INDIAN SCHOOL AL WADI AL KABIR

Midterm Examination 2023-24

SUB: Mathematics - Set 2

Date: 21/09/2023 Time Allowed :3 hours

Class: X Maximum Marks: 80

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (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 2 marks, 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.
8. Draw neat figures wherever required.

SECTION A

Section A consists of 20 questions of 1 mark each.

1 The value(s) of x, if the distance between the points A(0, 0) and B(x, – 4) is 5 units is:

(A) ± 4 **(B)** ± 3 **(C)** ± 2 **(D)** ± 1

2 In ΔABC and ΔDEF, $\frac{AB}{DE} = \frac{BC}{FD}$. Which of the following makes the two triangles similar?

(A) $\angle A = \angle D$ **(B)** $\angle B = \angle D$

(C) $\angle B = \angle E$ **(D)** $\angle A = \angle F$

3 M and N are positive integers such that $M = p^2q^3r$ and $N = p^3q^2$, where p, q and r are prime numbers. The HCF (M, N) is:

(A) p^3q^3r **(B)** p^3q^3 **(C)** p^2q^2 **(D)** pqr

4 If α and β are the zeroes of the polynomial $p(x) = 2x^2 - 7x + 3$, then the value of $\alpha^2 + \beta^2$ is:

(A) 10 **(B)** $\frac{37}{4}$ **(C)** $\frac{23}{2}$ **(D)** 37

5 If $\sin A = \frac{1}{2}$, then the value of cot A is:

(A) $\sqrt{3}$ **(B)** $\frac{1}{\sqrt{3}}$ **(C)** $\frac{\sqrt{3}}{2}$ **(D)** 1

6 Consider the following distribution:

Classes	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9

The sum of the lower limit of the modal class and upper limit of median class is:

(A) 20 **(B)** 25 **(C)** 30 **(D)** 35

7 Graphically the pair of equations: $-6x - 2y = 21$ and $2x - 3y + 7 = 0$ represents two lines which are:

(A) intersecting exactly at one point **(B)** intersecting exactly at two points

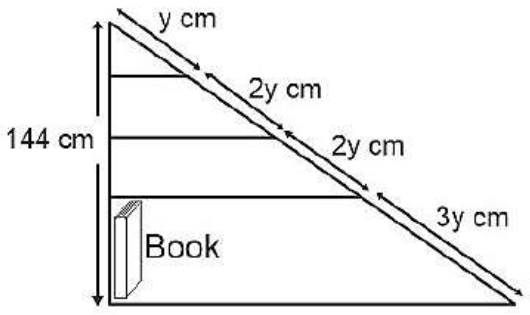
(C) coincident **(D)** parallel

8 Two legs AB and BC of right triangle ABC are in the ratio 1:3. The value of sin C is:

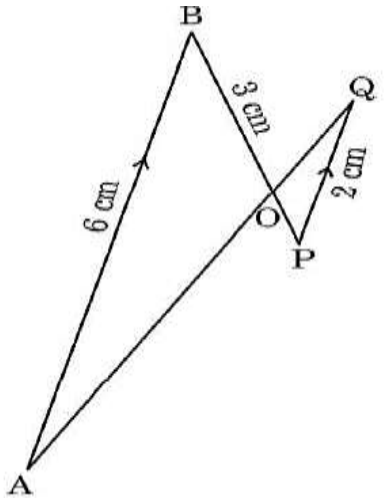
(A) $\sqrt{10}$ **(B)** $\frac{1}{\sqrt{10}}$ **(C)** $\frac{3}{\sqrt{10}}$ **(D)** $\frac{1}{2}$

9 Leela has a triangular cabinet that fits under her staircase. There are 4 parallel shelves as shown in the figure.

The total height of the cabinet is 144 cm. What is the maximum height of a book that can stand upright on the bottom – most shelf.?



(A) 18 cm **(B)** 36 cm **(C)** 54 cm **(D)** 86.4 cm

10	If one root of the equation $2x^2 - 5x + (t - 4) = 0$ be the reciprocal of the other, then the value of t is:						
	(A)	5	**(B)**	4	**(C)**	6	**(D)** 8
11	If the mean and the median of a data are 12 and 15 respectively, then its mode is:						
	(A)	13.5	**(B)**	21	**(C)**	6	**(D)** 14
12	If AB is a chord of a circle with centre at O(2, 3), where the coordinates of A and B are (4, 3) and (x, 5) respectively, then the value of x is :						
	(A)	3	**(B)**	2	**(C)**	5	**(D)** 4
13	Harsh correctly solved a pair of linear equations in two variables and found their only point of intersection as (3, -2). One of the lines was x – y = 5. Which of the following could have been the other line? I: 3x – 3y = 15 II: 2x – 3y = 12 III: 2x – 3y = 14						
	(A)	Only I	**(B)**	Only II	**(C)**	Only I and II	**(D)** Only II and III
14	In the given figure, AB ‖ PQ. If AB = 6 cm, PQ = 2 cm and OB = 3cm, then the length of OP is:  						
	(A)	9 cm	**(B)**	3 cm	**(C)**	4 cm	**(D)** 1cm

15	Which of the following is a quadratic polynomial with zeroes $\frac{5}{3}$ and 0?						
	(A)	$3x(3x - 5)$	**(B)**	$3x(x - 5)$	**(C)**	$x^2 - \frac{5}{3}$	**(D)** $\frac{5}{3}x^2$
16	If $p^2 = \frac{32}{50}$, then p is/an a:						
	(A)	whole number	**(B)**	integer	**(C)**	rational number	**(D)** irrational number
17	If the HCF of 360 and 64 is 8, then their LCM is:						
	(A)	2480	**(B)**	2780	**(C)**	512	**(D)** 2880
18	$(\sec^2\theta - 1)(1 - \text{cosec}^2\theta)$ is equal to:						
	(A)	1	**(B)**	-1	**(C)**	2	**(D)** -2
	Direction for questions 19 & 20: In question numbers 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option. (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.						
19	**Assertion(A)**: The number 5^n cannot end with the digit 0, where n is a natural number. **Reason(R)**: Prime factorisation of 5 has only two factors, 1 and 5.						
20	**Assertion(A)**: If in a ΔABC, a line DE ∥ BC intersects AB in D and AC in E, then $\frac{AB}{AD} = \frac{AC}{AE}$. **Reason(R)**: If a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio.						

SECTION B

Section B consists of 5 questions of 2 marks each.

21 Points A(3, 1), B(5, 1), C(a, b) and D(4, 3) are vertices of a parallelogram ABCD. Find the values of a and b.

OR

Points P and Q trisect the line segment joining the points A(– 2, 0) and B(0, 8) such that P is near to A. Find the coordinates of points P and Q.

22 If $\cos(A - B) = \frac{\sqrt{3}}{2}$ and $\sin(A + B) = \frac{\sqrt{3}}{2}$, find A and B where (A + B) and (A – B) are acute angles.

23 Write a quadratic polynomial whose zeroes are $(3 + 2\sqrt{2})$ and $(3 - 2\sqrt{2})$.

OR

If one zero of the polynomial $2x^2 + 3x + m$ is $\frac{1}{2}$, find the value of m and the other zero.

24 In the following cumulative frequency table, find the values of **a, b, c** and **d**.

Class	0-10	10-20	20-30	30-40	40-50
Frequency	5	7	**a**	5	**b**
Cumulative frequency	5	**c**	18	**d**	30

OR

If the mean of the following distribution is 7.5, find the value of p.

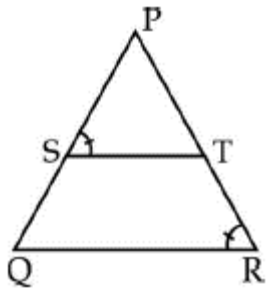
Class	2-4	4-6	6-8	8-10	10-12	12-14
Frequency	6	8	15	p	8	4

25 For what value of k, does the system of linear equations

$$2x + 3y = 7$$

$$(k - 1)x + (k + 2)y = 3k$$

have an infinite number of solutions?

	SECTION C
	Section C consists of 6 questions of 3 marks each.
26	If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio. **OR** In the given figure $\frac{PS}{SQ} = \frac{PT}{TR}$ and $\angle PST = \angle PRQ$. Prove that ΔPQR is an isosceles triangle. 
27	If $\tan\theta = \frac{3}{4}$, find the value of $\left(\frac{1-\cos^2\theta}{1+\cos^2\theta}\right)$
28	Arvind owns a dry fruits store. He sells cashew nuts at ₹600/kg and pistachio nuts at ₹750/kg. A customer asks for a mixture of cashew nuts and pistachio nuts with the following conditions. ▪ Both the items should together weigh $\frac{1}{2}$ kg. ▪ Both the items should together cost ₹360. (i)If Arvind packs **x** kg of cashew nuts and y kg of pistachio nuts for the customer, frame the equations that represent the given context. (ii) Find the weight of cashew nuts and pistachio nuts that Arvind packed for the customer. **OR** If 217x + 131y = 913; 131x + 217y = 827, then solve the equations for the values of x and y.

29 The distribution below gives the weights of 30 students of a class. Find the median weight of a student.

Weight (in kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75
No. of students	2	3	8	6	6	3	2

30 Find the zeroes of the quadratic polynomial $6x^2 + x - 12$ and verify the relationship between the zeroes and the coefficients of the polynomial.

31 Prove that $2 - 3\sqrt{5}$ is an irrational number, given that $\sqrt{5}$ is an irrational number.

SECTION D

Section D consists of 4 questions of 5 marks each.

32 Solve the following pair of equations graphically: $3x + y - 5 = 0$; $2x – y – 5 = 0$

Find the area of the triangle formed by these two lines and Y axis.

33 Find the ratio in which the *y* -axis divides the line segment joining the points (-1, -4) and (5, -6). Also find the coordinates of the point of intersection.

OR

The vertices of quadrilateral ABCD are A(5, - 1), B(8, 3), C(4, 0) and D(1, - 4).

Prove that ABCD is a rhombus and find the area of the rhombus.

34 A survey regarding the heights (in cm) of 50 girls of class X of a school was conducted and the following data was obtained:

Height(cm)	120-130	130-140	140-150	150-160	160-170
No. of girls	2	8	12	20	8

Find the mean and mode of the data.

35 Evaluate the following:

$$\frac{2cos^2 60^\circ + 3sec^2 30^\circ - 2tan^2 45^\circ}{sin^2 30^\circ + cos^2 45^\circ}$$

OR

Prove that:

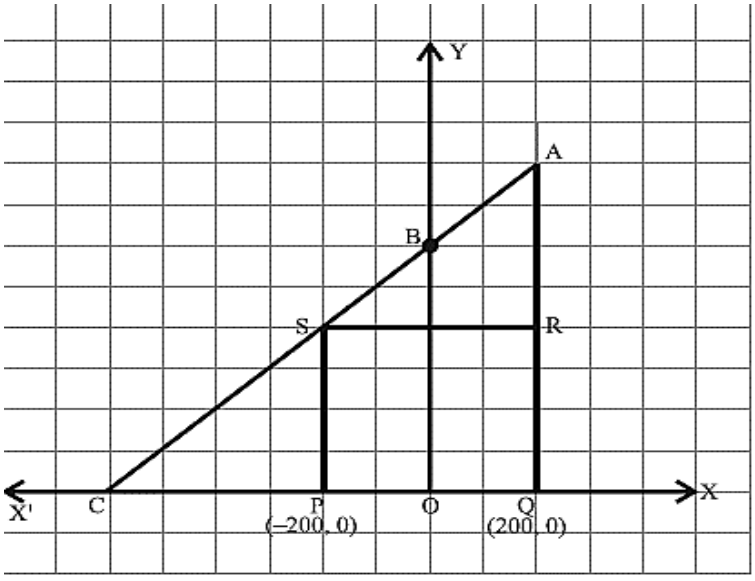
$$(sin\theta + cosec\theta)^2 + (cos\theta + sec\theta)^2 = 7 + tan^2\theta + cot^2\theta$$

SECTION E

Case Study Based Questions are compulsory.

36 **Case Study -1**

Jagdish has a field which is in the shape of a right-angled triangle AQC. He wants to leave a space in the form of a square PQRS inside the field for growing wheat and the remaining for growing vegetables (as shown in the figure). In the field, there is a pole marked as O.



Based on the above information answer the following questions.

I	Taking O as origin, coordinates of P are (–200, 0) and of Q are (200, 0). PQRS being a square, what are the coordinates of R and S?	1m
II	If S divides CA in the ratio k:1, what is the value of k, where point A is (200, 800)?	1m
III	What is the area of square PQRS? **OR** What is the length of diagonal PR in square PQRS?	2m

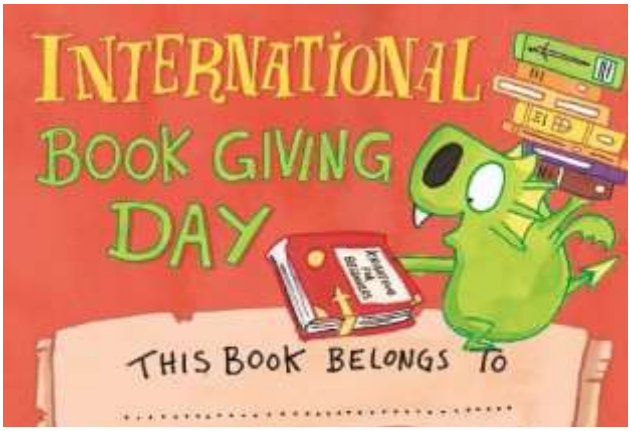
37

Case Study – 2

February 14 is celebrated as International Book Giving Day and many countries in the world celebrate this day. Some people in India also started celebrating this day and donated the following number of books of various subjects to a public library:

History = 96, Science = 240, Mathematics = 336.

These books have to be arranged in minimum number of stacks such that each stack contains books of only one subject and the number of books on each stack is the same.



Based on the above information answer the following questions.

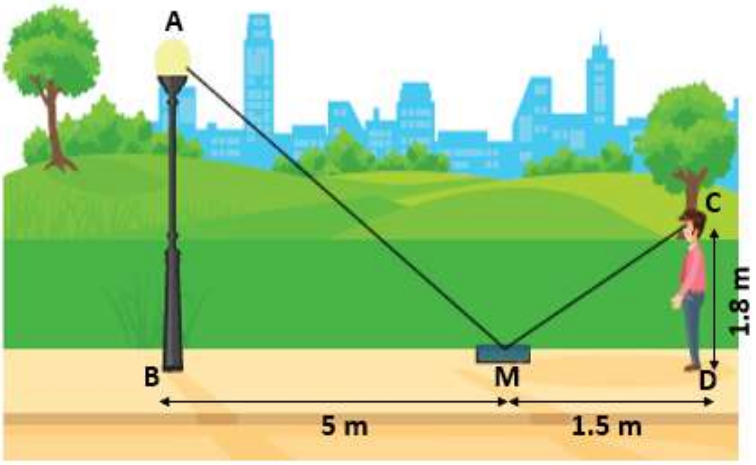
I	How many books are arranged in each stack?	1m
II	How many stacks are used to arrange all the Mathematics books?	1m
III	Determine the total number of stacks that will be used for arranging all the books**.** **OR** If the thickness of each book of History, Science and Mathematics is 1·8 cm, 2·2 cm and 2·5 cm respectively, then find the height of each stack of History, Science and Mathematics books.	2m

38

Case Study -3

Ramesh places a mirror on level ground to determine the height of a pole (with traffic light fired on it). He stands at a certain distance so that he can see the top of the pole reflected from the mirror. Ramesh's eye level is 1.8 m above the ground.

The distance of Ramesh from mirror and that of building from mirror are 1.5 m and 5 m respectively.



Based on the above information answer the following questions.

I	Name the similar triangles from the figure.	1m
II	Which similarity criterion is applied here?	1m
III	Find height of the pole. **OR** Now Ramesh move behind such that distance between pole and Ramesh is 13 meters. He places mirror between him and pole to see the reflection of light in right position. What is the distance between mirror and Ramesh?	2m

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INDIAN SCHOOL AL WADI AL KABIR

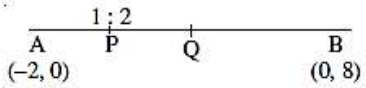
Midterm Examination 2023-24

SUB: Mathematics - Set 2

Date: 21/09/2023 Marking Scheme Time Allowed :3 hours

Class: X Maximum Marks: 80

SECTION A	
1	**(B)** ± 3
2	**(B)** $\angle B = \angle D$
3	**(C)** p^2q^2
4	**(B)** $\frac{37}{4}$
5	**(A)** $\sqrt{3}$
6	**(C)** 30
7	**(A)** intersecting exactly at one point
8	**(B)** $\frac{1}{\sqrt{10}}$
9	**(C)** 54 cm
10	**(C)** 6
11	**(B)** 21
12	**(B)** 2
13	**(B)** Only II
14	**(D)** 1 cm
15	**(A)** 3x(3x -5)
16	**(C)** rational number

17	**(D)** 2880
18	**(B)** -1
19	(c) Assertion (A) is true and reason (R) is false.
20	(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)
	SECTION B
21	Diagonals of parallelogram bisect each other $\therefore \quad \left(\frac{3+a}{2}, \frac{1+b}{2}\right) = \left(\frac{5+4}{2}, \frac{1+3}{2}\right)$ 1m $3 + a = 9,\ 1 + b = 4$ So $a = 6,\ b = 3$ ½ m 1/2m **OR**  P divides AB in the ratio 1 : 2 $\therefore$ Coordinates of P are $\left(\frac{0-4}{3}, \frac{8+0}{2}\right) = \left(\frac{-4}{3}, \frac{8}{3}\right)$ 1m Q divides AB in the ratio 2 : 1 $\therefore$ Coordinates of Q are $\left(\frac{0-2}{3}, \frac{16+0}{3}\right) = \left(\frac{-2}{3}, \frac{16}{3}\right)$ 1m
22	$\cos(A-B) = \frac{\sqrt{3}}{2} \Rightarrow A-B=30°$ ½ m $\sin(A+B) = \frac{\sqrt{3}}{2} \Rightarrow A+B=60°$ ½ m $2A = 90° \Rightarrow A=45°$ ½ m $B=15°$ ½ m
23	Sum of the zeroes = 6, Product of the zeroes = 1 1m Required polynomial is x^2-6x+1 1m **OR**

$P(x) = 2x^2+3x+m \quad P\left(\frac{1}{2}\right) = 0$

$P\left(\frac{1}{2}\right) = 0 \Rightarrow 2\times\frac{1}{4}+\frac{3}{2}+m = 0$

$m = -2$

$\alpha\beta = \frac{m}{2} = \frac{-2}{2} = -1$

$\alpha = \frac{1}{2} \Rightarrow \frac{\beta}{2} = -1 \Rightarrow \beta = -2$

½ m

½ m

½ m

½ m

24

Class	0-10	10-20	20-30	30-40	40-50
Frequency	5	7	**a = 6**	5	**b = 7**
Cumulative frequency	5	**c=12**	18	**d =23**	30

(1/2m × 4)

OR Table 1m

Class	Frequency (f)	x	fx
2-4	6	3	18
4-6	8	5	40
6-8	15	7	105
8-10	p	9	9p
10-12	8	11	88
12-14	4	13	52
	41 + p		303 + 9p

$\text{Mean} = 7.5 = \frac{303+9p}{41+p} \Rightarrow p = 3$ 1m

25

For infinitely many solutions

$\frac{2}{k-1} = \frac{3}{k+2} = \frac{7}{3k}$

$2k + 4 = 3k - 3; \qquad 9k = 7k + 14$

$k = 7 \qquad\qquad k = 7$

Hence $k = 7$

1 m

½ m

½ m

SECTION C

26

For correct given, To prove, Construction and figure (1 ½ m)

For correct proof (1 ½ m)

OR

Given : $\frac{PS}{SQ} = \frac{PT}{TR}$ ½ m

$\angle PST = \angle PRQ$

To prove : PQR is isosceles triangle

Proof : $\frac{PS}{SQ} = \frac{PT}{TR}$ 1 m

By converse of B.P.T. We get ST||QR

$\angle PST = \angle PQR$ (corresponding angles)

$\angle PST = \angle PRQ$ (given) 1m

$\Rightarrow \angle PQR = \angle PRQ$

So ΔPQR is isosceles triangle ½ m

27

$\sec^2\theta = 1 + \frac{9}{16} = \frac{25}{16}$ 1 m

$\therefore \cos^2\theta = \frac{16}{25}$ ½ m

Hence $\frac{1-\cos^2\theta}{1+\cos^2\theta} = \frac{1-\frac{16}{25}}{1+\frac{16}{25}} = \frac{9}{41}$ 1½ m

28

(i) x + y = 0.5

600 x + 750 y = 360/ 20x + 25y = 12 1 m

(ii) 20x + 20y = 10 ½ m

20x + 25y = 12 ½ m

-5y = -2 ⟶ y = 2/5 ½ m

x = 1/10 ½ m

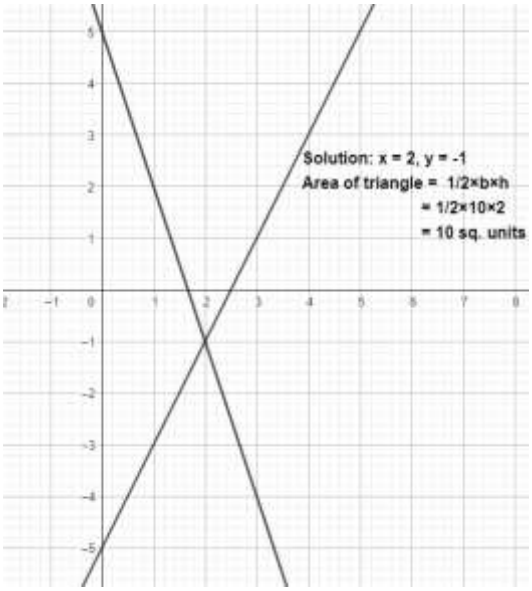
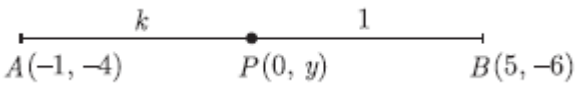
Weight of cashew nuts = 0.1 kg = 100g

Weight of pistachio nuts = 0.4 kg = 400g

OR

217x + 131y = 913;

	$131x + 217y = 827$ Adding, $348x + 348y = 1740$, $x + y = 5$ Subtracting, $86x - 86y = 86$, $x - y = 1$ $x = 3$, $y = 2$	1 m 1 m 1 m
29	Weight (in kg) / No. of Students / Cu. Fr. 40 – 45 / 2 / 2 45 – 50 / 3 / 5 50 – 55 / 8 / 13 55 – 60 / 6 / 19 60 – 65 / 6 / 25 65 – 70 / 3 / 28 70 – 75 / 2 / 30 30 Median class = 55.60 $\text{Median} = l + \frac{\frac{n}{2} - C.F}{f} \times h$ $\text{Median} = 55 + \frac{15 - 13}{6} \times 5 = 56.67 \text{ kg}$	1 m ½ m 1 ½ m
30	$6x^2 + x - 12$ $a = 6$, $b = 1$, $c = -12$ Sum = 1, Pdt = .-72 $6x^2 + 9x - 8x - 12 = 3x(2x + 3) - 4(2x + 3) = 0$ $(3x - 4)(2x + 3) = 0$ $x = 4/3$, $x = -3/2$ Let $\alpha = 4/3$, $\beta = -3/2$ $\alpha + \beta = 4/3 + -3/2 = -1/6 = -b/a$ $\alpha\beta = 4/3 \times -3/2 = -2 = c/a$	1m 1m 1m

31	Let $2 - 3\sqrt{5}$ be rational. $2 - 3\sqrt{5} = \frac{a}{b}$, a and b are coprime and b≠0 $-3\sqrt{5} = \frac{a}{b} - 2$ $\sqrt{5} = \left(\frac{a}{b} - 2\right) \times \frac{1}{-3}$ LHS= rational, RHS = irrational, LHS ≠ RHS Our assumption $2 - 3\sqrt{5}$ be rational is not correct. Therefore $2 - 3\sqrt{5}$ is irrational.	½ m ½ m 1m 1m
	SECTION D	
	Section D consists of 4 questions of 5 marks each.	
32		Table: 2m Graph: 2m Solution: ½ m Area: ½ m
33	Let points P(0, y) divides the line joining the point A(- 1, - 4) and B(5,- 6) in ratios k :1.  $0 = \frac{k \times 5 + 1 \times (-1)}{k+1}$ $5k - 1 = 0 \Rightarrow k = \frac{1}{5}$	1m 1m

$$y = \frac{k(-6)+1(-4)}{k+1}$$

$$= \frac{\frac{1}{5}(-6)+1(-4)}{\frac{1}{5}+1}$$

$$= \frac{-26}{6} = \frac{-13}{3}$$

1m

1m

½ m

Hence, value of k is $\frac{1}{5}$ and required point is $\left(0, -\frac{13}{3}\right)$

½ m

OR

The vertices of the quadrilateral $ABCD$ are $A(5,-1)$, $B(8,3)$, $C(4,0)D(1,-4)$.

Now

$$AB = \sqrt{(8-5)^2+(3+1)^2}$$
$$= \sqrt{3^2+4^2} = 5 \text{ units}$$

$$BC = \sqrt{(8-4)^2+(3-0)^2}$$
$$= \sqrt{4^2+3^2} = 5 \text{ units}$$

$$CD = \sqrt{(4-1)^2+(0+4)^2}$$
$$= \sqrt{(3)^2+(4)^2} = 5 \text{ units}$$

$$AD = \sqrt{(5-1)^2+(-1+4)^2}$$
$$= \sqrt{(4)^2+(3)^2} = 5 \text{ units}$$

Finding the sides 3m

Finding diagonals 1m

Area 1m

Diagonal,

$$AC = \sqrt{(5-4)^2+(-1-0)^2}$$
$$= \sqrt{1^2+1^2} = \sqrt{2} \text{ units}$$

Diagonal

$$BD = \sqrt{(8-1)^2+(3+4)^2}$$
$$= \sqrt{(7)^2+(7)^2} = 7\sqrt{2} \text{ units}$$

Area = ½ × product of the diagonals

= ½ × $\sqrt{2}$ × $7\sqrt{2}$

= 7 sq. units

As the length of all the sides are equal but the length of the diagonals are not equal. Thus $ABCD$ is not square but a rhombus.

34

Height (cm)	No. of girls	x_i (1m)	$f_i x_i$ (1m)
120-130	2	125	250
130-140	8	135	1080
140-150	12	145	1740
150-160	20	155	3100
160-170	8	165	1320
	50		7490

Mode $= \ell + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$ (1/2m)

$= 150 + \left(\frac{20 - 12}{2\times 20 - 12 - 8}\right) \times 10$ (1m)

$= 150 + \frac{80}{20} = 154$ (1/2m)

Mean $= \bar{x} = \frac{\sum f_i x_i}{\sum f_i} = \frac{7490}{50} = 149.8$ cm (1m)

35

$$\frac{2\cos^2 60° + 3\sec^2 30° - 2\tan^2 45°}{\sin^2 30° + \cos^2 45°} = \frac{2\left(\frac{1}{2}\right)^2 + 3\left(\frac{2}{\sqrt{3}}\right)^2 - 2(1)^2}{\left(\frac{1}{2}\right)^2 + \left(\frac{1}{\sqrt{2}}\right)^2}$$

$$= \frac{2\left(\frac{1}{2}\right)^2 + 3\left(\frac{2}{\sqrt{3}}\right)^2 - 2(1)^2}{\left(\frac{1}{2}\right)^2 + \left(\frac{1}{\sqrt{2}}\right)^2}$$

$$= \frac{\frac{2}{4} + 4 - 2}{\frac{1}{4} + \frac{1}{2}} = \frac{10}{3}$$

2 ½ m

2m

½ m

OR

$(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2$ — 2 m

$= \sin^2\theta + \operatorname{cosec}^2\theta + 2\sin\theta\operatorname{cosec}\theta + \cos^2\theta$

$+ \sec^2\theta + 2\cos\theta\sec\theta$

$= (\sin^2\theta + \cos^2\theta) + \operatorname{cosec}^2\theta + 2 + \sec^2\theta + 2$ — 1 ½ m

$= 1 + (1 + \cot^2\theta) + 2 + (1 + \tan^2\theta) + 2$ — 1m

$= 7 + \tan^2\theta + \cot^2\theta$ Hence Proved — ½ m

SECTION E

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I	R(200, 400) and S(-200, 400)	1m
II	1	1m
III	PQ = 400units, QR = 400 units	1m
	Area = side × side = 160000 sq. units	1m
	OR	
	PR = $\sqrt{(-200-200)^2 + (0-400)^2}$	1m
	$= \sqrt{(-400)^2 + (-400)^2} = \sqrt{320000} = 400\sqrt{2}$ sq. units	1m

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I	HCF(96, 240, 336) = 48	1m
II	336/48 = 7	1m
III	No. of stacks = $\frac{96+240+336}{48} = 14$	1m + 1m
	OR	
	Height of each stack of History books = 48 × 1.8 = 86.4 cm	1m
	Height of each stack of Science books = 48 × 2.2 = 105.6 cm	½ m
	Height of each stack of Mathematics books = 48 × 2.5 = 120 cm	½ m

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Case Study -3

I	$\Delta ABM \sim \Delta CDM$	1m
II	AA similarity	1m
III	Height of the pole $\frac{AB}{CD} = \frac{BM}{DM}$ $\frac{AB}{5} = \frac{1.8}{1.5}$ AB = 6 m **OR** $\frac{6}{13 - x} = \frac{1.8}{x}$ x = 3 m Distance between mirror and Ramesh is 3m.	1m 1m 1m 1m