



INDIAN SCHOOL AL WADI AL KABIR

Mid-Term Question Paper (2023-24)

Class: IX

Sub: MATHEMATICS

Max Marks: 80

Date: 26/09/23

(SET 1)

Time:3 hours

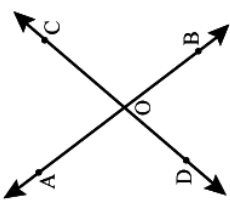
**General Instructions:**

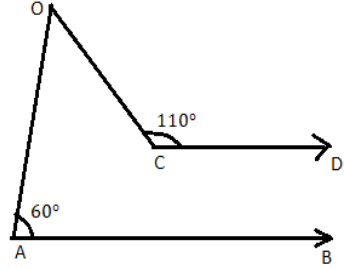
1. This question paper is divided into 5 sections- A, B, C, D and E.
2. Section A-(MCQ) comprises of 18 questions of 1 mark each and 2 Assertion Reasoning questions of 1 mark each.
3. Section B-(Short answer) comprises of 5 questions of 2 marks each.
4. Section C-(Long answer) comprises of 6 questions of 3 marks each.
5. Section D- (Long answer) comprises of 4 questions of 5 marks each.
6. Section E- Comprises of 3 Case study-based questions of 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However, an internal choice in 2 Qs of 2marks, 2 Qs of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.

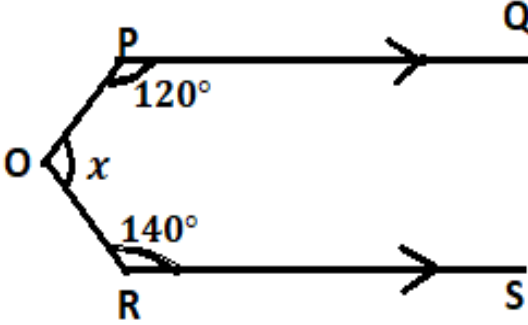
**Section A**

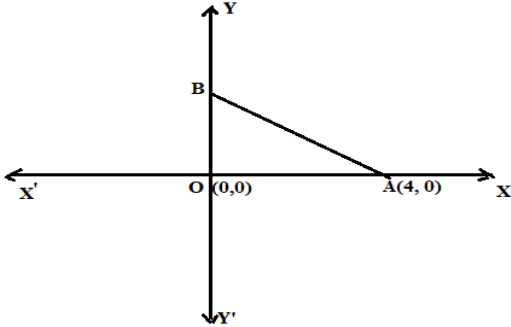
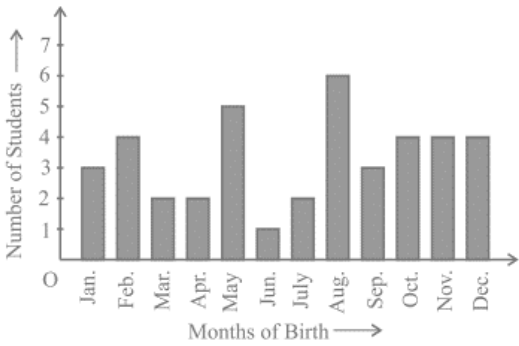
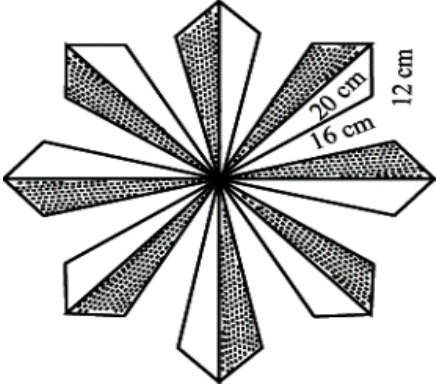
PART-1(MCQ-1 mark each)

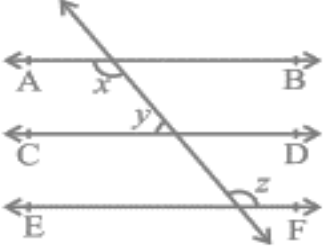
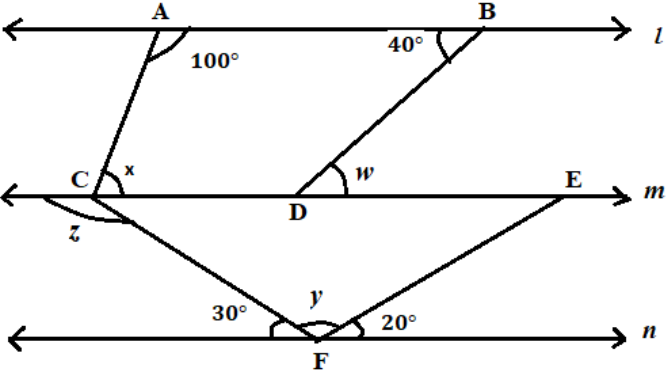
Q.1.	The value of $2\frac{2}{3} \times 2\frac{1}{3}$ is:							
	A	$2\frac{2}{3}$	B	$2\frac{1}{3}$	C	2	D	1
Q.2.	The area of an equilateral triangle with perimeter $24\sqrt{3}$ is:							
	A	$36\sqrt{3}cm^2$	B	$48cm^2$	C	$18\sqrt{3}cm^2$	D	$48\sqrt{3}cm^2$
Q. 3.	The base and hypotenuse of a right triangle is respectively 5cm and 13cm and its area is:							
	A	$60cm^2$	B	$30cm^2$	C	$65cm^2$	D	$18cm^2$
Q. 4.	Simplified form of $8\sqrt{15} \div 2\sqrt{3}$ is:							
	A	$4\sqrt{5}$	B	$2\sqrt{3}$	C	$5\sqrt{3}$	D	$4\sqrt{3}$

Q. 5.	The semi-perimeter of a triangle having the length of its sides as 20cm, 15cm and 21cm is:							
	A	56cm	B	28cm	C	29cm	D	30cm
Q. 6.	The decimal expansion of the number $\sqrt{2}$ is:							
	A	Finite decimal	B	1.41421	C	Non-terminating recurring	D	Non-terminating non-recurring
Q. 7.	The point of intersection of the co-ordinate axes is:							
	A	Origin	B	Abscissa	C	Quadrant	D	Ordinate
Q.8.	The number of dimensions of a surface has:							
	A	3	B	1	C	0	D	2
Q.9.	The class mark of the interval 116.5 – 121.5 is:							
	A	5	B	119	C	238	D	120
Q.10.	<p>Two straight lines AB and CD intersect one another at the point O.  If <math>\angle AOC + \angle COB + \angle BOD = 246^\circ</math>, then <math>\angle AOD</math> is:</p> 							
	A	$114^\circ$	B	$90^\circ$	C	$246^\circ$	D	$104^\circ$
Q.11.	Two angles $(30^\circ - a)$ and $(125^\circ + 2a)$ . If each one is the supplement of the other, then the value of $a$ is:							
	A	$35^\circ$	B	$30^\circ$	C	$155^\circ$	D	$25^\circ$
Q.12.	Image of point (0 ,5) about x -axis is:							
	A	(-5, 5)	B	(-5, 0)	C	(0, 5)	D	(5, 0)
Q.13.	In the class intervals 100-300, 300-500, the number 300 is included in:							
	A	both the intervals	B	100 - 300	C	300-500	D	none of the intervals

Q.14.	If $(a, -7) = (9, b)$ , then the value of a and b respectively are:							
	<b>A</b>	$(-2, 7)$	<b>B</b>	$(9, -7)$	<b>C</b>	$(-7, 9)$	<b>D</b>	$(-2, 9)$
Q.15.	Which of the following needs a proof?							
	<b>A</b>	Theorem	<b>B</b>	Axiom	<b>C</b>	Definition	<b>D</b>	Postulates
Q.16.	To draw a histogram to represent the following frequency distribution, the adjusted frequency for the class 25-45 is:							
	Marks		5-10	10-15	15-25	25-45	45-75	
	No. of candidates		6	12	10	8	15	
	<b>A</b>	2	<b>B</b>	3	<b>C</b>	5	<b>D</b>	6
Q.17.	The number of interwoven isosceles triangles in Sriyantra (in the Atharvaveda) is:							
	<b>A</b>	7	<b>B</b>	8	<b>C</b>	9	<b>D</b>	11
Q.18.	If two interior angles on the same side of transversal intersect two parallel lines are in the ratio 2:3, then the measure of the larger angle is:							
	<b>A</b>	$36^\circ$	<b>B</b>	$108^\circ$	<b>C</b>	$72^\circ$	<b>D</b>	$110^\circ$
	<b>DIRECTION:</b> In the question number 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option.							
Q.19.	Statement A (Assertion): In figure. $AB \parallel CD$ , $\angle BAO = 60^\circ$ and $\angle OCD = 110^\circ$ , then $\angle AOC = 50^\circ$ .							
	Statement R(Reason): If two parallel lines are intersected by a transversal, then each pair of consecutive interior angles are equal.							
	<p>(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)</p> <p>(b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)</p> <p>(c) Assertion (A) is true but reason (R) is false.</p> <p>(d) Assertion (A) is false but reason (R) is true.</p>							

Q.20.	<p>Statement A (Assertion): The area of an equilateral triangle with each side ‘p’ is</p> $\Delta = \frac{\sqrt{3}}{4} p^2 \text{ sq. Units}$ <p>Statement R(Reason): The area of a triangle with perimeter ‘2s ‘and sides a, b and c is given by</p> $\Delta = \sqrt{s(s - a)(s - b)(s - c)}$ <p>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 and 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.</p>
	<p><b>Section B</b> (S.A-2 mark each)</p>
Q.21.	<p>Simplify and find the value of <math>\{5 \left(8^{\frac{1}{3}} + 27^{\frac{1}{3}}\right)^3\}^{\frac{1}{4}}</math></p> <p style="text-align: center;">OR</p> <p>If a = 2, b=3, then find the value of <math>(a^b + b^a)^{-1}</math>, write the answer with positive exponent.</p>
Q.22.	<p>Find the area of a triangle ABC in which then <math>\angle ABC = 90^\circ</math>, then <math>\angle ACB = 45^\circ</math> and <math>AB = \sqrt{18}</math> cm.</p> <p style="text-align: center;">OR</p> <p>The sides of a triangle are in the ratio 3: 4: 5 and its perimeter is 24cm. Find the length of its sides and identify what type of triangle it is.</p>
Q.23.	<p>Solve the equation <math>m - 15 = 32</math> and state which axiom is used here.</p>
Q.24.	<p>In figure given below, <math>PQ \parallel RS</math> ,</p> <p>find the value of <math>x</math> . State reasons for your answer.</p> <div style="text-align: center;">  </div>

<p>Q.25.</p>	<p>In fig. AOB is a triangle with co-ordinates of A (4, 0) and O (0, 0) and AB= 5units.</p> <p>Find the coordinates of B.</p>	
<p><b>Section- C</b> (S.A-3 mark each)</p>		
<p>Q.26.</p>	<p>Find the values of a and b, when <math>\frac{5+2\sqrt{6}}{5-2\sqrt{6}} = a + b\sqrt{6}</math></p> <p style="text-align: center;">OR</p> <p>Represent <math>\sqrt{9.3}</math> on the number line.</p>	
<p>Q.27.</p>	<p>In a particular section of Class IX, 40 students were asked about the months of their birth and the following graph was prepared for the data so obtained:</p> <p>(i) How many students were born from October to December?</p> <p>(ii) In which month were the minimum number of students born and how many?</p> <p>(iii) Compare the number of students were born in February and September.</p> <p>Which month were maximum no. of students born and by how much?</p>	
<p>Q.28.</p>	<p>A floral design on a floor is made up of 16 tiles, each triangular in shape having sides 16 cm, 12 cm and 20 cm.</p> <p>Find the cost of polishing the tiles at ₹ 5 per cm<sup>2</sup>.</p>	

Q.29.	State any three Euclid's Axiom.
Q.30.	Three vertices of a triangle are P (− 4, 1), Q (4, 1) and R (0, 5). Plot these points on a graph sheet and find the area of the triangle so obtained.
Q.31.	<p>If two lines intersect each other, prove that the vertically opposite angles are equal.</p> <p style="text-align: center;">OR</p> <p>In figure, if <math>AB \parallel CD</math> and <math>CD \parallel EF</math> and <math>y : z = 3 : 7</math>, find the value of <math>x</math>, <math>y</math> and <math>z</math>.</p> 
<p>Section- D (L.A-5 mark each)</p>	
Q.32.	<p>Rationalise the denominator and simplify <math>\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2}</math></p> <p style="text-align: center;">OR</p> <p>Evaluate <math>[\frac{81}{16}]^{\frac{-3}{4}} \times \{ (\frac{9}{25})^{\frac{3}{2}} \div (\frac{5}{2})^{-3} \}</math></p>
Q.33.	Plot the points A (1,3), B (1, −1), C (−1, −1) and locate the fourth vertex D, if ABCD is a rectangle. Also, find the area of the rectangle.
Q.34.	<p>If a transversal intersects two lines such that bisectors of a pair of corresponding angles are parallel, then prove that the two lines are parallel.</p> <p style="text-align: center;">OR</p> <p>If line <math>l \parallel m</math> and <math>m \parallel n</math>, then find the values of <math>x</math>, <math>y</math>, <math>w</math> and <math>z</math>. State reasons for your answer. Also, find <math>x + y : y - x</math></p> 

Q.35. The following data which shows the monthly cost of living index of a city in a period of 2 years. Draw a histogram and a frequency polygon representing the given data.

Cost of living index:	480-500	500-520	520-540	540-560	560-580
No. of months:	5	4	3	8	4

Section- E  
(CASE STUDY BASED QUESTIONS-4mark each)

Q.36. CASE STUDY-I

It is a type of online game that challenges the students to think fast. They will be bombarded with different types of numbers such as integers, rationals and irrational numbers and numbers in exponential form. Two friends Abhay and Arun played this game. They got the following list of numbers.  $1.322222\dots$ ,  $(256)^{\frac{1}{4}}$ ,  $\sqrt{28}$ ,  $\frac{1}{3-2\sqrt{2}}$ ,  $\frac{2}{11}$ ,  $\frac{3}{13}$ ,  $\sqrt{98}$  and  $\sqrt{147}$ .



Based on the above information, answer the following questions.

- (i) Express the number  $1.3222\dots$  in  $\frac{p}{q}$  form. (1m)
- (ii) Simplify  $\sqrt{27} + \sqrt{98} - \sqrt{48}$  (1m)
- (iii) Find any two irrational numbers in between  $\frac{2}{5}$  and  $\frac{3}{5}$  (2m)

OR

If  $x = 3 - 2\sqrt{2}$ , find the value of  $x + \frac{1}{x}$  (2m)

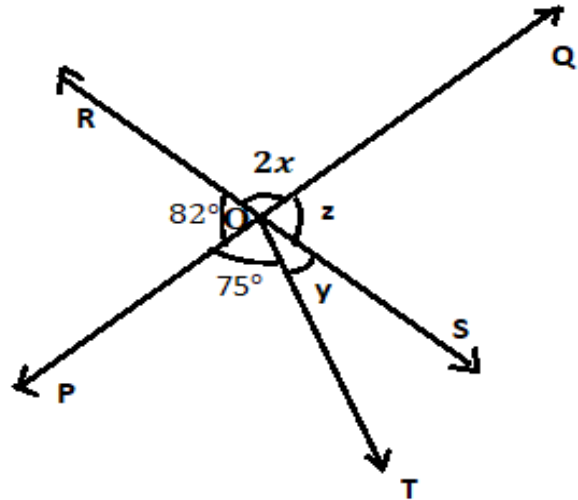
Q.37.

CASE STUDY-II

An angle is formed by two rays joining at a point having one common endpoint.

There are several types of angles like an acute angle, obtuse angle, right angle etc. Further, these types of angles are divided into a pair of angles like supplementary angles, complementary angles, linear pair of angles, opposite angles, adjacent angles etc. However, position, direction, precision, and optimization are some ways in which people use angles in their daily life. Carpenters use them to measure precisely to build doors, chairs, tables, etc. Athletes use them to gauge the distances of a throw and to enhance their performance in sports.

In the given figure, two straight lines PQ and RS intersect each other at O.



Based on the above information, answer the following questions with reasons.

- (i) Find the measurement of  $\angle SOQ$ . ( 1m)
- (ii) Find the measurement of  $\angle ROQ$ . ( 1m)
- (iii) Find the value of  $y + z$ .

OR ( 2m)

Find the value of reflex angle  $\angle ROT$ .

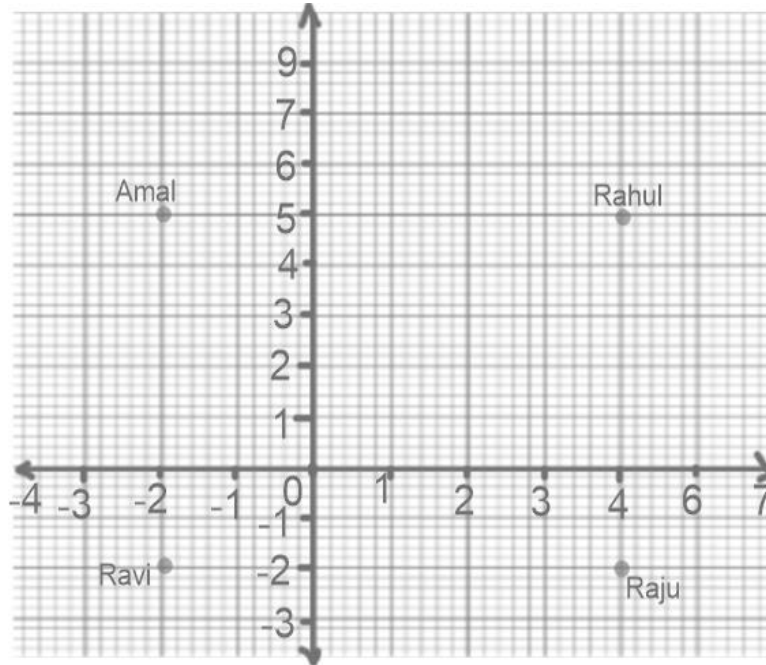


Q.38.

CASE STUDY-III

Playgrounds are safe spaces where kids develop crucial physical, social, emotional and imaginative skills necessary to gain self-confidence, improve coordination, and advance critical thinking capabilities. Amal went to a play ground along with his friends Ravi, Raju and Rahul. They were passing the volleyball to each other. Amal allotted different positions for his friends where they have to be. After returning to his room, he plotted a graph by assuming that foot of the long pole as origin and marked four places on the graph as per the direction of movement of the ball.

Based on the above information, answer the following questions.



- (i) Find the coordinates of the position of Rahul and Amal. (1m)
- (ii) Find the distance between Ravi and Raju. (1m)
- (iii) Identify the quadrant or axis on which the following points lie.  
(-1, -2), (3, 0), (-3, 4), (3, -2)

OR (2m)

Find the value of  
(Ordinate of the position of Amal – Abscissa of the position of Raju.)  
Also, find the distance of Raju from Y-axis.