000 after two years.

REASON: Compound interest is calculated using the formula $A=P(1 + \frac{R}{100})^n$ [AO2]

10. ASSERTION: The ratio of 20 hrs to 20 minutes is 20:20=1:1

REASON : To compare two quantities, the units must be same [AO2]

11. ASSERTION: The selling price of a geometry box of marked price Rs 150 on a discount of 20% is Rs 120

REASON : Discount =Marked price- Discount percentage [AO1]

12. ASSERTION: In simple interest, the growth remains constant. But in compound interest, the growth has been very fast.

REASON: In compound interest, the interest is calculated mostly on principal amount. But in simple interest, it is charged on both the principal as well as the accumulated interest [AO1]

2 MARKS QUESTIONS

13. A student got 150 marks out of 200 in Maths and 120 out of 180 in Science. In which subject he scored better? [AO2]
14. A person goes for shopping and spends 75% of his money. If he is left with Rs 600, how much money he had in the beginning? [AO1]
15. The number of unelectrified villages in India decreased from 18000 to 12000. What is the percentage decrease? [AO1]
16. The price of one pair of school uniform in a shop A is Rs 1500. Another shop B offers the same for Rs 1450. What is the percentage difference of the prices in both the shops?[AO1]
17. Find the compound interest for a sum of Rs 21000 at the rate of 3% per annum for three years. [AO1]

3 MARKS QUESTIONS

18. Find the difference between compound interest and simple interest on Rs 45000 at 12% per annum interest for two years. [AO2]
19. Aleena went for shopping mall to purchase a saree. Marked price of a saree is Rs 2000. Shop owner gave a discount of 20% and then a 5%. Find the price of the saree after the two discounts. [AO2]
20. Laxmi got 36 marks in PT1 (out of 40) and 56 marks in Half yearly exams(out of 60) in Maths. In which exam she scored better? [AO2]
21. In a particular season, Aravind harvested 30kg of cucumber compared to 25kg the previous season. Find the percentage increase. [AO1]
22. Seema weaves 25 baskets in 35days. In how many days will she weave 110 baskets? [AO1]

5 MARKS QUESTIONS

23. A shopkeeper bought 2 phones for Rs 8000 each. After selling the phones, there was a loss of 4% on the first phone while a profit of 8% on the second phone. Calculate the overall gain or loss percent on the whole transaction. [AO2]
24. If a man were to sell his hand cart for Rs 720, he would lose 25%. What must he sell it for to gain 25%? [AO2]
25. An alloy contains 36% zinc, 40% copper and the rest is nickel. Find in grams the quantity of each of the contents in a sample of 1kg alloy. [AO1]

CASE BASED QUESTIONS

26. Following is the table showing the various income tax slabs. A taxpayer can choose from old or new regime according to their convenience. A person whose annual taxable income is less than 7,00,001 is exempted from paying income tax under the new regime [AO2]

cleartax

Income tax slab rates for FY 2023-24/ AY 2024-25			
Old Regime			
Slabs	Individuals (Age < 60 years)	Resident Senior Citizens (≥60 but <80 years)	Resident Super Senior Citizens (80 years and above)
Up to Rs 2,50,000	Nil	Nil	Nil
Rs 2,50,001 to Rs 3,00,000	5%	Nil	Nil
Rs 3,00,001 to Rs 5,00,000	5%	5%	Nil
Rs 5,00,001 to Rs 10,00,000	20%	20%	20%
Above Rs 10,00,000	30%	30%	30%
New Regime			
Slabs	Income Tax Rates		
Up to Rs 3,00,000	Nil		
Rs 3,00,001 to Rs 6,00,000	5% (Tax rebate u/s 87A)		
Rs 6,00,001 to Rs 90,000	10% (Tax rebate u/s 87A up to Rs 7 lakh)		
Rs 9,00,001 to Rs 12,00,000	15%		
Rs 12,00,001 to Rs 1500,000	20%		
Above Rs 15,00,000	30%		

- (a) Vasudev opts the new regime and he has a taxable income of Rs 8 lakhs. What will be his total tax on that amount?
- (b) Manu aged 52, opted for old regime. If his total taxable income is 7 lakhs, what amount he has to pay?

27. Under ordinary conditions the minimum domestic water demand for a city with a full flushing system should be taken at 200 lpcd.(litres per capita per day): [AO2]

USE	CONSUMPTION(Ltr/PCD)
Drinking	5
Cooking	5
Bathing	75
Washing of Clothes	25
Washing Utensils	15
Washing and Cleaning of house	15
Lawn watering and gardening	15
Flushing of water and closets etc..	45
TOTAL	200

- (a) What percentage of water is used for cooking per day?
- (b) how much less percent of water is used washing utensils than washing clothes?
- (c) what percentage is used for cooking and bathing taken together?
- (d) if 40litres of water can be saved in overall, what percentage can be saved?

28. An EMI (Equated monthly instalment) is a fixed payable amount made by a borrower to a lender at a specified date each calendar month. EMI are used to pay off both interest and principal each month , so that over a specified number of years, the loan is fully paid off along with the interest. [AO2]

- (a) Shubham took a loan of Rs 1,00,000 at the rate of 12% per annum compounded annually. What will be the interest if he repays the amount after 2 years?
- (b) what will be the EMI if he repays in 20 months?

29. The **Dearness Allowance (DA)** is a calculation on inflation and allowance paid to civil servant employees (alongside public sector enterprises’ employees as public sector unit employees are also government employees but not civil servants), some private sector employees and civil servant pensioners in India. It is calculated as the percentage increase on the basic pay of the employee. The DA for the months January- June 2024 stands at 50% after an increase of 4%.

- (a) if the Basic pay of an employee is 35000, calculate the DA on May 2024.
- (b) find the difference in DA of an employee on December 2023 and April 2024. [AO1]

30. The **Nissan GT-R (Gran Turismo–Racing)** is a car built by Japanese marque Nissan since 2007. It has a 2+2 seating layout and is considered both a sports car and a grand tourer.



The sales of the car from 2021 to 2024 (from January to December) is given in the table below:

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021	16	16	18	17	16	17	23	22	23	20	20	20
2022	16	16	18	1	1	2	0	1	1	1	0	0
2023	47	45	51	25	24	25	30	33	32	26	26	27
2024	25	25	26	24	25	25	0	0	0	0	0	0

- (a) Find the percentage increase in the sales between December 2022 and December 2023.
- (b) What is the total sales difference percentage between 2022 and 2024(till June) [AO1]

SOLUTIONS: CHAPTER 7-COMPARING QUANTITIES

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

ASSERTION REASONING QUESTIONS

9. (a) 10(d) 11(c) 12(c)

2 MARKS QUESTIONS

13. Maths 75% and science $33\frac{1}{3}\%$.
So performed better in maths.
14. 75% of total= 600
So total = Rs 2400
15. Percentage decrease = $\frac{6000}{18000} \times 100$
= 33.3%
16. Percentage difference = $\frac{50}{1500} \times 100$
= 3.33%
17. Amount = 22947 (using formula) approx
So interest = 2947

3 MARKS QUESTIONS

18. Simple interest = 10800 (by formula)
Compound interest = $56448 - 45000 = 11448$ (by formula)
Difference = 648 [all in rupees]
19. Selling price after two discounts = $2000 \times 0.80 \times 0.95$
= Rs 1520
20. Percentage in PT = $\frac{36}{40} \times 100 = 90\%$
Percentage in HY = $\frac{56}{60} \times 100 = 93.3\%$
Scored better in HY.
21. Percentage increase = $\frac{5}{25} \times 100 = 20\%$
22. No of days needed = $\frac{35}{25} \times 110 = 154$ days (unitary method)
23. Loss on first phone = $8000 \times \frac{4}{100} = 320$
Profit on second phone = $8000 \times \frac{8}{100} = 640$
Overall = 320 profit
Percentage = $\frac{320}{16000} \times 100 = 2\%$

5 MARKS QUESTIONS

24. CP = $720 \times \frac{100}{75} = 960$
SP for a gain of 25% = $960 \times \frac{125}{100} = 1200$
25. Zinc = 36% of 1kg = 360g
Copper = 400g
Nickel = 24% = 240g

CHAPTER:8. ALGEBRAIC EXPRESSION

MULTIPLE CHOICE QUESTIONS

Q1. A rectangular garden has dimensions as $(7xy + 5yz - 3zx)$ and $(-3xz + 5yz - 2xy)$. Which of the following will be representing the perimeter of the garden? [AO1]

- a) $5xy + 10yz - 6zx$ b) $10xy + 20yz - 12zx$ c) $7xy + 5yz - 3zx$ d) $-3xz + 5yz - 2xy$

Q2. If $(2x - 5) + (x + 3) = \dots$ [AO1]

- a) $2x^2 + x - 15$ b) $2x^2 - 15$ c) $3x - 15$ d) $3x - 2$

Q3. If $(3y - 1)(2y - 3) = 6y^2 - ay + 3$, then 'a' is [AO2]

- a) 7 b) -11 c) 11 d) -7

Q4. If $x = 3$, $y = 2$, then $(x - y)(x^2 + xy + y^2)$ is [AO1]

- a) 31 b) 19 c) 1 d) 25

Q5. What is the area of the table cloth required for a table top of length $9n$ and breadth $4n^2$?

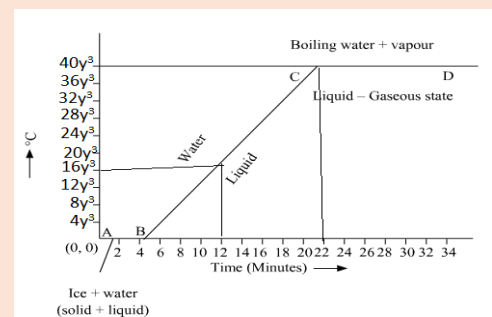
- a) $36n^3$ b) $13n^3$ c) $4n^2$ d) $9n$

[AO1]

Q6. The following is the temperature–time graph. Observe the graph carefully.

Choose the difference between the temperatures, after 12 minutes and after 22 minutes, from the options given below:

- a) $24y^3$ b) $4y^3$
c) $16y^3$ d) $40y^3$ [AO1]



Q7. Sushi's present age is thrice of Swan's present age. Four years ago, Swan's age was x . Then Sushi's age, four years ago was: [AO2]

- a) $3(x - 4)$ b) $3x - 6$ c) $3x + 8$ d) $3(x + 4)$

Q8. $a(b + c) = ab + ac$ is property. [AO1]

- a) closure property on addition b) commutative property on addition
c) associative property on addition d) distributive property on addition

ASSERTION AND REASON QUESTIONS

In these questions two statements are provided. One is Assertion (A) statement and the other one is Reason (R) statement. By reading the statements carefully, choose the correct option.

- a) Both Assertion (A) and Reason (R) are 'True' and Reason (R) is the correct explanation of the Assertion (A).
b) Both Assertion (A) and Reason (R) are 'True' and Reason (R) is not the correct explanation of the Assertion (A).
c) Assertion (A) is 'True' but Reason (R) is 'False'.
d) Assertion (A) is 'False' but Reason (R) is 'True'.

Q9. Assertion (A): The volume of a rectangular box, whose length, breadth and height are $2ax$; $3by$ and $5cz$ respectively, is $30abcxyz$.

Reason (R): The surface area of a cuboid can be calculated by using the formula,

$$T.S.A. = 2(lb + bh + hl) \quad [AO1]$$

Q10. Assertion (A): The algebraic expressions $(x + 4)(x - 4)$ can be simplified as $x^2 - 16$.

Reason (R): The expression $(a + b)(a - b)$ can always be simplified as $a^2 - b^2$. [AO1]

Q11. Assertion (A): The algebraic expression $2x^2 + 3x - 5$ is binomial.

Reason (R): An algebraic expression which has three terms is known as trinomial. [AO1]

Q12. Assertion (A): The product of $(3x)$ and $(9x^2 + 6y)$ is $27x^3 + 18xy$.

Reason (R): The sum of monomial and binomial is a trinomial.

[AO1]

2 MARKS QUESTIONS

Q13. Determine the total length of the wire required to fence a rectangular park with measurements $(4p^2 + 5p + 7)$ and $3p$ as its length and breadth respectively. [AO2]

Q14. Find the volume of cuboidal box whose dimensions are $0.5a$; $4b$; $1.5c$ [AO1]

Q15. Show that $a(a+b+c) + b(b+c+a) + c(c+a+b) - a(b+c+a) - b(c+a+b) - c(a+b+c) = 0$ [AO2]

Q16. Fill in the blanks with correct answer, in the following addition: [AO2]

$$\begin{array}{r} 12a - 9ab + 5b - 3 \\ (\dots) - 7ab + (\dots) + 12 \text{ (add)} \\ \hline \end{array}$$

$$8a - (\dots) + 2b - (\dots)$$

Q17. i) add $(-m^2)$ and $(-3m^2)$. [AO1]

ii) multiply $(-m^2)$ and $(-3m^2)$. [AO1]

Are the answers same in the above bits? [AO1]

3 MARKS QUESTIONS

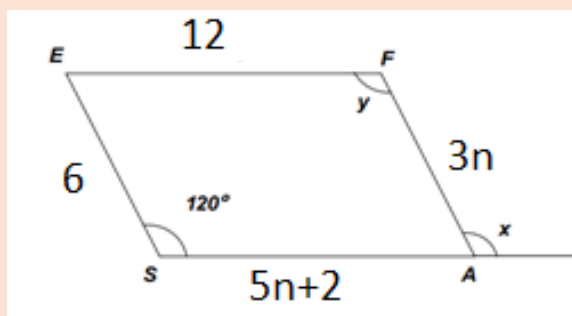
Q18. Find the product of $(a + b)$ and $(2a - 3b + c)$. Also find the product of $(2a - 3b + c)$ and $(a + b)$. Are the results same in both the cases. If it is so, then write the name of the property used here. [AO1]

Q19. On the occasion of Independence day, a walking programme was planned by the students and teachers of class 8th of a school, to instill the patriotism among the people, in a quadrilateral shaped public park, whose sides are represented as $(x^2 + x - 1)$; $(2x^2 - 3x + 1)$; $(5x^2 - 4x - 2)$ and $(7x^2 - 4x + 8)$. Determine the total length covered by them in one round, along the boundary of the park. [AO1]

Q20. Simplify $\left(\frac{3}{4}x - \frac{4}{3}y\right)\left(\frac{2}{3}x + \frac{3}{2}y\right)$ and also evaluate the product so obtained if $x = 1$ and $y = -1$.

[AO2]

Q21. SAFE is a parallelogram. Determine the value of $(SA) \times (AF)$ using the given figure. Is the product so obtained can be equalised to 72? If yes, explain why? [AO2]



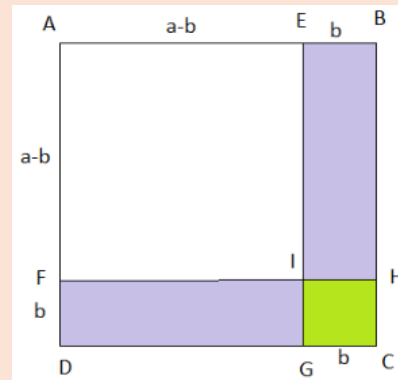
Q22. Complete the table of products:

[AO1]

First Polynomial → Second Polynomial ↓	3p	4q	pq
2q			
-7p			

5 MARKS QUESTIONS

Q23. The rough sketch of a square park is given in the figure. By using the given information, answer the given questions accordingly.



- i) What is the name of the shape of the portion GCHI? [AO1]
- ii) What is the length and breadth of the portion AEIF? [AO1]
- iii) Determine the area of the shaded portion FDGI. [AO1]
- iv) What is length of the boundary of the portion ABCD? [AO1]
- v) Find the sum of FI and BH. [AO1]

Q24. i) If $A = (7x + 2)$; and $B = (-6x + 8)$. Determine the value of $A - B$. Also find the value of $B - A$. Are the values $(A - B)$ and $(B - A)$ same? [AO2]

ii) Find the product of $(3y^4 - 7y^3 + 2y^2 - y + 3)$ and $(-6y - 2)$ [AO1]

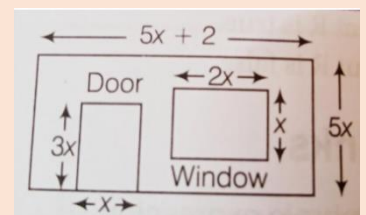
Q25. Kiriti has $3a(a + b + c)$ marbles in his hand. Karna has $-2b(a - b + c)$ marbles in his bag. Kunti has $4c(-a + b + c)$ marbles in her pocket.

i) Kiriti and Karna mixed their marbles in a box. Find the total number of marbles in the box. [AO1]

ii) Later, Kunti removed some marbles from the box, which are equal to the marbles in her pocket. Finally how many marbles left out in the box? [AO2]

CASE BASED QUESTIONS

Q26. Gouri, Sumit and Amit are members of a family. They made a rough sketch of one of the walls of their house as shown in the given figure. And the wall is having a window and a door as shown. Read the following questions carefully and answer them accordingly.

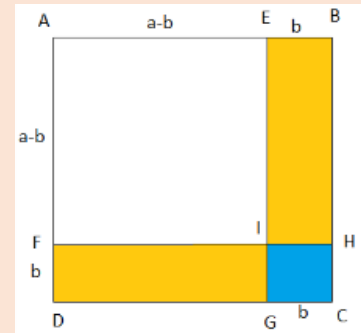


- i) Amit calculated the area of the door and area of the window. He found that, the area of the window is greater than the area of the door. Will you agree with him? (1M) [AO1]
- ii) Sumit wants to fix a pink coloured tape, along the four sides of the wall. If $x = 2$ units, then how much length of the tape is required for him to fix the tape. [AO1]
- iii) Gouri wants to paint the wall, excluding the door and the window. Help her in finding the area to be painted, if $x = 2$ units. (2M) [AO2]

(OR)

Gouri also wants to decorate the edges of the window and the door with decorative flowers. How many flowers are required for her to decorate, as she wants to fix the flowers at every unit length of the borders? (Use $x = 2$ units). (2M) [AO2]

Q27. The design of a park, with dimensions, is as shown in the given figure.



i) One day, Spandana, a regular walker in that park, observed that the total length, she walked per one round is $2(a + b)$ meters. How much total length will she walk in 1 round along the border ABCD, if $a=30\text{m}$ and $b = 5\text{m}$? (1M) [AO1]

ii) Somu, the gardener of that park, wants to grow rose plants in the corner portion (GCHI). Determine the area available for him to grow the rose plants. [Use the bit (i) information] (1M)

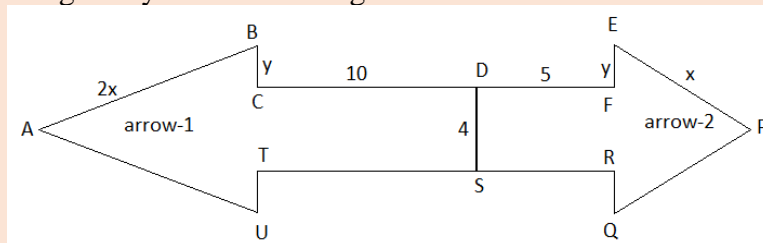
[AO1]
[AO1]

iii) a) Write an expression for the area of the land AFIE. (1M)

b) The municipal authorities want to level the ground AFIE, at the rate of 20Rs per sq.m. Determine the cost of leveling the ground AFIE. [Use the bit (i) information] (1M)

[AO2]

Q28. The design of the floor of a building is planned, by using two arrow shaped tiles, as shown in the figure. And the design is symmetrical along the line AP.



Answer the following questions using the information given in the figure.

i) Find the total length of the boundary of the arrow-1. (1M)

[AO2]

ii) Find the area of the portion CFRT. (1M)

[AO2]

iii) Find the difference between the boundaries of arrow-1 arrow-2. (2M)

[AO2]

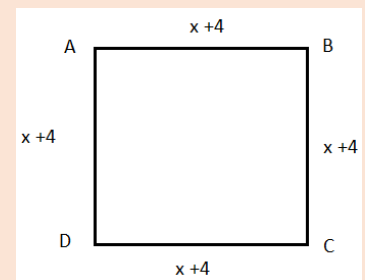
(OR)

iii) Find the sum of the perimeters of $\triangle ABU$ and $\triangle PQE$. (1M)

[AO2]

Q29. A garden is in the shape of a square as shown in the given figure. Its area is 289 m^2 .

Based on the given information answer the following questions accordingly.



i) Determine the value of 'x', if area is 289 m^2 (2M)

[AO2]

(OR)

i) By mistake the area of the square is typed as 289 m^2 . But actual area is 400 m^2 . Find the 'x' value for this actual area. (2M)

[AO2]

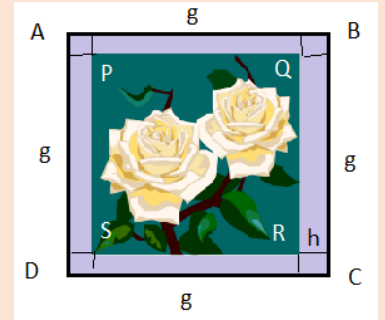
ii) Find the total length of the boundary of the park for the actual area. (1M)

[AO1]

iii) But one student called Suraj, could not identify the mistake in the area, so, he used the area as 289 m^2 only. Help him, in finding the perimeter for his value. (1M)

[AO2]

Q30. A photo frame is shown in the given figure with 'g' as the length of the outer square and 'h' as the width of the border all around. Observe the figure carefully and answer the given questions accordingly.



- i) Find the total length of the boundary of the outer border (ABCD) of the photo. (1M) [AO1]
- ii) Determine the length of the inner border (PQRS) of the photo frame. (1M) [AO2]
- iii) Determine the area of the photo PQRS. (2M) [AO2]

(OR)

- iii) If 'g' is found as 30cm and 'h' is found as 3cm, find the area of the photo PQRS. (2M) [AO2]

SOLUTIONS: CHAPTER-8. ALGEBRAIC EXPRESSION

MULTIPLE CHOICE QUESTIONS

- Q1. b) $10xy+20yz-12zx$
Q2. d) $3x-2$
Q3. c) 11
Q4. b) 19
Q5. $36n^3$
Q6. a) $24a^3$
Q7. c) $3x+8$
Q8. d) distributive property on addition.

ASSERTION AND REASON QUESTIONS

- Q9. b
Q10. a
Q11. d
Q12. c

2 MARKS QUESTIONS

Q13. Length of the wire = perimeter of the rectangle
$$= 2[(4p^2 + 5p + 7) + (3p)]$$
$$= 8p^2 + 16p + 14$$

Q14. Volume of cuboid = $l \times b \times h$
$$= 0.5a \times 4b \times 1.5c$$
$$= 3abc$$

Q15. Take $(a+b+c)$ common in all the terms
LHS = $(a+b+c)(a+b+c-a-b-c)$
$$= (a+b+c)(0)$$
$$= 0$$
$$= \text{RHS}$$

Q16. $12a - 9ab + 5b - 3$
 $(-4a) - 7ab + (-b) + 12$ (add)

 $8a - (16ab) + 2b - (-9)$

Q17. i) $-4m^2$ ii) $+3m^4$; both are not same.

3 MARKS QUESTIONS

Q18. Product-I = $(a + b) \times (2a - 3b + c)$
$$= 2a^2 - 3ab + ac + 2ab - 3b^2 + bc$$
$$= 2a^2 - 3b^2 - ab + bc + ac$$

Product-II = $(2a - 3b + c) \times (a + b)$
$$= 2a^2 + 2ab - 3ab - 3b^2 + ca + cb$$
$$= 2a^2 - 3b^2 - ab + bc + ac$$

\therefore Product-I = product-II

The name of the property is commutative property under multiplication.

Q19. Total length = perimeter = $(x^2 + x - 1) + (2x^2 - 3x + 1) + (5x^2 - 4x - 2) + (7x^2 - 4x + 8)$
$$= 15x^2 - 10x + 6$$

Q20. Product = $\frac{x^2}{2} + \frac{9xy}{8} - \frac{8xy}{9} - 2y^2$
Evaluate: $\frac{(1)^2}{2} + \frac{9(1)(-1)}{8} - \frac{8(1)(-1)}{9} - 2(-1)^2 = \frac{-52}{72}$

Q21. SA x AF = $(3n)(5n+2) = 15n^2+6n$
SA x AF = SE x EF = $6 \times 12 = 72$ (opposite sides of a parallelogram are equal)

Q22.

First Polynomial → Second Polynomial ↓	3p	4q	pq
2q	6pq	8q ²	2pq ²
-7p	-21p ²	-28pq	-7p ² q

5 MARKS QUESTIONS

Q23. i) square

- ii) (a-b) and (a-b)
- iii) (b)(a-b) = ab-b²
- iv) 4a
- v) (a-b)+(a-b) = 2a - 2b

Q24. i) $A - B = (7x + 2) - (-6x + 8) = 7x + 2 + 6x - 8 = 13x - 6$
 $B - A = (-6x + 8) - (7x + 2) = -6x + 8 - 7x - 2 = -13x + 6$
 $A - B \neq B - A$

ii) Product
 $= (3y^4 - 7y^3 + 2y^2 - y + 3) \times (-6y - 2)$
 $= -18y^5 - 6y^4 - 42y^4 + 14y^3 - 12y^3 - 4y^2 + 6y^2 + 2y - 18y - 6$
 $= -18y^5 - 48y^4 + 2y^3 - 2y^2 - 16y - 6$

Q25. Kiriti + Karna = $3a(a + b + c) - 2b(a - b + c)$
 $= 3a^2 + 3ab + 3ac - 2ab + 2b^2 - 2bc$
 $= 3a^2 + 2b^2 + ab + 3ac - 2bc$

Final total number of marbles in the box = $(3a^2 + 2b^2 + ab + 3ac - 2bc) - 4c(-a + b + c)$
 $= 3a^2 + 2b^2 + ab + 3ac - 2bc + 4ac - 4bc - 4c^2$
 $= 3a^2 + 2b^2 - 4c^2 + ab - 6bc + 7ac$

CASE BASED QUESTIONS

Q26. i) Answer: Area of the door = $(3x) \times (x) = 3x^2$
 Area of the window = $(2x) \times (x) = 2x^2$
 Here, area of door is greater than the area of the window.
 \therefore Amit's conclusion is wrong.

ii) Length of the tape = Perimeter of the wall = $2[(5x + 2) + (5x)]$
 $= 20x + 4$
 $= 20(2) + 4 [\because x = 2]$
 $= 44$ units

iii) Area of the wall to be painted = $\text{Ar}(\text{wall}) - \text{Ar}(\text{door}) - \text{Ar}(\text{window})$
 $= (5x + 2)(5x) - (3x)(x) - (2x)(x)$
 $= 20x^2 + 10x$
 $= 100$ sq.units [$\because x = 2$ units]

(OR)

iii) total length of the door and window = $8x + 6x = 14x = 14(2) = 28$
 number of flowers required = 28

Q27. i) length for 1 round $4a + 4b = 4(30) + 4(5) = 140$ m

- ii) area = $5 \times 5 = 25$ m²
- iii) $(a-b)(a-b) = a^2 - 2ab + b^2$
 area = $(30-5)(30-5) = 625$

$$\text{cost} = 625 \times 20 = 12500\text{Rs}$$

Q28. i) boundary of arrow-1 = $4x+2y+24$

ii) area = $15 \times 4 = 60$

iii) difference in boundaries = $4x+2y+24 - (2x+2y+14) = 2x+10$

(OR)

iii) sum = $(4x+2y+4) + (2x+2y+4) = 6x+4y+8$

Q29. i) $(x+4)^2 = 289$

$x+4 = 17$

$x = 13$

(OR)

$(x+4)^2 = 400$

$x+4 = 20$

$x = 16$

ii) boundary = $4 \times 16 = 64$

iii) wrong perimeter = $4 \times 13 = 52$

Q30. i) boundary of ABCD = $4g$

ii) inner boundary = $4(g-2h) = 4g-8h$

iii) area of inner square = $(g-2h)^2$

(OR)

iii) area of PQRS = $(30-6)^2 = 24 \times 24 = 576$

Reasoning: The surface area of all three-dimensional shapes can be calculated using similar formulas based on the shape. (AO2)

12. Assertion: The perimeter of a triangle is the sum of the lengths of its three sides. (AO2)

Reasoning: The perimeter can be simplified by averaging the lengths, offering a better representation

2 MARKS QUESTIONS

13. Calculate the area of a rectangle with a length of 15 cm and a width of 6 cm. (AO1)

14. A circular pond has a radius of 5 meters. Find the circumference of the pond. Use ($\pi =$ approx 3.14). (AO1)

15. If the height of a triangular garden is 12 m and the area is 36 m², find the length of the base of the triangle. (AO1)

16. Calculate the volume of a cube with a side length of 5 cm. (AO1)

17. A cylindrical water tank has a radius of 4 m and a height of 6 m. What is the total surface area of the tank? (Use ($\pi = 22/7$)) (AO2)

3 MARKS QUESTIONS

18) A rectangular garden has a length of 14 meters and a breadth of 10 meters. Calculate the area of the garden and also find the perimeter. (AO1)

19) A circular pond has a radius of 5 meters. Find the circumference of the pond. Use ($\pi =$ approx 3.14). (AO1)

20) A cube has a side length of 6 cm. Determine the total surface area of the cube. (AO1)

21 Calculate the volume of a cylindrical container with a radius of 7 cm and a height of 12 cm. Use ($\pi =$ approx 3.14). (AO2)

22) A triangular park has a base of 10 meters and a height of 8 meters. Find the area of the park and its height if the area were doubled. (AO2)

5 MARKS QUESTIONS

23) A triangle has a base length of 12 cm and a height of 9 cm. Calculate the area of the triangle. Explain the formula used for calculating the area and show your working steps (AO2)

24) A cylindrical water tank has a radius of 5 m and a height of 10 m. Calculate the total surface area of the tank. Use the formula for the surface area of a cylinder, showing all calculations. (AO2)

25) A cube has a side length of 8 cm. Calculate the volume of the cube and explain the significance of this measurement. Include the formula used to find the volume and show your working steps. (AO2)

CASE BASED QUESTIONS

- 26) A rectangular garden is 15 meters long and 8 meters wide. The garden is surrounded by a walkway of uniform width, which is 2 meters wide on all sides. (AO2)
- Calculate the area of the garden.
 - Determine the total area of the garden including the walkway.
- 27) A water tank in the shape of a cylinder has a radius of 2 meters and a height of 6 meters.(AO2)
- Find the capacity of the tank in cubic meters.
 - If the tank is filled with water up to 5 meters, what is the volume of the water in the tank?
- 28) A cuboid has a length of 10 cm, a width of 5 cm, and a height of 3 cm. (AO2)
- Calculate the surface area of the cuboid.
 - If the cuboid is made of cardboard and needs to be covered, how many square centimetres need to be covered?
- 29) A trapezium has bases of lengths 10 cm and 6 cm, with a height of 5 cm. (AO2)
- Find the area of the trapezium.
 - If each base of the trapezium is extended by 3 cm, calculate the new area.
- 30) A cone has a radius of 3 cm and a height of 9 cm. (AO2)
- Calculate the volume of the cone.
 - If the cone is filled with liquid, how much liquid is required to fill five such cones?

SOLUTIONS: CHAPTER 9 - MENSURATION MULTIPLE CHOICE QUESTIONS

- 1). 40 cm^2 , 2) 8 , 3) c) It quadruples
4) 351.68 cm^2 5) 20 cm^2 6) It quadruples 7) circle 8) b) increased

ASSERTION AND REASON QUESTIONS

- 9) :- Both Assertion (A) and Reason R are true, and Reason R is the correct explanation of Assertion (A). 10) :- Assertion (A) is true, but Reason R is false. 11) Assertion (A) is true, but Reason R is false
12) Assertion (A) is true, but Reason R is false.

2 MARKS QUESTIONS

- 13) Length of rectangle = 15 cm
Breadth of rectangle = 6 cm
Area of rectangle = Length x Breadth
= $15 \text{ cm} \times 6 \text{ cm}$
= 90 cm^2
Area of rectangle is 90 cm^2
- 14) Circumference of the circle = $2 \times \pi \times r$

$$= 2 \times \frac{22}{7} \times 10$$

$$= 62.86 \text{ cm}$$

15)

Area of Triangle = $\frac{1}{2}$ x base x height

$$36 = \frac{1}{2} \times \text{base} \times 12$$

Base = 6 m

16) - Volume of cube = side³

$$= 5^3 \text{ cm}^3$$

$$= 125 \text{ cm}^3$$

The volume of a cube is 125 cm³

17) The formula for the surface area of a cylinder is:

$$A = 2 \pi r h + 2 \pi r^2$$

Lateral surface area = $2\pi r h$

$$= 2 \times \left(\frac{22}{7}\right) \times 4 \times 6$$

$$= 2 \times \left(\frac{22}{7}\right) \times 24$$

$$= \frac{1056}{7}$$

$$= 150.86 \text{ cm}^2$$

Area of one base = πr^2

$$= \left(\frac{22}{7}\right) \times 4^2$$

$$= \left(\frac{22}{7}\right) \times 16$$

$$= 50.24 \text{ cm}^2$$

Total area of bases = $2 \times 50.24 = 100.48 \text{ cm}^2$

Now, add the lateral surface area and the area of the bases:

Total surface area = $150.86 + 100.48$

$$= 251.44 \text{ cm}^2$$

So, the surface area of the cylinder is 251.44 cm².

3 MARKS QUESTIONS

18) Area = length \times breadth

$$\text{Area} = 14 \times 10 = 140 \text{ m}^2$$

$$\text{Perimeter} = 2 \times (\text{length} + \text{breadth})$$

$$\text{Perimeter} = 2 \times (14 + 10)$$

$$= 2 \times 24 = 48 \text{ m.}$$

So, the area of the garden is 140 m^2 , and the perimeter is 48 m.

19) Circumference = $2 \times \pi \times r$

$$\text{Circumference} = 2 \times 3.14 \times 5$$

$$= 6.28 \times 5$$

$$= 31.4 \text{ meters}$$

So, the circumference of the pond is 31.4 m.

20) Total Surface Area = $6 \times a^2$

$$\text{Total Surface Area} = 6 \times (6)^2$$

$$= 6 \times 36$$

$$= 216 \text{ cm}^2$$

So, the total surface area of the cube is 216 cm^2

21) Volume of a cylindrical container = $\pi \times r^2 \times h$

$$\text{Volume of a cylindrical container} = 3.14 \times (7)^2 \times 12$$

$$= 3.14 \times 49 \times 12$$

$$= 1846.32 \text{ cm}^3$$

So, the volume of the cylindrical container is 1846.32 cm^3 .

22)- Area of Triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

$$\text{Area of Triangle} = 21 \times 10 \times 8$$

$$= 12 \times 80$$

$$= 40 \text{ m}^2$$

If the area were doubled, the new area would be:

$$\text{New Area} = 2 \times 40 = 80 \text{ m}^2$$

$$\text{New Height} = \frac{\text{New Area} \times 2}{\text{Base}}$$

$$\text{New Height} = \frac{80 \times 2}{10}$$

=16 meters

So, the area of the park is 40 m^2 . If the area were doubled, the new height would be 16m.

5 MARKS QUESTIONS

23)- Area of Triangle = $\frac{1}{2}$ x base x height, **Base:** The length of the base of the triangle. **Height:**

The perpendicular distance from the base to the opposite vertex.

The formula calculates the area by taking half of the product of the base and the height. This is because the area of a triangle is essentially half the area of a rectangle with the same base and height.

Substituting the given values:

$$\text{Area of Triangle} = \frac{1}{2} \times 12 \times 9$$

Calculate the product:

$$\text{Area} = \frac{1}{2} \times 108$$

Finally, divide by 2:

$$\text{Area} = 54 \text{ cm}^2$$

So, the area of the triangle is 54 cm^2

24):- To calculate the total surface area of a cylindrical water tank, use the formula:

$$\text{Total Surface Area} = 2\pi rh + 2\pi r^2$$

Step-by-Step Calculation:

1. **Calculate the Lateral Surface Area:** The lateral surface area of the cylinder is the area around the sides and can be found using:

$$\text{Lateral Surface Area} = 2\pi rh$$

Substituting the given values:

$$\text{Lateral Surface Area} = 2 \times 3.14 \times 5 \times 10$$

$$=2 \times 3.14 \times 50$$

$$=6.28 \times 50$$

$$=314 \text{ m}^2$$

2. **Calculate the Area of the Two Bases:** The area of one base of the cylinder is:

$$\text{Area of one base} = \pi r^2$$

Substituting the given values:

$$\text{Area of one base} = 3.14 \times 5^2$$

$$=3.14 \times 25$$

$$=78.5 \text{ m}^2$$

Since there are two bases:

$$\text{Total area of the bases} = 2 \times 78.5 = 157 \text{ m}^2$$

3. **Calculate the Total Surface Area:** Add the lateral surface area and the area of the bases:

$$\text{Total Surface Area} = \text{Lateral Surface Area} + \text{Total area of the bases}$$

$$= 314 + 157$$

$$= 471 \text{ m}^2$$

25):- To calculate the volume of a cube, use the formula:

$$\text{Volume of a cube} = a^3$$

where a is the length of a side of the cube.

Formula Explanation

- **Volume:** The measure of the space contained within the cube.
- **Side length (a):** The length of one edge of the cube.

Since a cube has all sides of equal length, the volume is found by cubing the side length.

Given: Side length $a = 8 \text{ cm}$

Calculation Steps:

1. **Apply the Formula:**

$$\text{Volume of a cube} = a^3$$

Substituting the given side length:

$$\text{Volume of a cube} = 8^3$$

2. **Calculate:**

$$8^3 = 8 \times 8 \times 8 = 64 \times 8 = 512 \text{ cm}^3$$

Significance of Volume Measurement

- **Space Measurement:** The volume represents the total space available inside the cube. In practical terms, it tells you how much of a substance (such as liquid, gas, or solid) the cube can hold.
- **Applications:** Understanding the volume is crucial in various fields, such as engineering, packaging, and construction, where knowing the capacity or amount of material needed is

CASE BASED QUESTIONS

26) Calculate the Area of the Garden = Area of rectangle

Area of rectangle = Length x Breadth

Given , Length =15 m and Width = 8 m

$$\text{Area of the Garden} = 15 \times 8 = 120 \text{ m}^2$$

ii. Determine the Total Area of the Garden Including the Walkway. To find the total area including the walkway, you need to account for the walkway surrounding the garden on all sides.

1. **Calculate the Dimensions of the Garden Including the Walkway:**

The walkway is 2 meters wide on all sides. This adds 2 meters to each side of the garden, so the total width and length including the walkway are:

- Length Including Walkway: $15 + (2 \times 2) = 15 + 4 = 19 \text{ m}$.
- Width Including Walkway: $8 + (2 \times 2) = 12 \text{ m}$.

2. Calculate the Total Area Including the Walkway:

Total Area = Length Including Walkway \times Width Including Walkway

$$= 19 \times 12 = 228 \text{ m}^2$$

The area of the garden alone is 120 m^2

- The total area of the garden including the walkway is 228 m^2

27) To solve these problems, use the formula for the volume of a cylinder.

i. Find the Capacity of the Tank in Cubic Meters

$$\text{volume of a cylinder (V)} = \pi \times r^2 \times h$$

Given: Radius $r=2$ m and Height $h=6$ m

$$V = \pi \times r^2 \times h$$

$$V = 3.14 \times 2^2 \times 6 = 3.14 \times 24$$

$$V = 75.36 \text{ m}^3$$

So, the capacity of the tank is 75.36 m^3

ii. Volume of Water in the Tank Filled Up to 5 Meters

To find the volume of water when the tank is filled up to a height of 5 meters, use the same formula, but with the height adjusted to 5 meters:

$$\text{volume of a cylinder (V)} = \pi \times r^2 \times h$$

Given: Radius $r=2$ m and Height $h=5$ m

$$V = \pi \times r^2 \times h$$

$$V = 3.14 \times 2^2 \times 5 = 3.14 \times 20$$

$$V = 62.8 \text{ m}^3$$

So, the volume of water in the tank when filled up to 5 meters is 62.8 m^3

28) Calculate the Surface Area of the Cuboid

$$\text{Surface area of a cuboid} = 2(lw+lh+wh)$$

$$\text{Surface area of a cuboid} = 2(lw + lh + wh)$$

$$\text{Surface area of a cuboid} = 2(lw+lh+wh)$$

Given: Length $l=10$ cm, Width $w=5$ cm and Height $h=3$ cm

Substitute these values into the formula:

$$\text{Surface area of a cuboid} = 2 \times (lw+lh+wh)$$

$$= 2 \times [(10 \times 5) + (10 \times 3) + (5 \times 3)]$$

$$= 2 \times [(10 \times 5) + (10 \times 3) + (5 \times 3)]$$

$$= 2 \times 95 = 190 \text{ cm}^2$$

ii. Determine the Amount of Cardboard Needed to Cover the Cuboid

Since the surface area of the cuboid is calculated to be 190 cm^2 , this is the total amount of cardboard needed to cover the cuboid.

29) Area of a trapezium $(A) = \frac{1}{2} \times (b_1+b_2) \times h$

Given: Base 1 $b_1=10$ cm, Base 2 $b_2=6$ cm and Height $h=5$ cm

Substitute these values into the formula:

$$\begin{aligned} A &= \frac{1}{2} \times (10+6) \times 5 \\ &= \frac{1}{2} \times 16 \times 5 = \frac{1}{2} \times 80 \\ &= 40 \text{ cm}^2 \end{aligned}$$

ii. Calculate the New Area if Each Base is Extended by 3 cm

If each base is extended by 3 cm, the new lengths of the bases will be:

- New Base 1 $b_1' = 10+3 = 13$ cm
- New Base 2 $b_2' = 6+3 = 9$ cm

Using the same height $h = 5$ cm, substitute the new base lengths into the area formula:

$$\begin{aligned} A' &= \frac{1}{2} \times (b_1'+b_2') \times h \\ &= \frac{1}{2} \times (13+9) \times 5 \\ &= \frac{1}{2} \times 22 \times 5 \\ &= 55 \text{ cm}^2 \end{aligned}$$

30) Calculate the Volume of the Cone

$$\text{Volume of a cone (V)} = \frac{1}{3} \pi r^2 h$$

Given: Radius $r = 3$ cm and Height $h = 9$ cm

Substitute these values into the formula:

$$\begin{aligned} V &= \frac{1}{3} \times 3.14 \times 3^2 \times 9 \\ &= \frac{1}{3} \times 3.14 \times 3^2 \times 9 \\ &= \frac{1}{3} \times 3.14 \times 9 \times 9 \\ &= \frac{1}{3} \times 3.14 \times 81 = 84.78 \text{ cm}^3 \end{aligned}$$

So, the volume of one cone is 84.78 cm^3

ii. Volume Required to Fill Five Such Cones

To find the total volume of liquid required to fill five cones, multiply the volume of one cone by 5:

$$\text{Total Volume} = 5 \times 84.78 = 423.9 \text{ cm}^3$$

CHAPTER 10- EXPONENTS AND POWERS

MULTIPLE CHOICE QUESTIONS

1. The standard form of 5126000 is [AO1]
(a) 5.126×10^4 (b) 5.126×10^6 (c) 5.126×10^{-4} (d) 5.126×10^{-6}
2. $\left(\frac{2}{3}\right)^{-5}$ is equal to [AO1]
(a) $\left(\frac{2}{3}\right)^5$ (b) $(3/2)^5$ (c) $\left(\frac{3}{2}\right)^{-5}$ (d) 1
3. If $\frac{8^{2n+1}}{8^{-3}} = 8^5$, then the value of n is [AO2]
(a) $\frac{1}{2}$ (b) $-\frac{1}{2}$ (c) 2 (d) -2
4. The mass of the earth is 5.97×10^{24} kg, whereas Jupiter has a mass of 1.8986×10^{27} kg
About how many times mass of Jupiter is bigger than mass of Earth? [AO2]
(a) 3 (b) 31 (c) 300 (d) 318
5. The distance of planet Neptune from sun is 4495000000000000km. Which of the following can be another way of representing the distance (in km) between Neptune and sun? [AO2]
(a) 4.495×10^{14} (b) 4.495×10^{15} (c) 4.495×10^{16} (d) 4.495×10^{17}
6. Multiplicative inverse of $(2^{-2} + 3^{-2} + 4^{-2})^{-1}$ is [AO2]
(a) $\frac{61}{144}$ (b) $\frac{144}{61}$ (c) $\frac{-61}{144}$ (d) $\frac{-144}{61}$
7. $\frac{1}{64}$ can be expressed as [AO1]
(a) 2^5 (b) 2^{-5} (c) 2^{-6} (d) 2^6
8. The standard form of the number 3456.678 is [AO1]
(a) 3456.678×10^0 (b) 34.56678×10^2 (c) 3.456678×10^3 (d) 3.456678×10^{-3}

ASSERTION RESONING QUESTIONS

9. Assertion: $2^4 \times 2^6 = 2^{10}$.
Reason: this is because the product rule of the exponents state that $a^m \times a^n = a^{m+n}$ [AO1]
10. Assertion: $25^0 = 25$
Reason: any number raised to the power zero is the number itself [AO1]
11. Assertion: $\left(\frac{2}{3}\right)^{-3} = \frac{-8}{27}$
Reason: $a^{-m} = -a^m$ [AO2]
12. Assertion: $[(2)^3]^{-2} = 2^1$
Reason: $[(a)^m]^{-n} = a^{m-n}$ [AO1]

2 MARK QUESTIONS

13. Express 4.85×10^{-5} km in usual form (in km) [AO1]
14. Pluto is 5913000000m far away from the sun. Express this in standard form. [AO1]

15. Convert 5 hectares in m^2 and express it in standard form. [AO1]

16. Find the product of cube of 3 and square of 2. [AO2]

17. Express $\left[\left(-\frac{3}{2} \right)^{-2} \right]^{-3}$ as a power of rational number with negative exponent. [AO1]

3 MARK QUESTIONS

18. The number of red blood cells per cubic millimeter of blood is approximately 5.5 million.

If the average body contains 5L of blood, what is the total number of red cells in the body?

Write in standard form. (1L= 1000000mm³) [AO2]

19. Find the value of x^{-3} , if $x = 100^{1-4} \div 100^0$ [AO1]

20. If $5^{3x-1} \div 25 = 125$, then find the value of x . [AO2]

21. Express $\frac{1.5 \times 10^6}{2.5 \times 10^4}$ in the standard form. [AO2]

22. The cells of a bacteria double itself every hour. How many cells will there be after 12 hour, if initially we start with 1 cell? Express the answer in powers. [AO2]

5 MARK QUESTIONS

23. If the size of a red blood cell is 0.0000007m and the size of a plant cell is 0.00001275m, then what is the difference between the sizes of the red blood cell and the plant cell?

Which one has the greater size? [AO2]

24. If $a = -1$ and $b = 2$, then find the value of the following:

(a) $a^b + b^a$ (b) $a^b \div b^a$ [AO1]

25. Consider a quantity of radioactive substance. The fraction of this quantity that remains after t half-lives can be found using the expression 3^{-t} .

(a) what fraction of substance remains after 7 half-lives? [AO1]

(b) after how many half-lives, will the fraction be $\frac{1}{243}$ of the original? [AO2]

CASE STUDY QUESTIONS

26. When a person gets infected or become sick, Doctor advises him for blood test. Pathologist

finds the number of cells in per cubic millimeter of blood. His blood report shows the following values Red blood cells count (RBC). --. 4.45×10^6 per mm³

White blood cells count (WBC) --. 8.9×10^3 per mm³

(Leucocytes)

Platelets count --. 3.02×10^5 per mm³

Hemoglobin --. 12.8 GM%

- (1) Find the ratio between RBCs and WBCs is [AO2]
- (2) What is the total number of RBCs and Platelets. [AO1]
- (3) In the sample, which are more WBCs or Platelets? [AO1]

27. On our Planet Earth approximately 71% is covered with water and 29% is land, out of this some area is covered by deserts in different continents. The deserts of world are given in the following table.

S. No.	Deserts of World	Area (Square Km.)
1	Kalahari, South Africa	932400
2	Thar, India	199430
3	Gibson, Australia	155400
4	Great Victoria, Australia	647500
5	Sahara, North Africa	8598800

- (1) Write the area of Sahara desert in standard form. [AO1]
- (2) After writing in standard form, Arrange these values in ascending order. [AO2]
- (3) Using the data in given table, find the total desert area in Africa in standard form. [AO1]
- (4) Find the ratio of area of Kalahari and Gibson desert. [AO1]

28. The mass of the earth is $5,976,000,000,000,000,000,000$ Kg and the radius of the earth is 6.37×10^6 m. Moon is the natural satellite of earth which revolves around the sun due to strong gravitational force of the earth. The mass of moon is 7.36×10^{22} Kg. The radius of the moon is 1.74×10^6 m. The distance between the earth and moon is 3.84×10^5 km.

- Write the mass of earth in standard form? [AO1]
- Express the distance between earth and moon in m and find its square. Write your answer in standard form? [AO2]
- Express the double of difference of radius of earth and moon in standard form. [AO2]
- What will be the product of mass of the moon and mass of earth in exponential form? [AO1]

29. The Sun is at an average distance of about 93,000,000 miles (150,000,000 Kilometer) away from Earth. It is so far away that light from the Sun, travelling at a speed of 300,000 Kilometers per second, takes about 8 minutes to reach us. Like all other planets in our solar

system, Earth travels in its elliptical orbit. The Sun is at average distance of 228,000,000 Kilometers from the Mars and 108,000,000 Kilometers from the Venus.

- 1) Find the distance between Earth and Sun. [AO1]
 - 2) Find the distance between Mars and Venus in standard form? [AO1]
 - 3) Find the approximate time in seconds in standard form in which light reaches Mars from Sun. [AO2]
 - 4) Which planet is far away from Earth, Venus or Mars? Justify by calculating distance in standard form? [AO1]
- 30.** Viruses range in size from 0.02 to 0.25 micron. Bacteria are giants when compared to viruses. The smallest bacteria are about 0.4 micron. 1 micron = 10^{-6} metre that is one millionth part of metre.
- (1)- What are the size of smallest bacteria ? [AO1]
 - (2)- Express 0.4 micron in terms of metres in standard form? [AO1]
 - (3)- Find the ratio of largest size of virus to smallest size of bacteria. [AO2]
 - (4)- If size of a virus and a bacterium are 0.02 and 0.4 microns. How many times is the size Of bacterium as compared to virus? [AO2]

SOLUTIONS: CHAPTER 10- EXPONENTS AND POWERS

MULTIPLE CHOICE QUESTIONS

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

ASSERTION RESONING QUESTIONS

9. (a)
10. (d)
11. (d)
12. (d)

2 MARK QUESTIONS

13. 0.0000485
14. 5.913×10^9
15. $50000 = 5 \times 10^4 m^2$
16. 108
17. $\left[\left(-\frac{2}{3} \right)^{-6} \right]$

3 MARK QUESTIONS

18. $5 \times 10^3 \times 5.5 = 2.75 \times 10^4$
19. $100^9 = 10^{18}$
20. $3x - 3 = 3, x = 2.$
21. $60 = 6 \times 10$
22. 2^{12}

5 MARK QUESTIONS

23. $0.0000007m - 0.00001275m = -1.275 \times 10^{-5}$. Plant cell is bigger.
24. (a) $3/2$ (b) 2
25. (a) 3^{-7} (b) $\frac{1}{243} = 3^{-3}$. So 3 half lives.

CASE STUDY QUESTIONS

26. (a) $4.45 \times 10^6 : 8.9 \times 10^3$
(b) $8.9 \times 10^3 : 3.02 \times 10^5$
(c) platelet
27. (a) $8.5988 \times 10^6 sqkm$
(b) arrange them in order.
(c) $9.5312 \times 10^6 sqkm$
(d) 932400: 155400
28. (a) $5.976 \times 10^{18} kg$
(b) $3.84 \times 10^5 km.$, square is $3.84 \times 10^{10} km.$
(c) $6.37 \times 10^6 - 1.74 \times 10^6$
(d) $5.976 \times 10^{18} \times 7.36 \times 10^{22}$
29. (a) 150,000,000 Kilometer
(b) $228,000,000 - 108,000,000 = 1.2 \times 10^8$
(c) mars
30. (a) 0.4 macron
(b) 4×10^{-7}
(c) $0.25 \times 10^{-6} : 4 \times 10^{-7}$

CHAPTER 11- DIRECT AND INVERSE PROPORTIONS

MULTIPLE CHOICE QUESTIONS

- 1) If 'x' and 'y' are in a direct proportion then which of the following is correct? (AO1)
- (a) $x - y = \text{constant}$ (b) $x + y = \text{constant}$
(c) $x \times y = \text{constant}$ (d) $\frac{x}{y} = \text{Constant}$
- 2) A man walks 20 km in 5 hours. Find out the time it will take for him to walk 32 km? (AO2)
- a) 3 hours b) 4 hours c) 6 hours d) 8 hours
- 3) If $x \propto y$ and $x_1=5, y_1=210$ and $x_2 = 2$, then find y_2 ? (AO1)
- a) 200 b) 84 c) 99 d) 70
- 4) The perimeter of a square and its side is in: (AO1)
- a) Direct Proportion b) Inverse Proportion
c) Neither direct nor inverse d) Cannot be determined
- 5) If 14 kg sugar costs Rs. 882, then the cost of 22 kg of sugar is (AO1)
- a) 1254 b) 1289 c) 1342 d) 1386
- 6) x and y are in direct proportion. When x is 8, y is 12. Which of the following is not a possible pair of corresponding values of x and y ? (AO2)
- a) 10 and 15 b) 2 and 3 c) 6 and 9 d) 15 and 20
- 7) Which of the following is case of direct variation; (AO2)
- (a) If the length of radius is increased the circumference will be increased
(b) If number of students in a hostel are increased then the fixed food provision will last for less days
(c) For fixed duration, more the periods, lesser will be the duration of one period
(d) Time taken will be less if number of workers are increased to complete the same work.
- 8) If the weight of 12 sheets of thick paper is 40 grams, how many sheets of the same paper would weigh 2500 grams? (AO2)
- (a) 750 (b) 800 (c) 850 (d) 950

ASSERTION REASON QUESTIONS

Direction: In the following questions 9 - 12, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

- a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

- (c) Assertion (A) is true but Reason (R) is false.
 (d) Assertion (A) is false but Reason (R) is true.

9) Assertion (A): If the cost of 16 books is 300. Then the cost of 18 books is 337.50

Reason (R): In a direct proportion, when one quantity increases other quantity also increases and vice versa. (AO2)

10) Assertion (A): If we increase the speed of the car, then the time taken to reach the destination decreases, so it is in direct proportion.

Reason(R) If x and y are in direct proportion then we can say $x \propto y$. (AO1)

11) Assertion (A) 10 metres of cloth cost Rs 1000. 4 metres costs Rs 400 (AO1)

Reasons (R) A direct proportion shows the direct the relation between two quantities.

12) Assertion (A) –A horse eats 18 kg of corn in 12 days. 13.5 kg he eat in 8 days

Reasons (R) –A direct proportion shows the direct the relation between two quantities. (AO1)

2 MARKS QUESTIONS

13) A farmer has enough food to feed 20 animals in his cattle for 6 days. How long would the food last if there were 10 more animals in his cattle. (AO2)

14) A worker is paid Rs. 225 for 9 days of work. If he works for 22 days, how much will he get? (AO1)

15) Three spraying machines working together can finish painting a house in 60 minutes. How long will it take for 5 machines of the same capacity to do the same job? (AO1)

16) A 10 m 50 cm high vertical pole casts a shadow 6 m long. Find at the same time the length of the shadow cast by another pole 5 m 60 cm high. (AO1)

17) A tap can completely fill a tank in $1\frac{1}{2}$ hours. How much of it can be filled in $\frac{3}{4}$ hours (AO2)

3 MARKS QUESTIONS

18) The Principal sanctioned a certain amount of money to the librarian to purchase some mathematics books costing Rs. 90 each. She could buy 80 books. Then she approached to a publisher who offered her a 20% discount. Find the number of copies of mathematics book which she could buy from the publisher for the sanctioned money. (AO2)

19) y is directly proportional to square of x . Find A and B (AO1)

X	3	5	B
y	36	A	64

20) If 1800 persons can finish the construction of a building in 40 days, how many more persons are required to complete the construction of the building in 24 days? If 600 more men will join the work then in how many days they will construct the building? (AO2)

21) While driving his car at a speed of 50km/hr, Rajesh covers a distance from home to his office in 1 hour 30 minutes. One day, he was 15 minutes late from his home. In order to reach office at time, what should be the speed of the car? Also, find the total distance covered by Rajesh daily (AO2)

22) Two persons could fit new windows in a house in 3 days. One of the persons fell ill before the work started. How long would the job take now? How many persons would be needed to fit the windows in one day? (AO2)

5 MARKS QUESTIONS

23) The purpose of the Scout and guides movement is to contribute to the development of young people in achieving their full physical, intellectual, emotional, social and spiritual potentials as individuals, as responsible citizens and as members of local, national and international communities. A four days scout and guide camp were arranged by the school for class 8 students. The students were so excited to go for the camp. Based on this context, answer the following question: (AO2)



i) The school arranged 6 buses to take 150 students to the camp. If 75 more students are joined, how many buses are required in all?

or

In the camp, they assigned some jobs to the students. 45 persons complete a job in 20 minutes. How many minutes will 30 persons take to complete the same job? (AO2)

ii) The camp has enough food for 150 students for 6 days. How long will the food last if 50 students were shifted to another camp? 2 marks (AO2)

iii) In the camp activities, there was a competition of writing words. Manvi can write 200 words in 30 minutes. How many words she will write in 12 minutes? 1 mark (AO1)

24) Rehman 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:



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 angles formed between the pairs of consecutive spokes in inverse proportion? 1 mark (AO1)
- (ii) (ii) Calculate the angle between a pair of consecutive spokes on a wheel with 15 spokes. 2 marks. (AO2)
- (iii) How many spokes would be needed, if the angle between a pair of consecutive spokes is 40° ? 2 MARKS (AO2)

- 25) A mixture of paint is prepared by mixing 1 part of red pigment with 8 parts of base.
- i) Check if the parts of red pigments and parts of base are in direct proportion 1 MARK (AO1)
- ii) In the following table, find the parts of base that need to be added. 2 marks (AO2)

Parts of red pigments	1	4	7	12	20
Parts of base	8	---	-----	-----	-----

- iii) If 1 part of a red pigment requires 75 mL of base, how much red pigment should we mix with 1800 mL of base? 2marks (AO2)

CASE BASED QUESTIONS

26) Nita invited four friends for her birthday party. She ordered Red velvet cake, pizza and juice.



- i) The cost 2 kg cake is ₹ 300. If Nita ordered 5kg cake, how much she paid for it? 1 mark (AO1)
- ii) Nita and her friends had eaten 2 pieces of pizza each.. Then find the total number of pieces consumed by Nitha and her friends. 1 mark (AO1)
- iii) The rent of party hall was ₹ 1200 for 2 hours. Nita's party started at 5:00 pm and ended by 8:30 pm. what amount did she pay for the party hall? (2 marks) (AO2)

27) Priyanka starts her journey to a certain place by car at 9:00 am and reaches the place 1:00 pm if she drives at a speed of 30 km/hr.



- i) Find the time taken by Priyanka to reach her destination 1MARK (AO1)
- ii) Calculate the total distance travelled by Priyanka 1 marks (AO1)
- iii) By how much she should increase her speed so that she can reach the place by 12 noon 2 MARKS (AO2)

28) Many schools have a recommended students-teacher ratio as 30:1. A school has 8 periods a day each of 45 minutes duration. The school management decided to increase the number of periods in a day so that more classes can be taken in a single day. However, they want to keep the school duration the same. Next year, school expects 270 students.



i) How many teachers will they have to appoint to maintain the students-teacher ratio? (2marks) (AO2)

ii) What will be the duration of new periods if the number of periods is increased to 10 (2 marks) (AO2)

29) Jagjith Singh has a road map with a scale of 1 cm = 20 km. Based on the above information, answer the following questions:

(i) He drives on a road for 72 km. What would be his distance covered in the map? 2MARKS (AO2)

(ii) Suppose the distance between two places on the map is 3.5cm, find the exact distance between the two places. 1MARK (AO1)

(iii) Jagjith Singh went from place a to b to meet his parents and then b to c to join his office. If the distance between a and b is 4cm, the distance between b and c is 2 cm on the map, total how much distance is covered by Jagjith Singh. 1 MARK (AO1)

30) The students of Anju's class sold posters to raise money. Anju wanted to create a ratio for finding the amount of money her class would make for different numbers of posters sold. She knew they could raise Rs 250 for every 60 posters sold.

(i) How much money would Anju's class make for selling 102 posters? 2mark (AO2)

(b) Anju's class could raise exactly Rs 2,000? If so, how many posters would they need to sell? 2 marks (AO2)

SOLUTIONS: CHAPTER 11- DIRECT AND INVERSE PROPORTIONS

MULTIPLE CHOICE QUESTIONS

1) C , 2) D , 3) B , 4) A , 5) D , 6) D , 7) A , 8) A

ASSERTION REASON QUESTIONS

9) A, 10) D , 11) A , 12) D

2 MARKS QUESTIONS

13) Let the number of days be x .

Total number of animals = $20 + 10 = 30$

Animals	20	30
days	6	x

Here, the number of animals and the number of days are in inverse proportion

$$\therefore 20/30 = x/6 \Rightarrow 30 \times x = 20 \times 6 \Rightarrow x = \frac{20 \times 6}{30} = 4$$

Hence, the food will last for four days.

14) Labour for 9 days work = 225

Let x be the labour for 22 days work

Days of work	9	22
Labour	225	x

Here days of work and labour are in direct proportion

$$\frac{9}{225} = \frac{22}{x} \Rightarrow 9x = 225 \times 22 \Rightarrow x = \frac{225 \times 22}{9} = \text{Rs. } 550$$

15) Let in x minutes, 5 machines can do the work

Machines	3	5
Period (minutes)	60	x

More machines, less period

\therefore By inverse variation $3/5 = x/60$

$$\Rightarrow 5 \times x = 3 \times 60 \Rightarrow x = \frac{3 \times 60}{5} = 36$$

\Rightarrow 5 machines can do the work in = 36 minutes

16) Let the length of the shadow of the other pole be x m.

1 m = 100 cm

The given information in the form of a table is as follows.

Height of pole (in m)	10.5	5.60
Length of shadow (in m)	6	x

More the height of an object, more will be the length of its shadow.

Thus, the height of an object and length of its shadow are directly proportional to each other.

Therefore,

we obtain

$$\frac{10.5}{6} = \frac{5.60}{x} \Rightarrow 10.5x = 6 \times 5.60$$

$$X = \frac{6 \times 5.60}{10.5} = 3.2\text{m}$$

17) Let the volume of the tank be v

Time(hour)	$1\frac{1}{2}$	$\frac{3}{4}$
volume	1	x

Time and volume of tank filled are in Direct proportion.

$$\frac{3/2}{1} = \frac{3/4}{x} \Rightarrow 3/2 \times x = 3/4 \times 1$$

$$X = 3/4 \div 3/2 = 3/4 \times 2/3 = 1/2, \text{ half of the tank will be filled.}$$

3 MARK QUESTIONS

18) The cost of a Mathematics books = Rs 90

The cost of 80 Mathematics books = $80 \times 90 = \text{Rs } 7200$

The publisher offered her a 20% discount.

Then the discount on each Mathematics book = $90 \times (20/100) = \text{Rs } 18$

Therefore after the discount cost of each book = $90 - 18 = \text{Rs } 72$

Cost	90	72
No of books	80	x

Inverse proportion

$$\frac{90}{72} = \frac{x}{80} \Rightarrow 90 \times 80 = 72x \Rightarrow x = \frac{90 \times 80}{72} = 100 \text{ books}$$

19)

X	3	5	B
X^2	9	25	
y	36	A	64

$$\frac{9}{36} = \frac{25}{A} \Rightarrow A = \frac{36 \times 25}{9} = 100, \quad \frac{9}{36} = \frac{x^2}{64} \Rightarrow x^2 = \frac{9 \times 64}{36} = 16, \quad B = \sqrt{16} = 4$$

20) Number of workers and number of days required to complete a work are in inverse proportion.

No of workers	1800	x
No of days	40	24

$$\frac{1800}{x} = \frac{24}{40} \Rightarrow x = \frac{1800 \times 40}{24} = 3000$$

Number of more workers needed to complete the work in 24 days = $3000 - 1800 = 1200$

If 600 men join, then the total no of workers = $1800 + 600 = 2400$

No of workers	1800	2400
No of days	40	y

$$\frac{1800}{2400} = \frac{y}{40} \Rightarrow y = \frac{1800 \times 40}{2400} = 30 \text{ days}$$

21) speed=distance/time

1 hour 30 minutes= 1.5 h , 1h 30 minutes- 15 minutes= 1h 15 minutes =1.25

speed	50	x
time	1.5	1.25

Speed and time are in inverse proportion.

$$\frac{50}{x} = \frac{1.25}{1.5} \Rightarrow x = \frac{50 \times 1.5}{1.25} = 60 \text{ km/h}$$

Distance travelled by Rajesh= 1.5x 50=75km

22) Let the number of days required by 1 man (as 1 person fell ill) to fit all the windows be x. The following table is obtained.

No of persons	2	1
No of days	3	x

Lesser the number of persons more will be the number of days required to fit all the windows.

Hence, this is a case of inverse proportion. Therefore, $2 \times 3 = 1 \times x$, $\therefore x = 6$

Hence, the number of days taken by 1 man to fit all the windows is 6.

Let the number of persons required to fit all the windows in one day be y. The following table is formed.

No of persons	2	y
No of days	3	1

Lesser the number of days more will be the number of persons required to fit all the windows.

Hence, this is a case of inverse proportion. Therefore, $2 \times 3 = y \times 1$, $\therefore y = 6$

Hence, 6 persons are required to fit all the windows in one day.

5 MARKS QUESTIONS

23)i)

No of buses	6	y
No of children	150	225

$$\frac{6}{150} = \frac{y}{225} \Rightarrow y = \frac{6 \times 225}{150} = 9$$

(OR)

No of children	45	30
Time (minutes)	20	y

$$\frac{45}{30} = \frac{y}{20} \Rightarrow y = \frac{45 \times 20}{30} = 30$$

ii)

No of children	150	100
No of days	6	y

$$\frac{150}{100} = \frac{y}{6} \Rightarrow y = \frac{150 \times 6}{100} = 9 \text{ days}$$

iii)

No of words	200	x
Time (minutes)	30	12

$$\frac{200}{30} = \frac{x}{12} \Rightarrow x = \frac{200 \times 12}{30} = 80$$

24) Here the number of spokes are increasing and the angle between a pair of consecutive spokes is decreasing. So, it is an inverse proportion and angle at the centre of a circle is 360° .

When the number of spokes is 8, then angle between a pair of consecutive spokes = $360^\circ / 8 = 45^\circ$

When the number of spokes is 10, then angle between a pair of consecutive spokes = $360^\circ / 10 = 36^\circ$

When the number of spokes is 12, then angle between a pair of consecutive spokes = $360^\circ / 12 = 30^\circ$

No. of spokes	4	6	8	10	12
Angle between a pair of consecutive spokes	90°	60°	45°	36°	30°

i) Yes, the number of spokes and the angles formed between a pair of consecutive spokes is in inverse proportion.

ii) When the number of spokes is 15, then angle between a pair of consecutive spokes = $360^\circ / 15 = 24^\circ$

iii) The number of spokes would be needed = $360^\circ / 40^\circ = 9$

25) $k = x_1 / y_1 = 1/8$

That is $y_1 = x_1 \times 8$, $y_2 = 4 \times 8 = 32$, $y_3 = 7 \times 8 = 56$, $y_4 = 12 \times 8 = 96$, $y_5 = 20 \times 8 = 160$

Calculation of amount of red pigment required:

$x_1 = 1$ and $y_1 = 75$, $x_2 = ?$ and $y_2 = 1800$

$x_1 / y_1 = x_2 / y_2$

$1/75 = x_2 / 1800$

$x_2 = 1800 / 75 = 24$

CASE STUDY QUESTIONS

26)

i) Weight and cost of the item are in direct proportion.

Weight in kg	2	300
Cost of the item	5	x

$$\frac{2}{5} = \frac{300}{x} \Rightarrow 2x = 5 \times 300, x = \frac{5 \times 300}{2} = 750$$

ii) $2x = 10$

iii) number of hours from 5.00 pm to 8.30 pm = 3h 30 minutes = 3.5h

Time and rent to be paid are in direct proportion

No of hours	2	3.5
rent	1200	x

$$\frac{2}{1200} = \frac{3.5}{x} \Rightarrow 2x = 1200 \times 3.5, x = \frac{1200 \times 3.5}{2} = 2100$$

- 27) i) duration of time from 9:00am to 1:00pm = 4h
 ii) total distance travelled by Priyanka = time x speed
 $4 \times 30 = 120$ km

iii) Time and speed are in inverse proportion
 Duration of time from 9:am to 12 noon = 3h

speed	30	x
time	4	3

$$\frac{30}{x} = \frac{3}{4} \Rightarrow x = \frac{30 \times 4}{3} = 40 \text{ km/h}$$

28) i)

students	30	270
teachers	1	x

$$\frac{30}{1} = \frac{270}{x} \Rightarrow x = \frac{1 \times 270}{30} = 9$$

ii) no of periods and duration of each period are in inverse proportion

No of periods	8	10
Duration (minutes)	45	x

$$\frac{8}{10} = \frac{x}{45} \Rightarrow x = \frac{8 \times 45}{10} = 36 \text{ minutes.}$$

29)

Distance on the map(cm)	1	x	3.5	6
Actual distance (km)	20	72	y1	y2

- i) $\frac{1}{20} = \frac{x}{72} \Rightarrow x = \frac{1 \times 72}{20} = 3.6$ cm
 ii) $\frac{1}{20} = \frac{3.5}{y1} \Rightarrow y1 = \frac{20 \times 3.5}{1} = 70$ km
 iii) $\frac{1}{20} = \frac{6}{y2} \Rightarrow y2 = \frac{20 \times 6}{1} = 120$ km.

30)

Amount	250	x	2000
No of posters	60	102	y

$$i) \frac{250}{60} = \frac{x}{102} \Rightarrow x = \frac{250 \times 102}{60} = 425$$

Amount collected from 102 posters = 425

ii) Posters need to sell to collect 2000

$$\frac{250}{60} = \frac{2000}{y} \Rightarrow y = \frac{2000 \times 60}{250} = 480 \text{ posters.}$$

CHAPTER 12-FACTORISATION

MULTIPLE CHOICE QUESTIONS

- Q1. An irreducible factor of $24x^2y^2$ is [AO1]
a) x^2 b) y^2 c) x d) $24x$
- Q2. Which of the following is not a factor of $18p^2q^2$? [AO1]
a) 3 b) y^2 c) pq d) q^2
- Q3. Subbu, started factorising an algebraic expression a^4-b^4 . Which of the following will be his next step, in the process of factorisation? [AO2]
a) $a^4 - b^4 - 2a^2b^2$ b) $(a+b)(a-b)$ c) $(a^2)^2 - (b^2)^2$ d) a^2-b^2
- Q4. On dividing $p(4p^2-16)$ by $4p(p-2)$, we get [AO1]
a) $2p+4$ b) $2p-4$ c) $p+2$ d) $p-2$
- Q5. Which of the following factorisation matches to the factorisation of x^3-225x ? [AO1]
a) $x(1-15x)(1+15x)$ b) $x(1-15x)(1-15x)$ c) $x(x-15)(x+15)$ d) $x(1+15x)(1+15x)$
- Q6. Which of the following is the simplified version of $(a+b)^2-(a-b)^2$? [AO1]
a) $4ab$ b) $-4ab$ c) $2a^2+2b^2$ d) $2a^2-2b^2$
- Q7. The value of $0.645 \times 0.645 + 2 \times 0.645 \times 0.355 + 0.355 \times 0.355$ is [AO2]
a) 0.645 b) 0.355 c) 1 d) 2
- Q8. If $\left(x - \frac{1}{x}\right)^2 = x^2 + k + \frac{1}{x^2}$, then the value of 'k' will be [AO1]
a) -2 b) 2 c) $2x$ d) $-2x$

ASSERTION AND REASON QUESTIONS

In these questions two statements are provided. One is Assertion (A) statement and the other one is Reason (R) statement. By reading the statements carefully, choose the correct option.

- a) Both Assertion (A) and Reason (R) are 'True' and Reason (R) is the correct explanation of the Assertion (A).
b) Both Assertion (A) and Reason (R) are 'True' and Reason (R) is not the correct explanation of the Assertion (A).
c) Assertion (A) is 'True' but Reason (R) is 'False'.
d) Assertion (A) is 'False' but Reason (R) is 'True'.

Q9. Assertion (A): The common factor of a^2m^4 and a^4m^2 is a^2m^2 .

Reason (R): A common factor is a number which divides exactly, all the terms, without leaving a remainder. [AO1]

Q10. Assertion (A): Factorisation of $3x^2 + x - 1$ is $(x + 1)(3x - 2) + 1$

Reason (R): To factorise $ax^2 + bx + c$, write 'b' as the sum of two numbers, whose product is 'ac'. [AO1]

Q11. Assertion (A): $(x - 3)$ divides $x^2 - 7x + 12$ exactly.

Reason (R): Every algebraic expression is exactly divisible by all of its factors. [AO1]

Q12. Assertion (A): The product of 93×107 is 9951

Reason (R): The above answer is obtained by using the identity: $(a - b)(a + b) = a^2 - b^2$. [AO1]

2 MARKS QUESTIONS

Q13. Determine the value of $\frac{0.73 \times 0.73 - 0.27 \times 0.27}{0.73 - 0.27}$ [AO2]

Q14. If $x^2 - x - 42 = (x+m)(x+6)$, then find the value of 'm'. [AO1]

Q15. Mrs Lakshmi has a rectangular plot of vacant land in a particular city, whose area is represented by $6 - x - 2x^2$. She wants to sell it to some person. Then that person asked her, what are the length and breadth of the plot? Please help her in finding the possible dimensions of her plot. [AO2]

Q16. Somu is trying to factorise $2x^2 + 8x + 7$. During the process he got one expression as

$$2x^2 + 8x + 7 = (2x)^2 + 2(6x) + 7$$

Later his friend found that step has some error(s). Find the error(s) and help him in getting the correct step. [AO2]

Q17. Suman, Sirish and Srinu are good friends. Once, their Mathematics teacher, given a problem, $\frac{a+5}{5}$, on division, for simplification. Suman does the simplification as: $\frac{a+5}{5} = \frac{a}{5} + 1$. Sirish does the simplification as: $\frac{a+5}{5} = a$. Srinu does the simplification as $\frac{a+5}{5} = \frac{a}{5} + 1$. Whose answer is correct? [AO2]

3 MARKS QUESTIONS

Q18. "When a monomial is divided by a monomial, the quotient is a monomial". But Radha disagrees with this statement as x^2 divided by x^2 is equal 1. Is Radha's argument correct? Justify your answer. [AO1]

Q19. Purna and Rama have some marbles in their pockets. They have multiplied their marbles and got the answer in the form of an algebraic expression as " $ax - by - ay + bx$ ". Find the number of marbles, each person has. [AO2]

Q20. Match the following: [AO1]

- | | |
|---------------------------|-------------------------|
| i) $(2x + 3y)^2$ | a) $4x^2 - 9y^2$ |
| ii) $(2x - 3y)^2$ | b) $4x^2 - 9y^2 + 12xy$ |
| iii) $(2x - 3y)(2x + 3y)$ | c) $4x^2 - 9y^2 - 12xy$ |

Q21. Factorise $x^4 - 256$, till you get irreducible factors. [AO2]

Q22. Kiran is student of 8th class. His uncle wants to test his understanding of division of algebraic expressions. He has given a problem on division to him. The problem is:

$$96abc(3a - 12)(5b - 30) \div 144(a - 4)(b - 6).$$

After simplification Kiran got the answer as $10abc$. Is Kiran's answer is correct? Explain. [AO1]

5 MARKS QUESTIONS

Q23. Swan and Span are twin sisters who are studying 8th class. One day they were preparing factorisation chapter for the Periodic Test. They factorised $p^4 + 9p^2 + 18$ as given below:

Swan:

$$\begin{aligned} p^4 + 9p^2 + 18 &= p^4 + 6p^2 + 3p^2 + 18 \\ &= p^2(p^2 + 6) + 3(p^2 + 6) \\ &= (p^2 + 6)(p^2 + 3) \end{aligned}$$

Span:

$$p^4 + 9p^2 + 18 = p^4 + 6p + 3p + 18$$

$$= p(p^3 + 6) + 3(p + 6)$$

$$= (p^3 + 6)(p + 3)(p + 6)$$

Who is correct? Give reasons to justify your answer.

[AO2]

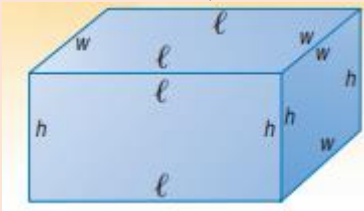
Q24. Factorise $x^2 + \frac{1}{x^2} + 2 - 3x - \frac{3}{x}$

[AO2]

- Q25. i) Area of rectangular field is given by the expression $(x^2 + 3x)^2 - 5(x^2 + 3x) - y(x^2 + 3x) + 5y$. By factorising the expression identify the possible length and breadth of this rectangle. [AO2]
 ii) The volume of cuboid is given by the formula, $V = l \times b \times h$. The volume of a cuboidal shaped geometrical instruments box is given by the expression as $2-50x^2$. By factorising the expression identify the possible length, breadth and height of the geometrical instruments box. [AO2]

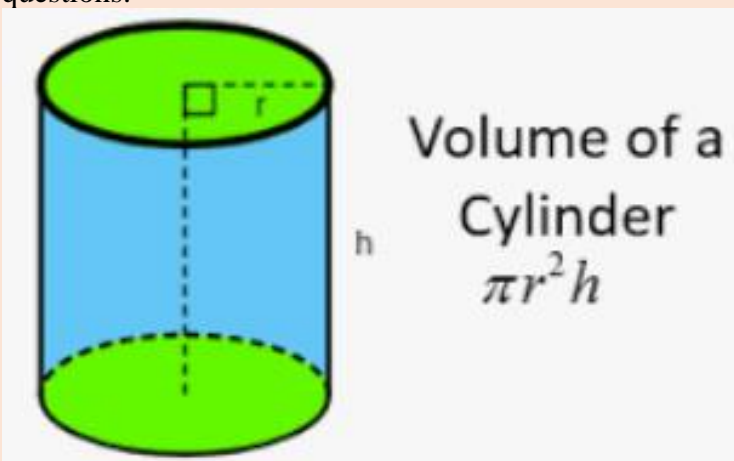
CASE BASED QUESTIONS

Q26. The volume of a cuboidal shaped jewelry box is expressed as $3x(4x^2 - 4)$. With the help of this information, answer the given questions accordingly.



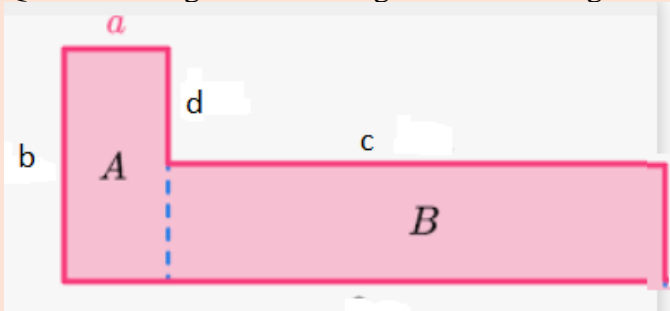
- i) The length of the box is given as $4(x + 1)$ and breadth is $3(x-1)$. Find the possible value of other measurement. (2M) [AO2]
 ii) If $x = 2$, find the sum of all the three dimensions of this box. (1M) [AO1]
 iii) If $x = 0$, then is it possible design this box? (2M) [AO2]

Q27. Cylinder is a three dimensional solid figure whose base and top are in the form of a circle. Its volume is given by the formula as shown in the figure. Siri found that the volume of the cylinder is expressed as $5\pi m^2 + 10\pi m + 5\pi$. With the help of this information answer the following questions.



- i) If 5 is the height of this cylinder, then what is the possible value for radius in terms of 'm'? (2M) [AO2]
 ii) If $m = 2$, then what may be the base area of the cylinder? [Take π as 3 units] (1M) [AO1]
 iii) If curved surface area of this cylinder is expressed as $2\pi(m + 1)n$. Then what is the height of the cylinder. (1M) [AO2]

Q28. The design of a wall is given as in the figure.



Answer the following questions using the information given in the figure.

- i) Area rectangle-A is given as $7x^2y$. Its length is given as $7y$. Then find the value of its breadth, if $x = 2$. (1M) [AO2]
- ii). If $d = 3y$, then find the width of the rectangle-B. (1M) [AO2]
- iii). If the area of rectangle-B is given by the expression $14x^2y$, then find the value of 'c' (2M) [AO2]

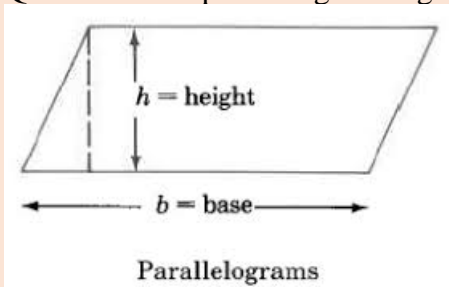
Q29. A traffic signal board is erected for the safety of road users. The area of the board is half the product of its base and height. Its area is given by the expression $14xy^2$.

Based on the given information answer the following questions accordingly.



- i) If the base of the board is equals to $7x$, then find the height of the board. (2M) [AO2]
- ii). If the height of the board is known as $4y^2$ then find the base of the board. (1M) [AO1]
- iii). If $x=2$ and $y=1$ then find the area of the board(1M) [AO1]

Q30. Area of a parallelogram is given as $4x^2 + 12x$.



- i). Find the possible length and breadth of the parallelogram. (2M) [AO1]
- ii). If $x=2$, then find the area of the parallelogram (1M) [AO1]
- iii). If $x=1$, find the dimensions of this parallelogram, then name the special parallelogram so formed if $x=1$. (2M) [AO1]

SOLUTIONS: CHAPTER 12-FACTORISATION

MULTIPLE CHOICE QUESTIONS

- | | | | |
|--------|--------|--------|--------|
| Q1. c) | Q2. b) | Q3. c) | Q4. c) |
| Q6. a) | Q7. c) | Q8. a) | Q5. c |

ASSERTION AND REASON QUESTIONS

- | | | | |
|-------|--------|--------|--------|
| Q9. a | Q10. d | Q11. a | Q12. a |
|-------|--------|--------|--------|

2 MARKS QUESTIONS

Q13. $\frac{0.73^2 - 0.27^2}{0.73 - 0.27} = \frac{(0.73 + 0.27)(0.73 - 0.27)}{0.73 - 0.27} = 0.73 + 0.27 = 1$

Q14. $x^2 - x - 42 = (x-7)(x-6)$

Therefore, $m = -7$

Q15. Possible length and breadth are $(3-2x)(2+x)$

Q16. Correct step is $2x^2 + 2(4x) + 7$

Q17. Suman and Sirish answers are wrong.

Srinu's answer is correct as he followed the simplification rules properly.

3 MARKS QUESTIONS

Q18. Radha's argument is wrong, because 1 is also monomial.

Q19. Possible number of marbles with them are $(a+b)$ and $(x-y)$

Q20. Matching:

i) --- b)

ii) --- c)

iii) --- a)

Q21. Irreducible Factors are $(x^2+16)(x-4)(x+4)$

Q22. Yes Kiran's answer $10abc$ is correct answer.

5 MARKS QUESTIONS

Q23. Swan's answer is correct.

Span's answer is not correct.

Q24. $x^2 + \frac{1}{x^2} + 2 - 3x - \frac{3}{x} = \left(x + \frac{1}{x}\right)^2 - 3\left(x + \frac{1}{x}\right) = \left(x + \frac{1}{x}\right)\left(x + \frac{1}{x} - 3\right)$

Q25. i) $(x^2+3x)(x^2+3x-5) - y(x^2+3x-5) = (x^2+3x-5)(x^2+3x-y)$

Possible length and breadths are (x^2+3x-5) and (x^2+3x-y)

ii) possible length, breadth and height are 2, $(1-5x)(1+5x)$

CASE BASED QUESTIONS

Q26. i) if $l=4(x+1)$ and $b=3(x-1)$ then $h=x$.

ii) if $x=2$; the $l+b+h=17$

iii) if $x=0$; then $l=4$; $b=-3$; $h=0$

these measurements not possible.

Q27. i) if $h=5$ then $r=m+1$

ii) if $m=2$; area of the base = $3 \times 3 \times 3 = 9$

iii) here $h=n$

Q28. i) breadth = $2^2 = 4$

ii) $a=x^2$; $b=7y$; width of rectangle-B is $4y$

iii) $14x^2y = (4y) \times (c)$;

$c = 3.5x^2$

Q29. i) $h=4y^2$

ii) $b=7x$

iii) area = 28

Q30. i) possible base and height are $4x$ and $x+3$

ii) area = 40

iii) dimensions are 4 and 4

CHAPTER 13- INTRODUCTION TO GRAPHS

MULTIPLE CHOICE QUESTIONS

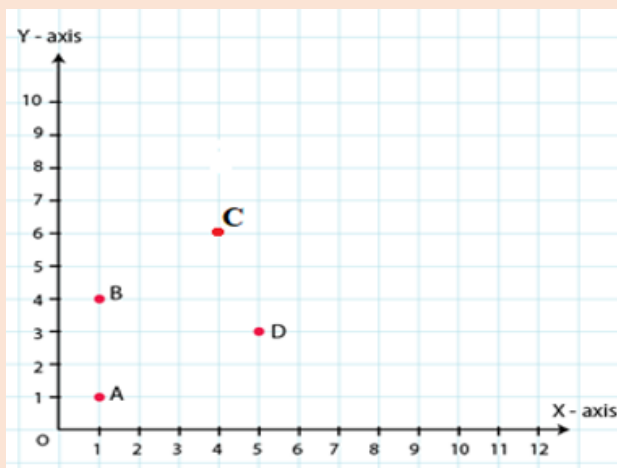
- (o, y) are the co-ordinates of a point lying on which of the following? (AO1)
(a) origin (b) x-axis (c) y-axis (d) none of these.
- A _____ graph which is a whole unbroken line is called a: (AO1)
(a) Bar-graph (b) Pie-chart (c) Histogram (d) Linear Graph
- A graph that displays data that changes continuously over periods of time is called: (AO1)
(a) Bar-graph (b) Pie-chart (c) Histogram (d) Line Graph
- Which point lies only on y-axis? (AO1)
(a) (-2,0) (b) (2,0) (c) (0,-2) (d) (2,-2)
- If we join (-3,2), (-3,-3) and (-3,4), then we obtain: (AO2)
(a) A triangle (b) Straight-line without passing through origin
(c) Straight-line passing through origin (d) None of the above
- The point (-5, 2) is nearer to: (AO1)
(a) x-axis (b) y-axis (c) origin (d) None of the above
- In a country like India it is observed that income depends on the level of education (AO2)
(a) Dependent variable – Income (b) Dependent variable – Level of education
Independent variable - Level of education Independent variable - Income
(c) Dependent variable – India (d) None of the above
Independent variable - Income
- The point (-2,-2) is: (AO1)
(a) near to x-axis (b) near to y-axis (c) near to origin (d) Equidistant from x-axis and y-axis.

ASSERTION REASON BASED QUESTIONS

- (a) If both assertion and reason are true and reason is the correct explanation of assertion.
(b) If both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Assertion is false but reason is true.
- Assertion (A): A line graph displays data that changes continuously over periods of time.
Reason(R): A line graph, which is a whole unbroken line, is called a linear graph. (AO1)
- Assertion (A) : Amount of electricity bill depends on quantity of electricity consumed
Reason(R) : Dependent variable is electricity bill and independent variable is quantity of electricity consumed (AO2)
- Assertion (A) : Amount of bill generated in a shopping store depends on the quantity of items purchased (AO2)
Reason (R) : Independent variable is bill and dependent variable is quantity of items purchased.
- Assertion (A) : If x-coordinate and y-coordinate are equal then the coordinate of the point could be expressed as (a,a) where a is the distance of the point from each axis (AO1)
Reason (R) : The horizontal line in cartesian plane is called y-axis whereas vertical line is called x-axis

2 MARKS QUESTIONS

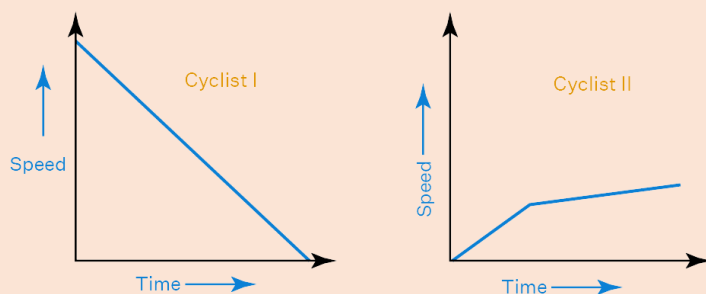
13. Plot the points (5, 0), (5, 1), and (5, 8). Do they lie on a line? What is your observation? (AO1)
14. Find the coordinates of points A, B, C, D (AO1)



15. Decide which of the following statements is true and which is false. (AO1)
- (i) A point whose x-coordinate is zero will lie on the y-axis.
 - (ii) A point whose y-coordinate is zero will lie on the x-axis.
 - (iii) The coordinates of the origin are (0, 0).
 - (iv) Points whose x and y coordinates are equal lie on a line passing through the origin.
16. Draw the points (1, 4) and (4, 1). Do they represent the same point? (AO1)
17. Write the abscissa and ordinate of the given points: (AO1)
- (a) (7,3) (b) (5,7)

3 MARKS QUESTIONS

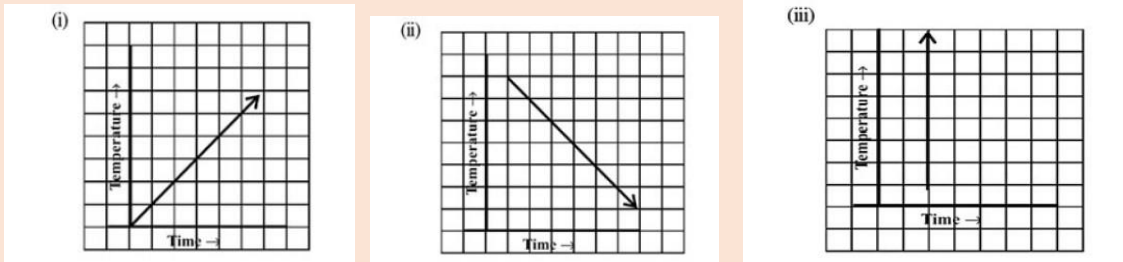
18. The given graphs show the progress of two different cyclists during a ride. For each graph, describe the rider's progress over the period of time (AO2)



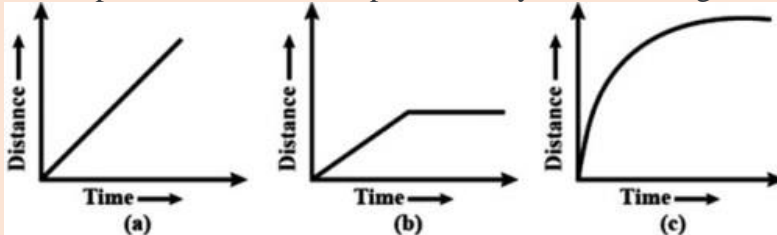
19. Match the coordinates given in Column A with the items mentioned in Column B. (AO2)

Column A	Column B
(i) (0, 5)	(a) y coordinate is $2 \times x$ -coordinate + 1
(ii) (2, 3)	(b) Coordinates of origin.
(iii) (4, 8)	(c) Only y -coordinate is zero.
(iv) (3, 7)	(d) The distance from x -axis is 5.
(v) (0, 0)	(e) y coordinate is double of x -coordinate.
(vi) (5, 0)	(f) The distance from y -axis is 2.

20. Can there be a time-temperature graph as follows? Justify your answer. (AO2)



21. Explain the situations represented by the following distance-time graphs. (AO2)

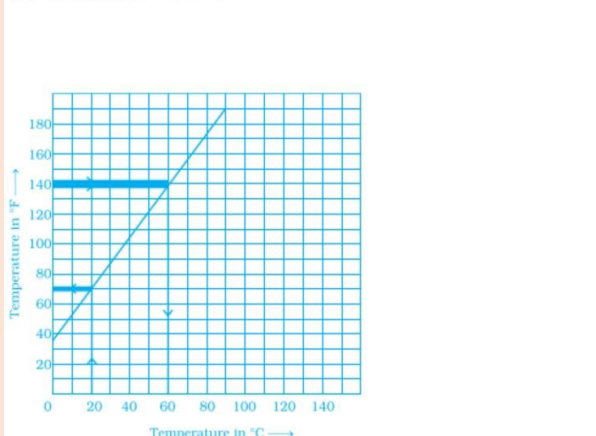


22. Observe the graph given below: (AO1)

The following is a conversion graph of temperature in $^{\circ}\text{C}$ and $^{\circ}\text{F}$.

Use the graph to answer the following questions.

- Convert 140°F to $^{\circ}\text{C}$.
- Convert 20°C to $^{\circ}\text{F}$



(c) What kind of a graph is observed in the given figure?

5 MARKS QUESTIONS

23. The cost of an icecream is Rs.10. Draw a graph after making a table showing the cost of 2,3, 4 ...icecreams. Use it to find

- (a) The cost of 7 notebooks
 (b) The number of notebooks purchased with Rs 50. (AO2)

24. Use the table given below to draw the graph (AO1)

i)

Number of oranges	1	2	3	4	5	6
Cost(in Rs)	3	6	9	12	15	18

(ii) The following table shows the number of patients discharged from a hospital with HIV diagnosis in different years: (AO1)

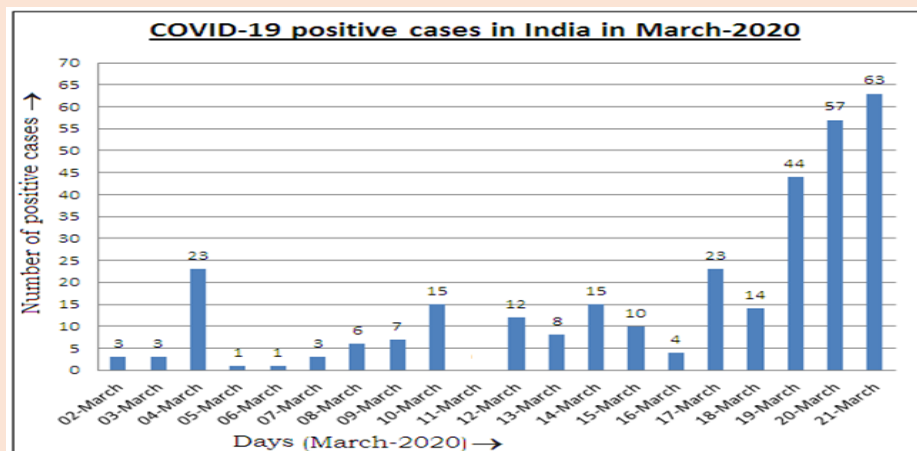
YEARS	2002	2003	2004	2005	2006
NUMBER OF PATIENTS	150	170	195	225	230

Represent the information by a graph.

25. Draw the line passing through (2,3) and (3,2). Find the coordinates of the points at which this line meets the x-axis and y-axis. Also find the area of the triangle obtained between line, x-axis and the y-axis (AO2)

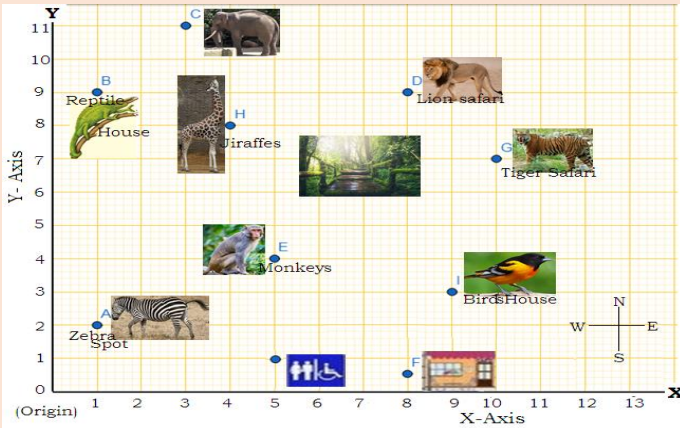
CASE STUDY BASED QUESTIONS

26. In March 2020, the COVID -19 cases detected in India from 2nd march to 21st march 2020 are given in the following graph.



- (a) What is the percentage of increase of cases from 9th march to 21st march? (AO2)
 (b) What is the average number of cases from 12th march to 21st march? (AO2)

27. An educational trip was organized by Oxford Public School during December 2019 for the students of Class VIII to visit the nearest zoo under the guidance of 5 adult teachers. The students with the teachers reached the main gate and collected the tickets and entered into the zoo at 10:30 A.M. All the children enjoyed the beauty of the environment and the variety of animals they saw.

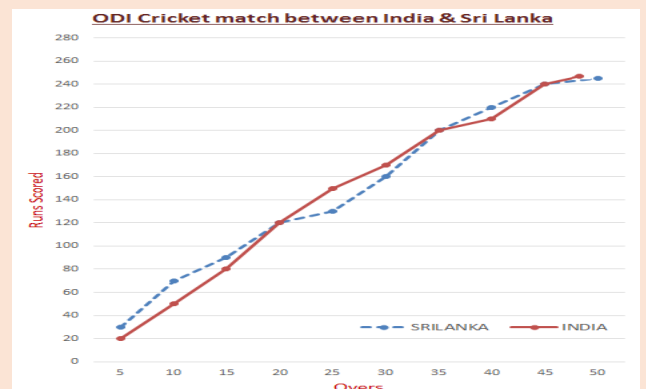


- Write the coordinates of the Reptile house (AO1)
- Write the coordinates of Tiger Safari (AO1)
- How far is zebra spot from reptile house? (AO2)

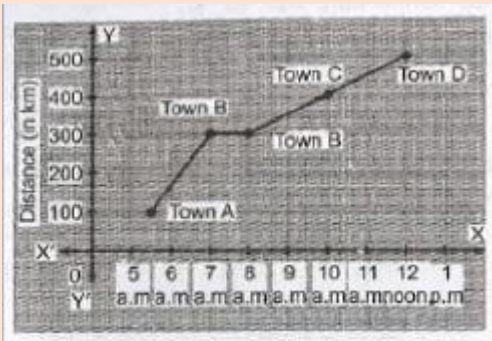
28. An one day international cricket match was held between India & SriLanka on 6th July 2019. The graphical representation of the proceedings of the match with a nail-biting finish was as follows.



- In how many occasion(s) both the team scored equal runs with same number of overs bowled? (AO1)
- How many runs were scored by the India team in between 15 to 20 overs? (AO1)
- What was the run rate of India at the completion of 25 overs? (AO1)

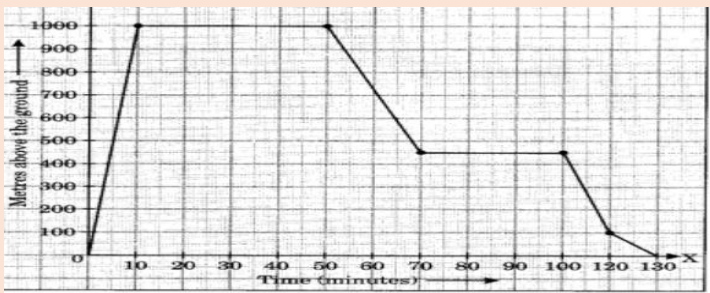


29. Following graph describes the movement of a car from a town A to town D. Study the graph and answer the following questions:



- What is the distance between town A and town D? (AO1)
- At What time did the car start from town A? (AO1)
- Where did the car stop and for what duration and how long did it take to go from town C to town D? (AO2)

30. The given graph shows the flight of an aeroplane.



- What are the scales taken on x-axis and y-axis? (AO1)
- Upto what height the aeroplane rises? (AO1)
- How long was the plane in level flight and how long did the whole flight take? (AO2)

SOLUTIONS: CHAPTER 13- INTRODUCTION TO GRAPHS

MULTIPLE CHOICE QUESTIONS

- Option (c) y-axis
- Option (d) Linear Graph
- Option (d) Line graph
- Option (c) (0,-2)
- Option (b)) Straight-line without passing through origin

6. Option (a) x-axis

7. Option (a) (a) Dependent variable – Income, Independent variable - Level of education

8. Option (d) Equidistant from x-axis and y-axis

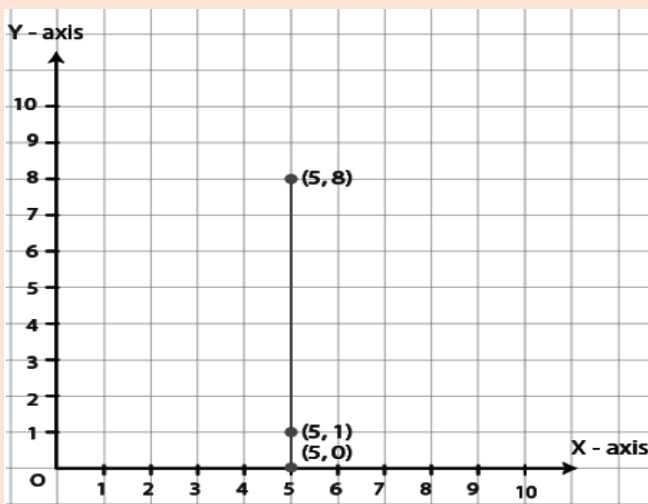
ASSERTION AND REASON QUESTIONS

9. Option (b) If both assertion and reason are true but reason is not the correct explanation of assertion.

10. Option (a) If both assertion and reason are true and reason is the correct explanation of assertion.

11. Option (a) If both assertion and reason are true and reason is the correct explanation of assertion.

12. Option (c) Assertion is true but reason is false



2 MARKS QUESTIONS

13. From the above graph, we observe that all points are having same X – coordinates, it can be seen that the points lie on a line parallel to the y-axis. Hence all points lie on the same line.

14. Coordinates of the points A,B,C and D respectively are (1,1), (1,4), (4,6), (5,3)

For A Abscissa =1 and ordinate = 1 so the coordinate of A is (1,1)

For B Abscissa =1 and ordinate = 4 so the coordinate of B is (1,4)

For C Abscissa =4 and ordinate = 6 so the coordinate of C is (4,6)

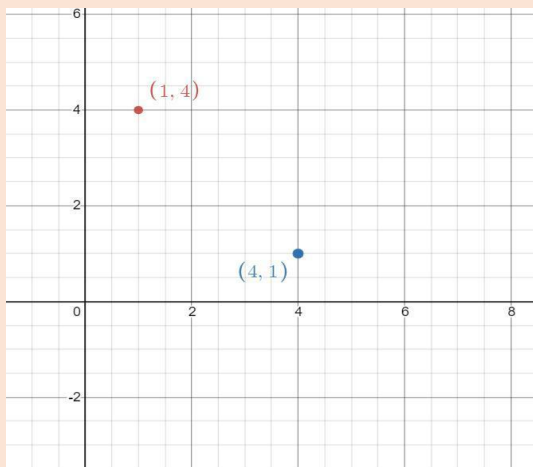
For D Abscissa =5 and ordinate = 3 so the coordinate of D is (5,3)

15. For $x = 0$, we have x- coordinates as zero. For example (0,5) and (0, 7) These points will lie on y axis. Hence, we say that our given statement is true.

(ii) A point whose y-coordinate is zero, will lie on x-axis. For $y = 0$, we have y- coordinates as zero. For example $(5,0)$ and $(7, 0)$ These points will lie on x axis. Hence, we say that our given statement is true.

(iii) The coordinates of the origin are $(0,0)$. Origin is intersection of x-axis and y-axis. This means that coordinates of the origin will be intersection of lines $y = 0$ and $x = 0$. Hence, coordinates of origin are $(0,0)$. \therefore Given statement is true.

(iv) Points whose x and y coordinates are equal, lie on a line passing through the origin. For above statement we can conclude that our statement satisfies the equation $x = y$. For $x = 0$ and $y = 0$, this equation gets satisfied. Hence, our given statement is true.



16.

No, they do not represent the same point on cartesian plane.

17. (a) Abscissa = 7
Ordinate = 3

(b) Abscissa = 5
Ordinate = 7

3 MARKS QUESTIONS

18. (a) The graph of cyclist 1 suggests that as time passes the speed of the cyclist decreases at a constant rate till it becomes zero.

(b) The graph of cyclist 2 suggests that for some time the speed of the cyclist increases at a constant rate and thereafter the speed increases very slowly than before.

19. (1) $(0,5)$ (d) The distance from x-axis is 5
 (2) $(2,3)$ (f) the distance from y-axis is 2
 (3) $(4,8)$ (e) y-coordinate is double of x-coordinate
 (4) $(3, 7)$ (a) y coordinate is $2 \times (x - \text{coordinate}) + 1$.
 (5) $(0, 0)$ (b) Coordinates of origin

(6) $(5, 0)$ (c) Only y-coordinate is zero

20. (i) This can be a time–temperature graph, as the temperature can increase with the increase in time.

(ii) This can be a time–temperature graph, as the temperature can decrease with the decrease in time.

(iii) This cannot be a time–temperature graph since different temperatures at the same time are not possible.

21. Here X-axis represents time and Y-axis represents distance.

(a) In the first graph, we observe that when the time changes, distance also varies at the same rate. When we move along time axis away from the origin, then the graph is strictly increasing. Hence, the object is moving at a uniform speed.

(b) In the graph (b), we observe that initially graph increases steadily i.e. at a uniform speed and after a certain period of time, it comes to rest position i.e. constant.

(c) In the graph (c), we see that the graph increases strictly with non-uniform speed

22. (a) From the graph it is clear that 140-degree Fahrenheit = 60 degree Celsius

(b) From the graph it is clear that 20 degree Celsius = 70 degree Fahrenheit

(c) The kind of graph obtained here is a Linear Graph

5 MARKS QUESTIONS

23. Let x be the number of icecreams and y be the cost of icecream

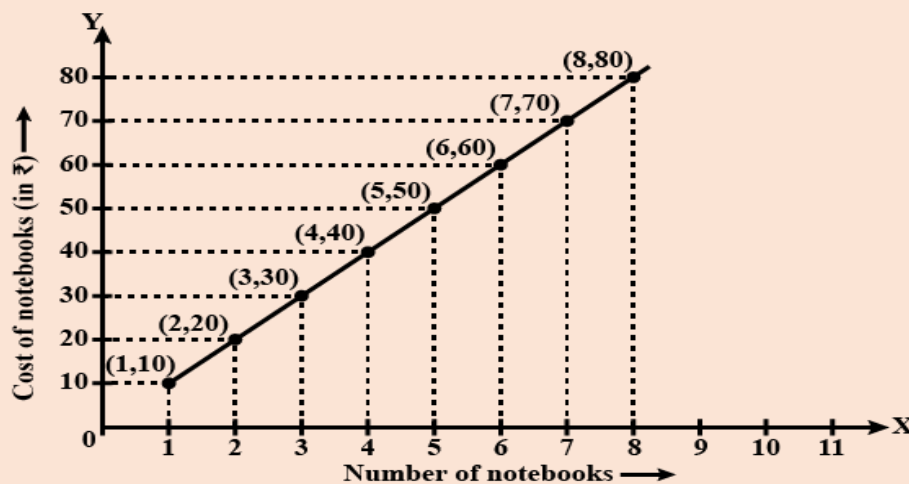
Then, the table is completed as shown. And hence, the graph is plotted from the table

(a) The cost of 7 icecreams is equal to the ordinate of the point (7,70), i.e. cost of 7 ice-creams = Rs 70

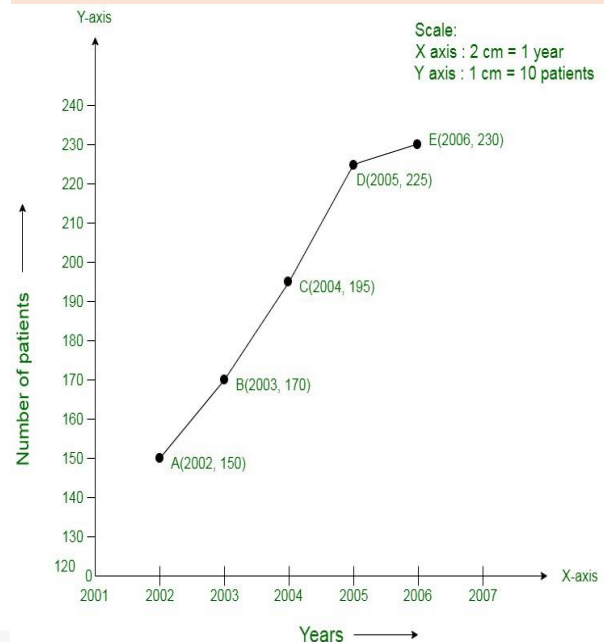
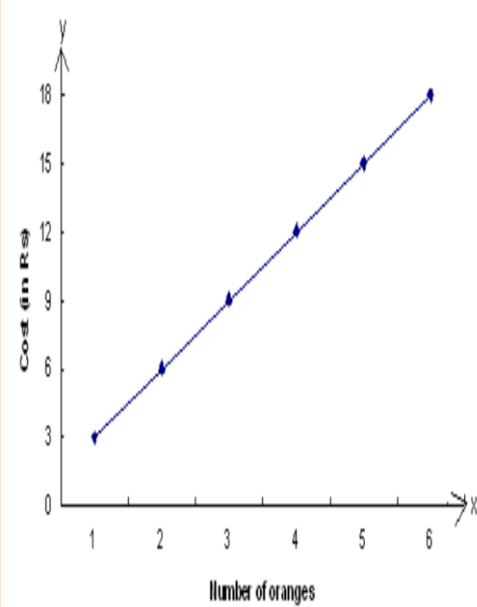
(b) The number of ice-creams that can be purchased with Rs 50 is equal to the abscissa of the point (5,50)

Hence, 5 ice-creams can be purchased with Rs 50

x	1	2	3	4	5	6	7	8
y	10	20	30	40	50	60	70	80



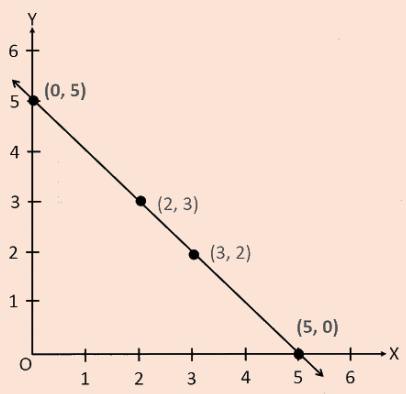
Solution:



24.

(i)

(ii)



25. From the graph, it can be observed that the line joining the points (2, 3) and (3, 2) meets the x-axis at the point (5, 0) and the y-axis at the point (0, 5).

Area of the triangle = $\frac{1}{2} \times b \times h = \frac{1}{2} \times 5 \times 5 = \frac{25}{2}$ sq.units

CASE STUDY BASED QUESTIONS

26. (i) Increase in cases = $63 - 7 = 56$
 Percentage increase = $\frac{56}{7} \times 100\% = 800\%$

(ii) Average = $\frac{\text{Sum of observations}}{\text{Total number of observations}} = \frac{12+8+15+10+4+23+14+44+57+63}{10} = \frac{250}{10} = 25$

27. (i) Coordinates of Reptile house = (1,9)
 (ii) Coordinates of Tiger Safari = (10,7)

(iii) Coordinate of zebra spot = (1,2) and Coordinates of Reptile house = (1,9)
Distance between Zebra spot and Tiger Safari = $9 - 2 = 7$ units

28. (i) In three occasions both the team scored equal runs with same number of overs bowled
(ii) Runs scored between 15 to 20 overs = $120 - 80 = 40$

(iii) Run rate of Indian team after completion of 25 overs = $\frac{150}{25} = 6$ runs per over

29. (a) Distance between Town A and Town D = $500 \text{ km} - 100 \text{ km} = 400 \text{ km}$

(b) Car started from Town A at 5:30 a.m.

(c) Car stopped at Town B for 1 hour i.e. from 7 a.m. to 8 a.m. At 10 a.m. Car started from Town C and reached Town D at 12 p.m. so it took 2 hours to reach from Town C to Town D

30. (a) Scale on x-axis, 1 cm = 10 minutes
Scale on y-axis, 1 cm = 100 metres

(b) The aeroplane rose upto 1000 metres.

(c) The time taken by the aeroplane to be in level flight is $40 + 30 = 70$ minute and the total flight time is 130 minutes.
