No. of printed pages:12

CLASS – VII

ANNUAL EXAM – 2023-24

SUBJECT – MATHEMATICS

SET – C1/C2

SOLUTIONS

TIME : $2\frac{1}{2}$ hrs **Max.Marks: 60**

GENERAL INSTRUCTIONS: Read the following instructions carefully and follow them:

(i) This question paper contains 16 questions. All questions are compulsory.

(ii) Question paper is divided into FIVE sections – Section A, B, C, D and E.

(iii) In section A – question number 1 have multiple choice questions (MCQs) of 1 mark each.

(iv) In section B – question number 2 to 7 are Objective type questions of 2 marks each.

(v) In section C – question number 8 to 10 are Short Answer (SA) type questions carrying 3 marks each.

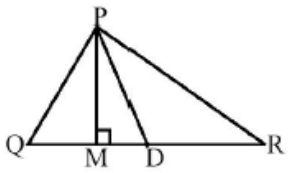
(vi) In section D – question number 11 to 13 are Long Answer (LA) type questions carrying 5 marks each.

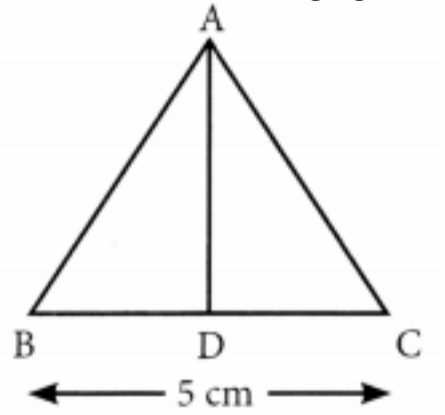
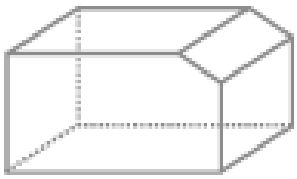
(vii) In section E – question number 14 to 16 are source based/case study questions carrying 4 marks each. Internal choice is provided in 2 marks question in each source based/case study question.

(viii) There is no overall choice. However, an internal choice has been provided in 1 question in Section B, 2 question in Section C and 2 questions in Section D.

(ix) Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

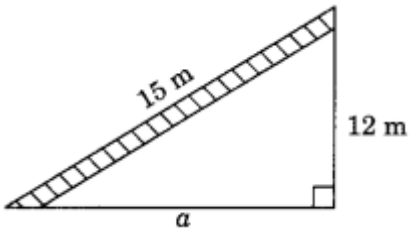
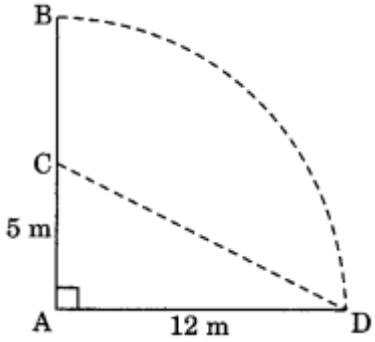
C1	C2	SECTION - A Question 1 consists of Multiple Choice questions (i-xii) of 1 mark each.	MARKS
1(i)	(xii)	0.09 is equal to (a) 90% (b) 9% (c) 0.9% (d) 0.09 Sol. (b)	
(ii)	(xi)	(- 1) × (- 1) × (- 1) × ……. 10 times is equal to (a) 1 (b) – 1 (c) 10 (d) none of these	

		Sol. (a)	
(iii)	(x)	What is $\frac{3}{4}$ of 12 : (a) 9 (b)16 (iii)18 (iv)32 Sol. (a) SET – C2 What is $\frac{5}{7}$ of 14 : (a) 10 (b)25 (iii) 14 (iv) 21 Sol. (a)	
(iv)	(ix)	The observation that occurs most often is called (a) Mean (b) Median (c) Mode (d) Frequency Sol. (c)	
(v)	(viii)	What is the value of y in 10 y – 20 = 50 a) 9 b) 8 c) 7 d) 6 Sol.(c)	
(vi)	(vii)	Additive inverse of $\frac{2}{3} - \frac{5}{6}$ is (a) $\frac{3}{2}$ (b) $\frac{-3}{2}$ (c) $\frac{1}{6}$ (d) $\frac{-1}{6}$ Sol. (c)	
(vii)	(vi)	In a die, the number of faces with odd number of dots is (a) 3 (b) 6 (c) 5 (d) 4 Sol. (a)	
(viii)	(v)	In Δ PQR , PM is (a) Median (b) altitude (c) bisector (d) side  Sol. (b)	
(ix)	(iv)	The standard form of the approximate distance of moon from the earth 121117000 m is (a) 121117×10^3 (b) 1.21117×10^3	

		(c) 1.21117×10^8 (d) 1.21117×10^{10} Sol. (c)	
(x)	(iii)	Which of the following is the numerical coefficient of -5xy? a) - 5 b) -x c) 5 d) -y Sol. (a)	
(xi)	(ii)	Find AD in the following figure, if area of ΔABC is 6 cm².  (a) 2.4 cm (b) 4 cm (c) 5 cm (d) 3 cm Sol. (a)	
(xii)	(i)	The number of vertices and faces in the given shape are  a) 10 and 9 b) 8 and 7 c) 10 and 7 d) 7and 10 Sol.(c)	
		SECTION – B Q 2 to 7 is Objective type questions of 2 marks each.	
2.	7.	Solve : $3(2x - 1) + 5 = 14$ SET C 2 $2(2x - 3) + 7 = 12$ Sol. 6x – 3 + 5 = 14 6x = 14 – 2 = 12 X = 2 ans. SET C 2	

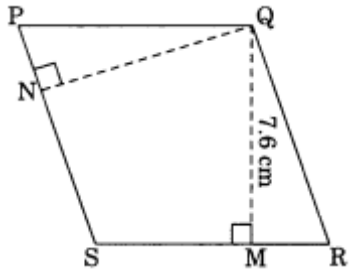
		4x – 6+ 7 = 12 4x = 12 – 1 = 11 X = 11/4 ans.	
3.	6.	The population of a city is 500000 and 30% are females, 40% are males and remaining are children. Find the number of children? Solution: The population of a city is 500000 Given: 30% are females 40% are males Total Percentage of females and males = 30% + 40% = 70% ∴ Percentage of children = (100 − 70)% = 30% No. of children are 150000.	
4.	5.	Arrange the rational numbers $\frac{-6}{5}, \frac{5}{6}, \frac{-8}{15}, \frac{8}{3}$ in descending order. Sol.LCM of 3,5,6 and 15 = 30 $\frac{-36}{30}, \frac{25}{30}, \frac{-16}{30}, \frac{80}{30}$ descending order is $\frac{8}{3} > \frac{5}{6} > \frac{-8}{15} > \frac{-6}{5}$	
5.	4.	Simplify by combining like terms and find the value for m = 5 and n = 1. 2m – (m – 3n) – n OR Get the algebraic expressions in the following cases using variables, constants and arithmetic operations. (i) Subtraction of 2p from q. (ii) One- fourth of the sum of numbers m and n. Sol. 2m – m +3 n – n = m + 2n = 5 + 2 = 7 ans. OR (a) q– 2p (b) (m + n)/4	
6.	3.	What is the order of rotational symmetry of a rectangle and How many lines of symmetry are there in an isosceles right triangle? Sol. 2 and 1	

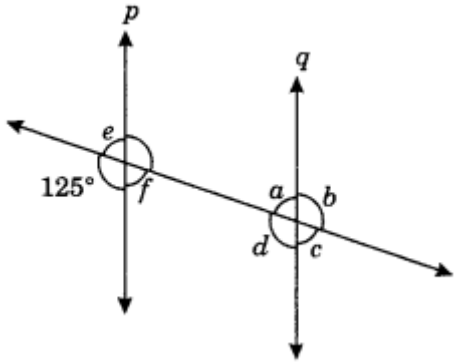
7.	2.	The temperature at 12 noon was 10°C above zero. If it decreases at the rate of 2°C per hour until midnight, What would be the temperature at midnight? Sol. Temperature at 12 noon was 10°C above zero i.e. +10°C Rate of decrease in temperature per hour = 2°C Number of hours from 12 noon to midnight = 12 ∴ Change in temperature in 12 hours = 12 × (-2°C) = -24°C ∴ Temperature at midnight = +10°C + (-24°C) = -14°C Hence, the required temperature at midnight =-14°C	
		SECTION – C Q 8 to 10 is Short answer type questions of 3 marks each.	
8.	10.	Vidya and Pratap went for a picnic. Their mother gave them a water bottle that contained 5 litres of water. Vidya consumed $2/5$ of the water. Pratap consumed the remaining water. (i) How much water did Vidya drink? (ii) What fraction of the total quantity of water did Pratap drink? Solution: (i) Water consumed by Vidya = 25 of 5 litres $= \frac{2}{\cancel{5}} \times \cancel{5}$ litres = 2 litres Water consumed by Patap = 5 litres – 2 litres = 3 litres (ii) Fraction of water consumed by Pratap = $3/5$ litres OR A vehicle covers a distance of 43.2 km in 2.4 litres of Petrol. How much distance will it cover in one litre of petrol? Solution: 2.4 litres of petrol is required to cover 43.2 km distance ∴ 1 litre of petrol will be required to cover 43.2 $= \frac{43.2}{2.4}$ km distance $= \frac{432}{24}$ km = 18 km Hence, the required distance = 18 km	

9.	9.	A 15 m long ladder reached a window 12 m high from the ground on placing it against a wall at a distance a. Find the distance of the foot of the ladder from the wall.  Solution: Here, the ladder forms a right angled triangle. $\therefore a^2 + (12)^2 = (15)^2$ (By Pythagoras property) $\Rightarrow a^2 + 144 = 225$ $\Rightarrow a^2 = 225 - 144$ $\Rightarrow a^2 = 81$ $\therefore a = \sqrt{81} = 9$ m Thus, the distance of the foot from the ladder = 9m SET C 2 A tree is broken at a height of 5 m from the ground and its top touches the ground at a distance of 12 m from the base of the tree . Find the original height of the tree. Solution: Let AB be the original height of the tree and broken at C touching the ground at D such that  AC = 5 m and AD = 12 m In right triangle ΔCAD, $AD^2 + AC^2 = CD^2$ (By Pythagoras property) $\Rightarrow (12)^2 + (5)^2 = CD^2$ $\Rightarrow 144 + 25 = CD^2$ $\Rightarrow 169 = CD^2$ $\therefore CD = \sqrt{169} = 13$ m But CD = BC AC + CB = AB 5 m + 13 m = AB	

		∴ AB = 18 m . Thus, the original height of the tree = 18 m.	
10.	8.	Using laws of exponents, simplify and write the answer in exponential form: $(2^{20} \div 2^{15}) \times 2^3$ Sol. $(2^{20} \div 2^{15}) \times 2^3$ $= 2^{20-15} \times 2^3$ $= 2^5 \times 2^3 = 2^{5+3} = 2^8$ OR Simplify and write in exponential form. $\frac{5\times 27\times 2^3}{25\times 3^4 \times 8^0}$ Sol. $\frac{5\times 27\times 2^3}{25\times 3^4 \times 8^0}$ $= \frac{1\times 1\times 8}{5\times 3\times 1} = \frac{8}{15}$ Ans.	
		SECTION – D Q 11 to 13 is Long Answer type questions of 5 marks each.	
11.	13.	In a public library, the following observations were recorded by the librarian in a particular week: **Days** | **Mon** | **Tues** | **Wed** | **Thurs** | **Fri** | **Sat** **Newspaper Readers** | 400 | 600 | 350 | 550 | 500 | 350 **Magazine Readers** | 150 | 100 | 200 | 300 | 250 | 200 (a) Draw a double bar graph choosing an appropriate scale. (b) On which day, the number of readers in the library was maximum? OR The scores in mathematics test (out of 25) of 15 students is as follows: 19, 25, 23, 20, 9, 20, 15, 10, 5, 16, 25, 20, 24, 12, 20 Find the mode and median of this data. Are they same? Solution:	

		Draw the double bar graph . Thursday OR Given data: 19, 25, 23, 20, 9, 20, 15, 10, 5, 16, 25, 20, 24, 12, 20 Mean = (sum of the observations) / no. of the observations =(19+25+23+20+9+20+15+10+5+16+25+20+24+12+20)/15 = 263/ 15 = 17.53 approx. Let us arrange the given data in increasing order $5, 9, 10, 12, 15, 16, 19, \underbrace{20, 20, 20, 20}, 23, 24, 25, 25$ Since 20 occurs 4 times (highest) ∴ Mode = 20 n = 15 (odd) ∴ Median = $\{(n+1)/2\}$ th term = $(15+1)/2$ = 8th term = 20 Thus, median = 20 and mode = 20 ∴ Mode and median are same but mean is not same.	
12.	12.	(a) Arun bought a car for ₹ 3,50,000. The next year, the price went upto ₹ 3,70,000. What was the Percentage of price increase? (b) Gardening shears bought for ₹ 250 and sold for ₹ 325 , find the profit % or loss% on this transaction . Solution: (a) Original price of the car = ₹ 3,50,000 Price increased next year = ₹ 3,70,000 Increase in price = ₹ 3,70,000 – ₹ 3,50,000 = ₹ 20,000 ∴ Percentage of the increase in the price $= \frac{20,000 \times 100}{3,50,000} = \frac{40}{7}\% = 5\frac{5}{7}\%$ (b) Here, CP = ₹ 250 SP = ₹ 325 Since SP > CP ∴ Profit = SP – CP = ₹ 325 – ₹ 250 = ₹ 75 $\therefore \quad \text{Profit}\% = \frac{\text{Profit} \times 100}{\text{CP}}$ $= \frac{75}{250} \times 100 = 30\%$	3+2=5

		Hence, the required profit = ₹ 75 and Profit per cent = 30% OR What rate gives ₹ 280 as interest on a sum of ₹ 56,000 in 2 years? Also calculate the amount ? Solution: Given: Principal = ₹ 56,000 Interest = ₹280 Time = 2 years Rate = ? $\text{Rate} = \frac{100 \times I}{P \times T} = \frac{100 \times 280}{56{,}000 \times 2}$ $= \frac{1}{4}\% \text{ or } 0.25\%$ Hence, the required rate = 0.25% Amount = P + I = 56000 + 280 = Rs. 56280 /	
13.	11.	PQRS is a parallelogram. QM is the height of Q to SR and QN is the height from Q to PS. If SR = 12 cm and QM = 7.6 cm. Find: (a) the area of the parallelogram PQRS (b) QN, if PS = 8 cm  Solution: (a) Area of the parallelogram PQRS = SR × QM (∵ Area = Base × Height) = 12 cm × 7.6 cm = 91.2 cm^2 (c) Area of the parallelogram PQRS 91.2 = PS × QN QN = 11.4 cm	
		SECTION – E Q 14 to 16 is Source based/Case study questions of 4 marks each.	

14.		When two or more parallel lines are intersected by a transversal then Pair of corresponding angles are equal. Pairs of alternate interior/exterior angles are equal and Co interior angles are supplementary. In the given figure, p || q.  Based on the above information, answer the following questions: (a) What kind of ∠e and ∠f are ? (b) What is the measure of ∠d ? (c) What is the measure of ∠f and ∠a ? (Give reason) OR What is the measure of ∠e and ∠c ? (Give reason) Sol. (a).∠e = ∠f (Vertically opposite angles) (b) ∠d = 125° (Corresponding angles) (c) ∠f = 180° − 125° = 55°(Linear Pair) ∠a = ∠f= 55° (Alternate interior angles) OR ∠e = 180° − 125° = 55°(Linear Pair) ∠c = ∠e= 55° (Alternate exterior angles)	
15.		There are many situations that involve fractional numbers . You can represent a distance of 750 m above sea level as $\frac{3}{4}$ km. Can we represent 750 m below sea level in km? Can we denote the distance of $\frac{3}{4}$ km below sea level by $\frac{-3}{4}$? We can see that $\frac{-3}{4}$ is neither an integer nor a fractional number as fractions can not be negative .Such number are called rational numbers . A rational number is a number of the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$. So now , We shall introduce the concept of rational numbers.	

Based on above situation, answer the following questions.

i) Compare $\frac{-3}{4}$ and $\frac{-13}{2}$.

ii) Write $\frac{3}{-24}$ in standard form.

iii) List two rational numbers between – 2 and – 3.

OR

Draw the number line and represent the rational numbers $-\frac{1}{6}$ on it.

Sol. (i) $\frac{-3}{4} > \frac{-13}{2}$

(ii) $\frac{-1}{8}$

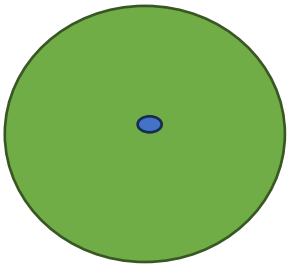
(iii) Two rational numbers between $\frac{-20}{10}$ and $\frac{-30}{10}$ are $\frac{-21}{10}$ and $\frac{-23}{10}$

Or

Represent $-\frac{1}{6}$ on number line.

16.

A gardener wants to fence a circular garden of diameter 21 m.



(a) Find the radius of garden ?

(b) Find the length of the rope he needs to purchase for fencing it ?

(c) Find the area of the garden ?

OR

Find the cost of the rope, if he makes 2 rounds of fence. if it costs ₹ 4 per metre. (Take π =22/7)

(a) sol.The radius of garden = 21/2 = 10.5 m

(b)The length of the rope he needs to purchase for fencing it = circumference of the circle = π d = (22/7) × 21 = 22 × 3 = 66 m

		(b) The area of the garden = π r^2 sq. units = $(22/7) \times 10.5 \times 10.5$ m^2 =346.5 m^2 OR The cost of the rope, if he makes 2 rounds of fence. if it costs ₹ 4 per metre. Cost = Rs. $(2 \times 66 \times 4)$ = Rs. 528/	