



INDIAN SCHOOL AL WADI AL KABIR

Revision Question Paper

Mid-term Examination (2023-24)

Sub: MATHEMATICS

Date: 10-09-2023

Class: X

Time: 3 hours

Maximum marks: 80

General Instructions

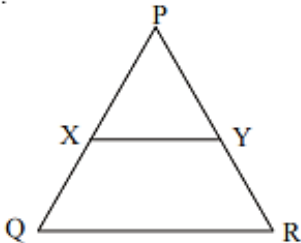
1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 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 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided.
An internal choice has been provided in the 2 marks questions of Section E

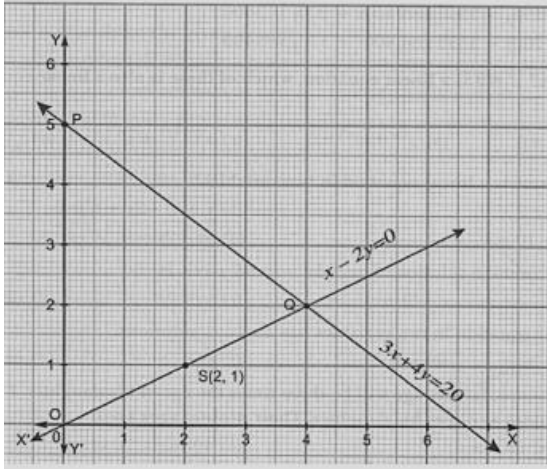
SECTION A

Section A consists of 20 questions of 1 mark each.

Q.1.	If $3x = \sec \theta$ and $\frac{3}{x} = \tan \theta$, then $(x^2 - \frac{1}{x^2})$ is equal to							
	A	3	B	1	C	$\frac{1}{9}$	D	9
Q.2.	For which value (s) of p, will the lines represented by the following pair of linear equations be parallel. $3x - y - 5 = 0$; $6x - 2y - p = 0$							
	A	all real values except 10	B	10	C	$\frac{5}{2}$	D	$\frac{1}{2}A$

Q.3.	If the HCF of 65 and 117 is expressible in the form $65m - 117$, then the value of m is							
	A	4	B	2	C	1	D	3
Q.4.	D and E are respectively the points on the sides AB and AC of a triangle ABC such that $AD = 2$ cm, $BD = 3$ cm, $BC = 7.5$ cm and $DE \parallel BC$. Then, length of DE (in cm) is							
	A	2.5	B	3	C	5	D	6
Q.5.	The LCM of smallest two -digit composite number and smallest composite number is							
	A	12	B	4	C	20	D	44
Q.6.	If the sum of the zeroes of the quadratic polynomial $kx^2 + 2x + 3k$ is equal to their product, then k equals							
	A	$\frac{1}{3}$	B	$-\frac{1}{3}$	C	$\frac{2}{3}$	D	$-\frac{2}{3}$
Q.7.	The point on the Y-axis which is equidistant from $(2, -5)$ and $(-2, 9)$ is							
	A	$(0, 3)$	B	$(0, 2)$	C	$(0, 5)$	D	$(0, -2)$
Q.8.	The coordinates of the point which divides the line segment joining the points $(4, -3)$ and $(8, 5)$ in the ratio 3:1 internally.							
	A	$(-3, -7)$	B	$(-7, -3)$	C	$(3, 7)$	D	$(7, 3)$
Q.9.	Two lines are given to be intersecting. The equation of one of the lines is $2x - 3y = 7$. The equation of the second line can be							
	A	$3x + 4y = 14$	B	$4x - 6y = -14$	C	$12x - 18y = 24$	D	$-12x + 18y = -42$
Q.10.	If α and $\frac{1}{\alpha}$ are zeroes of $4x^2 - 17x + k - 4$, the value of k is							
	A	1	B	3	C	5	D	8

Q.11.	The value of mode if the mean and median of the distribution are 14 and 15 respectively.																			
	A	16	B	17	C	18	D	13												
Q.12.	If $\sin \theta = \frac{a}{b}$, then $\tan \theta$ is equal to																			
	A	$\frac{b}{\sqrt{a^2 + b^2}}$	B	$\frac{b}{\sqrt{b^2 - a^2}}$	C	$\frac{a}{\sqrt{a^2 - b^2}}$	D	$\frac{a}{\sqrt{b^2 - a^2}}$												
Q.13.	Evaluate: $\frac{2 \tan 45^\circ \times \cos 60^\circ}{\sin 30^\circ}$																			
	A	$2\sqrt{2}$	B	2	C	1	D	$\frac{1}{2}$												
Q.14.	Find the upper limit of the median class for the given frequency distribution:																			
			<table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>Class</td> <td>0 - 5</td> <td>5 - 10</td> <td>10 - 15</td> <td>15 - 20</td> <td>20 - 25</td> </tr> <tr> <td>Frequency</td> <td>8</td> <td>10</td> <td>19</td> <td>25</td> <td>8</td> </tr> </tbody> </table>						Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	Frequency	8	10	19	25	8
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Frequency	8	10	19	25	8															
A	5	B	10	C	15	D	20													
Q.15.	In the given figure, $XY \parallel QR$ and $\frac{PX}{XQ} = \frac{PY}{YR} = \frac{1}{2}$, then																			
																				
A	$XY = QR$	B	$XY = \frac{1}{3} QR$	C	$XY = \frac{2}{3} QR$	D	$XY = \frac{1}{2} QR$													
Q.16.	If $x + 2$ is a factor of $x^2 + ax + 2b$ and $a + b = 4$, then																			
	A	$a = 1, b = 3$	B	$a = 5, b = -1$	C	$a = -1, b = 5$	D	$a = 3, b = 1$												

Q.17.	The ratio in which X-axis divides the line segment joining A (2, -3) and B (5, 6) is							
A	3: 5	B	1: 2	C	2: 1	D	2: 3	
Q.18.	<p>The coordinates of the vertices of the triangle formed between the lines and y-axis from the graph is</p> 							
A	(0,5), (0,0) and (6.5,0)	B	(4,2), (5,0) and (6.5,0)	C	(4,2), (0,0) and (0,5)	D	(0,0), (4,2) and (6.5,0)	
<p>DIRECTION: In question numbers 19 and 20, a statement of Assertion (A) is followed by statement of Reason (R). Choose the correct option</p> <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.19.	<p>Statement A (Assertion): For $k = 6$, the system of linear equations $x + 2y + 3 = 0$ and $3x + ky + 6 = 0$ inconsistent.</p> <p>Statement R (Reason): The system of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ is inconsistent if $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$.</p>							
Q.20.	<p>Statement A (Assertion): The values of x for which the distance between the points P (2, -3) and Q (x, 5) is 10 are 8 and -4.</p> <p>Statement R (Reason): The distance of a point P (x, y) from the origin (0, 0) is $\sqrt{x^2 + y^2}$.</p>							

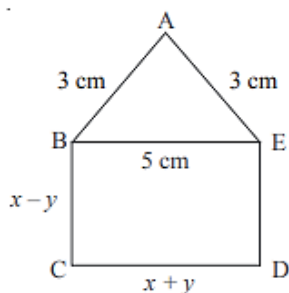
SECTION B

Section B consists of 5 questions of 2 marks each.

Q.21. Solve: $99x + 101y = 499$; $101x + 99y = 501$

OR

ABCDE is a pentagon with $BE \parallel CD$ and $BC \parallel DE$, BC is perpendicular to CD. If the perimeter of ABCDE is 21 cm, find x and y.



Q.22. Three bells ring together at intervals of 6, 12 and 18 minutes. If all the three rang at 6 a.m., when will they ring together again?

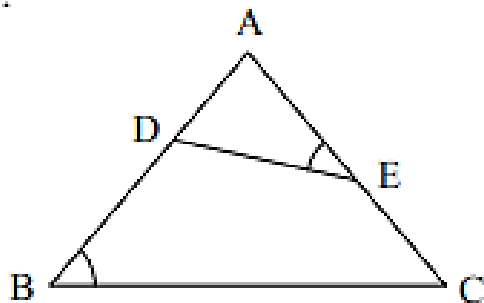
Q.23. If $\cos A + \cos^2 A = 1$, then find the value of $\sin^2 A + \sin^4 A$

Q.24. Find a quadratic polynomial, whose zeroes are - 4 and - 5.

OR

If α and β are the zeroes of the polynomial $x^2 + 2x + 1$, then find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$.

Q.25. In the given fig, D and E are points on sides AB and CA of $\triangle ABC$ such that $\angle B = \angle AED$. Show that $\triangle ABC \sim \triangle AED$.



SECTION C

Section C consists of 6 questions of 3 marks each.

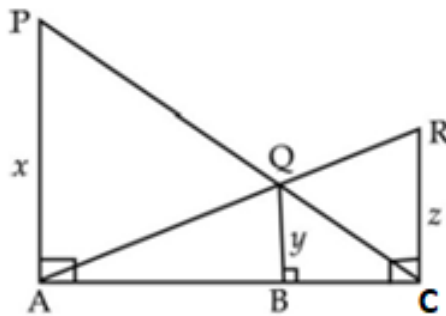
- Q.26.** Grow More Plantations have two rectangular fields of the same width but different lengths. They are required to plant 84 trees in the smaller field and 231 trees in the larger field. In both fields, the trees will be planted in the same number of rows but in different numbers of columns.
- (i) What is the maximum number of rows that can be planted in this arrangement?
- (ii) If the trees are planted in the number of rows obtained in (i), how many columns will each field have?

- Q.27.** The mode of the following frequency distribution is 36. Find the missing frequency x .

Classes	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Frequency	8	5	x	16	12	7

- Q.28.** Find the zeroes of the polynomial $p(x) = 2x^2 - 7x - 15$ and verify the relationship between zeroes and coefficients.

- Q.29.** In the given figure, PA, QB and RC are all perpendicular to AC. Prove that $\frac{1}{x} + \frac{1}{z} = \frac{1}{y}$



OR

ABCD is a trapezium in which $AB \parallel DC$ and its diagonals intersect each other at the point O.

Show that $\frac{AO}{BO} = \frac{CO}{DO}$.

Q.30.	Prove: $\frac{\operatorname{cosec}^2 \theta}{\operatorname{cosec} \theta - 1} - \frac{\operatorname{cosec}^2 \theta}{\operatorname{cosec} \theta + 1} = 2 \sec^2 \theta$																		
Q.31	<p>Solve the following pair of linear equations graphically: $x - y = 1$, $2x + y = 8$.</p> <p>Also find the co-ordinates of the points where the lines represented by the above equation intersect $y -$ axis.</p> <p style="text-align: center;">OR</p> <p>For what values of a and b, the pair of linear equations has coincident lines on the graphical representation.</p> <p>$2x - y = 5$ $(a - 2b) - (a + b) y = 15$</p>																		
SECTION D																			
Section D consists of 4 questions of 5 marks each.																			
Q.32.	<p>(i) Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.</p> <p>(ii) Using the above theorem prove that a line drawn through the mid-point of one side of a triangle parallel to another side bisects the third side.</p>																		
Q.33.	<p>Prove that $\frac{\tan \theta}{1 - \tan \theta} - \frac{\cot \theta}{1 - \cot \theta} = \frac{\cos \theta + \sin \theta}{\cos \theta + \sin \theta}$</p> <p style="text-align: center;">OR</p> <p>Prove: $(\operatorname{cosec} A - \sin A) (\sec A - \cos A) = \frac{1}{\tan A + \cot A}$</p>																		
Q.34.	<p>A student noted the number of cars passing through a spot on a road for 100 periods each of 3 minutes and summarized it in the table given below.</p> <p>Find the mean and mode of the given data.</p> <table border="1" data-bbox="224 1696 1507 1879" style="width: 100%; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td>No. of cars</td> <td>0 - 10</td> <td>10 - 20</td> <td>20 - 30</td> <td>30 - 40</td> <td>40 - 50</td> <td>50 - 60</td> <td>60 - 70</td> <td>70 - 80</td> </tr> <tr> <td>Frequency</td> <td>7</td> <td>14</td> <td>13</td> <td>12</td> <td>20</td> <td>11</td> <td>15</td> <td>8</td> </tr> </tbody> </table>	No. of cars	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	Frequency	7	14	13	12	20	11	15	8
No. of cars	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80											
Frequency	7	14	13	12	20	11	15	8											

OR

For what value of x , is the median of the following frequency distribution 34.5?

Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
Frequency	3	5	11	10	x	3	2

Q.35.

Prove that $\sqrt{3}$ is irrational and hence prove that $2 - 5\sqrt{3}$ is irrational.

SECTION E

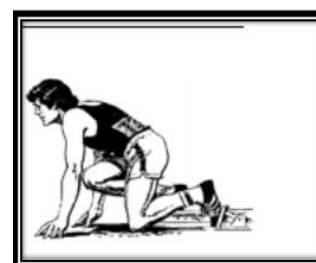
Case study- based questions are compulsory.

Q.36.

Case study-based 1

A stopwatch was used to find the time that it took a group of students to run 100 m.

Time (in sec)	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
No. of students	8	10	13	6	3



Based on the above information answer the following questions:

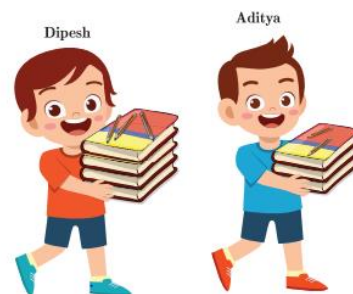
(i)	What is the upper limit of the modal class?	1m
(ii)	What is the sum of lower limits of median class and modal class?	1m
(iii)	Estimate the mean time taken by a student to finish the race.	2m
OR		
	Find the mode of the above data.	

Q.37.

Case study-based 2

Dipesh bought 3 notebooks and 2 pens for ₹ 80. His friend Ramesh said that price of each notebook could be ₹ 25. Then three notebooks would cost ₹ 75, the two pens would cost ₹ 5 and each pen could be for ₹ 2.50. Another friend Amar felt that ₹ 2.50 for one pen was too little. It should be at least ₹16. Then the price of each notebook would also be ₹16.

Aditya also bought the same types of notebooks and pens as Dipesh. He paid ₹ 110 for 4 notebooks and 3 pens.



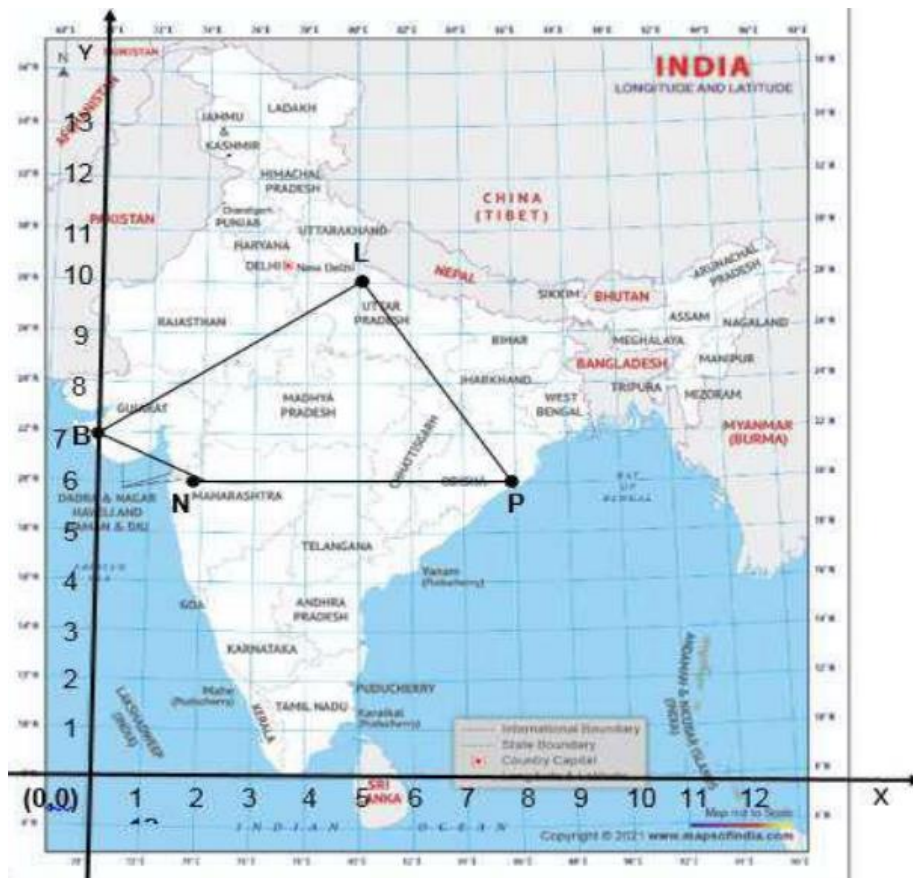
Based on the above information answer the following questions:

(i)	Is the estimation of Ramesh and Amar applicable for Aditya?	1m
(ii)	Write the pair of linear equations for the situation given.	1m
(iii)	What is the exact cost of notebook and pen?	2m
OR		
	What is the total cost of 15 notebooks?	

Q.38.

Case study-based 3

In a GPS, the lines that run east-west are known as lines of latitude, and the lines running north-south are known as lines of longitude. The latitude and the longitude of a place are its coordinates and the distance formula is used to find the distance between two places. The distance between two parallel lines is approximately 150 km. A family from Uttar Pradesh planned a round trip from Lucknow (L) to Puri (P) via Bhuj (B) and Nashik (N) as shown in the given figure below.



Based on the above information answer the following questions:

(i)	Find the distance between Lucknow (L) to Bhuj (B).	1m
(ii)	If Kota (K), internally divide the line segment joining Lucknow (L) to Bhuj (B) in the ratio 3: 2 then find the coordinates of Kota (K).	1m
(iii)	Name the type of triangle formed by the places Lucknow (L), Nashik (N) and Puri (P)	2m
OR		
	Find a place (point) on the longitude (y-axis) which is equidistant from the points Lucknow (L) and Puri (P).	

Answers

Q.1	C	Q.2	A	Q.3	B	Q.4	B
Q.5	C	Q.6	D	Q.7	B	Q.8	D
Q.9	A	Q.10	D	Q.11	B	Q.12	D
Q.13	B	Q.14	C	Q.15	B	Q.16	D
Q.17	B	Q.18	C	Q.19	c	Q.20	b
Q.21	$x = 3, y = 2$ $x = 5, y = 0$	Q.22	6: 36 am	Q.23	1	Q.24	$x^2 + 9x + 20$ OR -2
Q.26	(i) 21 (ii) 4, 11	Q.27	10	Q.28	Zeroes are $5, \frac{-3}{2}$	Q.31	(0, -1) (0, 8) OR $a = 4, b = -1$
Q.34	Mean = 40.7 Mode = 44.7 OR $x = 13$	Q.36	(i) 60 (ii) 80 (iii) 43 sec OR 44	Q.37	(i) Both estimations are wrong (ii) $3x + 2y = 80;$ $4x + 3y = 110$ (iii) ₹20, ₹ 10 OR ₹30	Q.38	(i) $\sqrt{74}$ units (ii) $(2, \frac{41}{5})$ (iii) isosceles OR $(0, \frac{25}{8})$