INDIAN SCHOOL AL WADI AL KABIR

Post Mid-Term Question Paper (2023-24)

Class: IX | Sub: MATHEMATICS (Subject Code 041) | Max Marks: 80

Date: 03/12/2023 | (SET 1) | Time:3 hours

General Instructions:

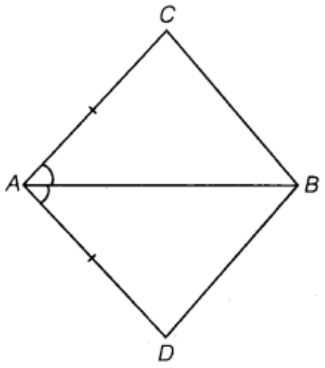
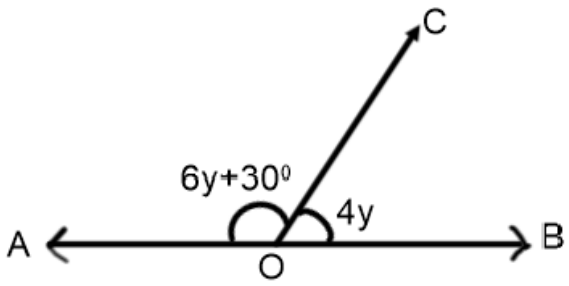
1. This question paper has 5 sections- A, B, C, D and E.
2. Section A- PART-1 (MCQ) comprises of 18 questions of 1 mark each
3. Section A- PART-2 (Assertion and Reason) comprises of 2 questions of 1 mark each.
4. Section B- (Short answer) comprises of 5 questions of 2mark each.
5. Section C- (Long answer) comprises of 6 questions of 3 marks each.
6. Section D- (Long answer) comprises of 4 questions of 5 marks each.
7. Section E – comprises of 3 Case study-based questions of 4 marks each with sub parts of the values 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice has been provided for certain questions.

Section A

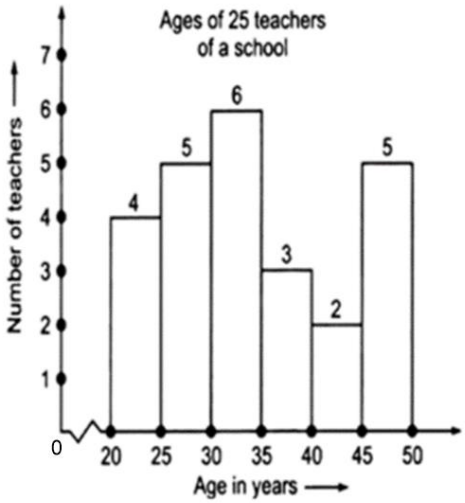
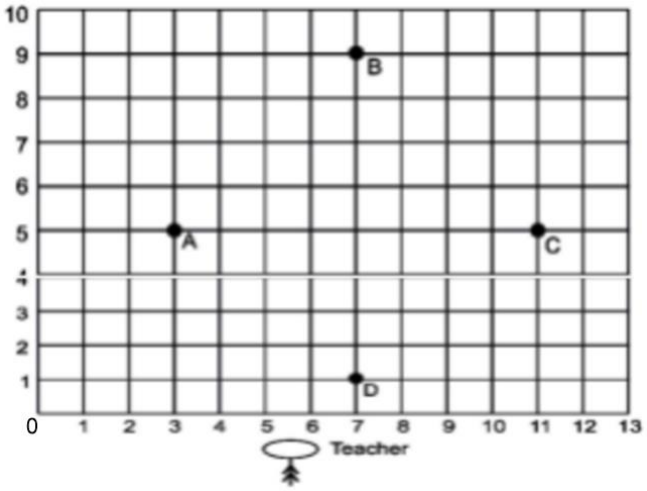
PART-1 MCQ (1 mark each)

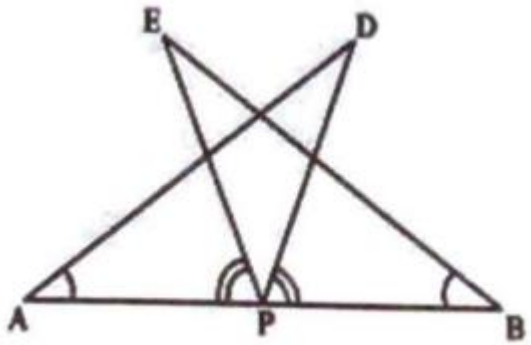
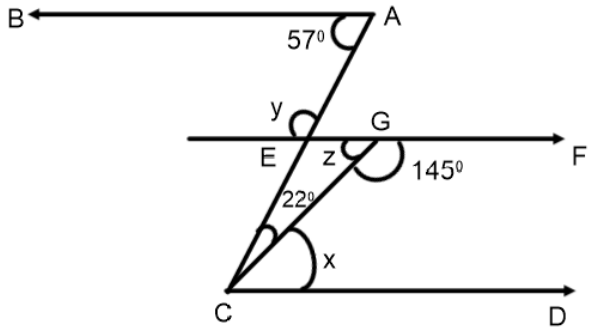
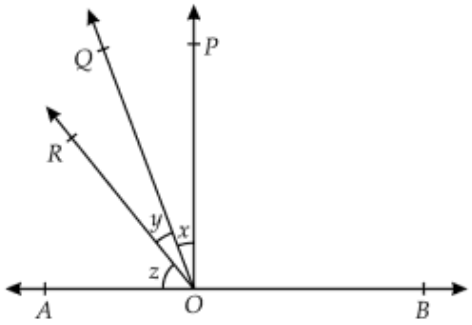
Q.1.	The coefficient of x in the expansion of $(x + 3)^3$ is_____.							
	A	1	**B**	9	**C**	18	**D**	27
Q.2.	The points whose abscissa and ordinate have different signs will be in:							
	A	II and IV quadrant	**B**	I and II quadrant	**C**	II and III quadrant	**D**	I and III quadrant
Q. 3.	On dividing $6\sqrt{27}$ by $2\sqrt{3}$, we get:							
	A	$9\sqrt{3}$	**B**	6	**C**	9	**D**	None of these

Q. 4.	Degree of the zero polynomial is _____.							
	A	0	**B**	Not defined	**C**	1	**D**	None of these
Q. 5.	The value of $(4)^{\frac{3}{2}} \times (4)^{\frac{5}{2}}$ is _____.							
	A	256	**B**	128	**C**	512	**D**	1024
Q. 6.	Euclid stated that "the whole is greater than the part" in the form of:							
	A	Postulate	**B**	Definition	**C**	Axiom	**D**	Proof
Q. 7.	Which of the following is an irrational number?							
	A	$\sqrt{16} - 4$	**B**	$(3 - \sqrt{3})(3 + \sqrt{3})$	**C**	$-\sqrt{25}$	**D**	$\sqrt{5} + \sqrt{9}$
Q. 8.	In a frequency distribution table, the class interval **140 – 150** has a frequency **15**. Then the point on the frequency polygon corresponding to this is_____.							
	A	(140,15)	**B**	(145,15)	**C**	(150,15)	**D**	(155,15)
Q. 9.	In how many chapters did Euclid divide his famous treatise "The Elements"?							
	A	13	**B**	10	**C**	16	**D**	15
Q.10.	The perpendicular distance of the point P(4,3) from x-axis is:							
	A	4	**B**	5	**C**	3	**D**	None of these
Q.11.	If AB = QR, BC = PR and CA = PQ, then:							
	A	$\Delta PQR \cong \Delta BCA$	**B**	$\Delta BAC \cong \Delta RPQ$	**C**	$\Delta ABC \cong \Delta PQR$	**D**	$\Delta CBA \cong \Delta PRQ$
Q.12.	Two angles which are supplementary are in the ratio $2:7$. Then the measures of angles are:							
	A	$40°, 140°$	**B**	$20°, 70°$	**C**	$40°, 70°$	**D**	$20°, 140°$
Q.13.	If the class marks of a continuous frequency distribution are 10, 20, 30, 40...., then the class interval representing the class mark 30 is_____.							
	A	$20 - 30$	**B**	$25 - 35$	**C**	$35 - 45$	**D**	$30 - 40$

Q.14.	In the given figure, the congruency criterion used in proving $\Delta ACB \cong \Delta ADB$ is:  							
	A	SAS	**B**	ASA	**C**	SSS	**D**	RHS
Q.15.	The length of each side of an equilateral triangle having an area of $9\sqrt{3}\ cm^2$ is_____.							
	A	4 cm	**B**	6 cm	**C**	$4\sqrt{3}$ cm	**D**	$6\sqrt{3}$ cm
Q.16.	The linear equation $4x - 5y = 12$ has _____.							
	A	unique solution	**B**	two solutions	**C**	infinitely many solutions	**D**	no solution
Q.17.	In the given figure, if $\angle BOC = 4y$ *and* $\angle AOC = 6y + 30°$. What will be the value of y to make AOB a straight line?  							
	A	15°	**B**	45°	**C**	25°	**D**	35°
Q.18.	If 9 is the class mark and 6 is the lower limit of a class in a continuous frequency distribution, then the upper limit of the class is _____.							
	A	3	**B**	18	**C**	15	**D**	12

	PART-2 ASSERTION AND REASON (1 mark each)
	DIRECTION: A statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.
Q.19	Statement A (Assertion): Sum of two irrational numbers $5+\sqrt{3}$ and $7+\sqrt{3}$ is an irrational number. Statement R (Reason): The square root of any odd number is irrational. (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.
Q.20	Statement A (Assertion): Two angles measures $a-31°$ and $152°-2a$. If each one is opposite to equal sides of an isosceles triangle, then the value of 'a' is 61°. Statement R (Reason): Angles opposite to equal sides of an isosceles triangle are equal. (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.
	Section B S.A. (2 mark each)
Q.21.	a) Use factor theorem to find whether $(x-2)$ is a factor of $(3x^3+x^2-20x+12)$. OR b) Find the value of 'k', if $(x-4)$ is a factor of $p(x)=x^2-kx+2k$.

Q.22.	The following histogram shows the frequency distribution of the ages of 25 teachers in a school. Answer the following questions based on the given histogram: i. Calculate the difference in the number of teachers between the age group **45-50** and the age group **20-25.** ii. In which age group does the maximum number of teachers fall and how many? 
Q.23.	Solve the equation $2x = 50$ and state the Euclid's axiom used in it.
Q.24.	Students of a school are standing in rows and columns in their playground for a drill practice. A, B, C and D are the positions of four students as shown in the figure. Observe the given figure and answer the following questions: i. Name the points identified by the coordinates (11,5) and (3,5). ii. Find the sum of abscissa of point B and ordinate of point D. 
Q.25.	a) Represent $\sqrt{5}$ on number line. OR b) Show that $1.\overline{28}$ can be expressed in the form $\frac{p}{q}$, where p and q are integers and q ≠ 0.

	Section C S.A. (3 mark each)
Q.26.	a) Prove that angles opposite to equal sides of an isosceles triangle are equal. **OR** b) AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that $\angle BAD = \angle ABE$ and $\angle EPA = \angle DPB$. Show that: (i) $\Delta DAP \cong \Delta EBP$ (ii) AD = BE. 
Q.27.	a) In the given figure, if AB ∥ EF ∥ CD, then find the value of x, y, z. Give reasons.  **OR** b) In the given figure, $PO \perp AB$. If $x : y : z = 1 : 3 : 5$, then find the value of x, y, z. Give reasons . 

Q.28. Plot the points P (5,1), Q (0,1), R (0, -2) and S (5, -2) on a graph paper. Name the type of quadrilateral obtained on joining the points in order.

Q.29. State any three Euclid's postulates.

Q.30. Kamala has a triangular field with sides 240 m, 200 m and 360 m. In order to prepare the field for cultivation, she needs to plough the field. Find the cost of ploughing the field at the rate of ₹ 5 per m^2.

Q.31. Draw the graph of the linear equation $2x + y = 6$.

Section D

L.A.(5 mark each)

Q. 32. a) Factorise: $x^3 + x^2 - 4x - 4$.

OR

b) If $p(r) = r^4 - 3r^2 + 2r + 5$, then find the value of $p(2) + p(1) + p(-1) - p(0)$.

Q. 33. a) The monthly profits (in ₹) of 70 shops are distributed as follows:

Profits(in ₹) per shop	100-150	150-200	200-250	250-300	300-350
Number of shops	12	18	20	14	6

Draw a histogram and a frequency polygon representing the given data.

OR

b) The following table gives the pocket money (in ₹) given to children per day by their parents. Draw a histogram to represent the information given below.

Pocket Money (in ₹)	0-10	10-30	30-60	60-70
Number of children	6	28	12	20

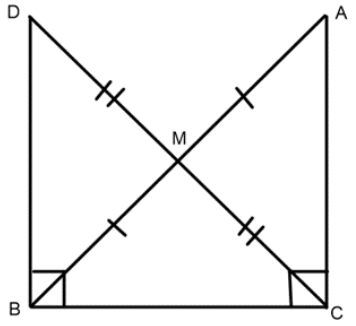
Q.34. $\Delta ABC \text{ and } \Delta DBC$ are two right triangles on the same base BC, right angled at C and B respectively. M is the mid-point of hypotenuse AB and DM = CM. Show that:

(i) $\Delta AMC \cong \Delta BMD.$

(ii) $\angle ACM = \angle BDM.$

(iii) $\Delta DBC \cong \Delta ACB.$

(iv) $AB = DC.$



Q.35. Simplify by rationalising the denominator: $\frac{\sqrt{11}-\sqrt{7}}{\sqrt{11}+\sqrt{7}} + \frac{\sqrt{11}+\sqrt{7}}{\sqrt{11}-\sqrt{7}}$

Section E

CASE STUDY BASED QUESTIONS(4 mark each)

Q.36. **CASE STUDY-I**

Prime Minister's National Relief Fund (also called PMNRF in short) is the fund raised to provide support for people affected by natural and man-made disasters. Natural disasters that are covered under this include flood, cyclone, earthquake etc. Man-made disasters that are included are major accidents, acid attacks, riots, etc.

Two friends Lata and Meena, together contributed ₹240 towards Prime Minister's Relief Fund. Based on the above information answer the following questions :

i. Write a linear equation in two variables to represent the above situation? (1m)

ii. If Lata contributed ₹124, then how much was contributed by Meena? (1m)

iii. a) Express $3y = 7$ in the form of $ax + by + c = 0$ and indicate the values of a, b, c.

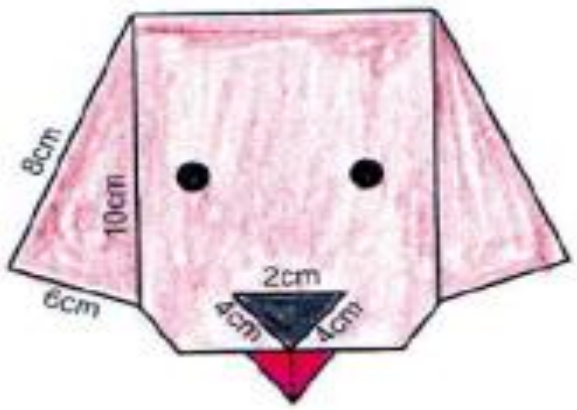
OR (2m)

b) If the point $(2k - 3, k + 2)$ lies on the graph of the equation $2x + 3y + 15 = 0$, then find the value of k.

Q.37.

CASE STUDY-II:

During summer vacations, Rohit injured his leg and could not go out to play with his friends. His mother suggested him to start making some origami craft materials. So he learnt origami craft through internet and made a puppy as shown in the below figure:



Based on the above information and measurement of different parts of the figure, answer the following questions:

i. a) Calculate the area of the paper used for making each ear of the puppy if both has same measure?

OR (2m)

b) The perimeter of a triangle is 300 cm and its sides are in the ratio $a:b:c = 3:5:7$, find the length of its sides. Also if the area of the triangle is $5\sqrt{3}$ times its perimeter, then find the area of the triangle.

ii. Find the semi-perimeter of the paper used to make the nose of the puppy. (1m)

iii. The area of an isosceles right triangle is $18cm^2$, find the length of its two equal sides. (1m)

Q.38.

CASE STUDY-III

Three friends Midhun, Maya and Mohan started a business together. They decided to share their capitals depending upon the variable expenditure. The capital of the three partners together is given by polynomial $(4a - 2b)^3$, which is the product of their individual share factors.

Use the above information, to answer the following questions:

i. a) Write the expanded form of $(4a - 2b)^3$.

OR (2m)

b) Find $x^2 + y^2 + z^2$, if $x + y + z = 9$ *and* $xy + yz + xz = 7$.

ii. Factorise: $\frac{81}{16}x^2 - \frac{4}{25}y^2$. (1m)

iii. Without actually calculating the cubes, find the value of $(10)^3 + (-7)^3 + (-3)^3$. (1m)

**********THE END**********