



INDIAN SCHOOL AL WADI AL KABIR
MIDTERM EXAMINATION

Subject: MATHEMATICS

Class :X Marking scheme (SET2) Max. Marks: 80

Date: 22-09-2026 Time: 3 hrs

SECTION A

1	(B) $\frac{1}{3}$	11	(A) ± 4
2	(D) $\frac{DE}{PQ} = \frac{EF}{RP}$	12	(C) 35
3	(C) 5, -3	13	(C) 3
4	(D) $180 a^3 b^4$	14	(B) $b = a + 1.5$
5	(A) $\frac{-5}{2}$	15	(D) a composite number
6	(D) 40^0	16	(C) 13
7	(D) parallel	17	(D) intersecting at (a, b)
8	(C) (3, 3)	18	(D) $k < 4$
9	(A) 1650	19	d
10	(B) 6 only	20	a

SECTION B

21

$$\alpha + \beta = \frac{16}{5}, \alpha \beta = -2$$

$$\therefore \frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{(\alpha + \beta)^2 - 2\alpha\beta}{\alpha\beta} = \frac{\left(\frac{16}{5}\right)^2 + 4}{-2}$$

$$= -\frac{356}{50} \text{ or } -\frac{178}{25}$$

1 m

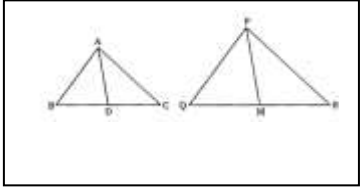
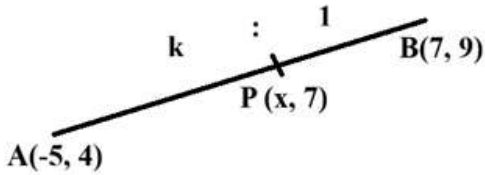
$\frac{1}{2}$ m

$\frac{1}{2}$ m

OR

(b)

	$\alpha + \beta = 5$ $\alpha\beta = 3$ $\alpha^4\beta^3 + \alpha^3\beta^4 = (\alpha\beta)^3(\alpha + \beta)$ $= 27 \times 5 = 135$	½ m ½ m ½ m
22	Total outcomes = 52 (i) P (card is queen of hearts) = $\frac{1}{52}$ (ii) P (not a jack) = $\frac{48}{52}$ or $\frac{12}{13}$	½ m 1 m ½ m
23	Let $3 + \sqrt{2}$ be rational $\therefore 3 + \sqrt{2} = \frac{p}{q}$, where p and q are integers and $q \neq 1$ $\square$ $\Rightarrow \sqrt{2} = \frac{p-3q}{q}$ Since, 3, p and q are integers $\Rightarrow \frac{p-3q}{q}$ is rational $\Rightarrow \sqrt{2}$ is also rational which is a contradiction. So, our assumption that $3 + \sqrt{2}$ is rational is wrong. Hence, $3 + \sqrt{2}$ is an irrational number.	½ m ½ m ½ m ½ m
24	(a) Let Rehan's present age be x years $(x - 5)(x + 7) = 2x + 1$ $x^2 = 36 \Rightarrow x = 6$ OR (b) $\therefore a(-2)^4 + (-2) - 3a = 0 \Rightarrow 4a - 2 - 3a = 0$ $a = 2$ And $(-2)^2 + b(-2) + b = 0 \Rightarrow 4 - 2b + b = 0 \Rightarrow b = 4$ $a^2b = 4 \times 4 = 16$	1m ½ m + ½ m ½ m ½ m ½ m ½ m

25	Let the zeroes are 3α and 4α $3\alpha + 4\alpha = -a$ $\Rightarrow 7\alpha = -a$ Also, $12\alpha^2 = b$ $LHS = 12a^2 = 12(-7\alpha)^2 = 49 \times 12(\alpha)^2 = 49b = RHS$	$\frac{1}{2} m$ $\frac{1}{2} m$ $1m$
	SECTION C	
26	$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AD}{PM} \text{ (given)}$ $\frac{AB}{PQ} = \frac{2BD}{2QM} = \frac{AD}{PM} \text{ (BC = 2BD, QM = 2QR)}$ $\frac{AB}{PQ} = \frac{BD}{QM} = \frac{AD}{PM}$  $\Delta ABC \sim \Delta PQR$ (SSS similarity) $\angle B = \angle Q$ (corresponding parts of similar triangles) In ΔABC and ΔPQR, $\frac{AB}{PQ} = \frac{BC}{QR}$ (given) $\angle B = \angle Q$ (proved above) $\Delta ABC \sim \Delta PQR$ (SAS similarity)	$\frac{1}{2} m$ $\frac{1}{2} m$ $\frac{1}{2} m$ $\frac{1}{2} m$
27 (a)	 Let $AP : PB = k : 1$ $\therefore 7 = \frac{9k + 4}{k + 1} \Rightarrow k = \frac{3}{2}$ So, required ratio is $3 : 2$ Hence, $x = \frac{7 \times 3 + (-5) \times 2}{3 + 2} = \frac{11}{5}$ OR	$\frac{1}{2} m$ $1 m + \frac{1}{2} m$ $\frac{1}{2} m + \frac{1}{2} m$
(b)		

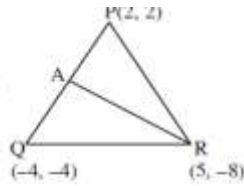
	$\begin{array}{ccccccc} & 1 & : & 1 & : & 1 & : & 1 \\ & \bullet & & \bullet & & \bullet & & \bullet & & \bullet \\ A(-2, 2) & P & & Q & & R & & B(2, 8) \end{array}$ Coordinates of mid - point Q of AB = (0, 5) Coordinates of mid - point P of AQ = $\left(-1, \frac{7}{2}\right)$ Coordinates of mid - point R of BQ = $\left(1, \frac{13}{2}\right)$	1 m 1 m 1 m
28 (a)	$p(x) = 4x^2 + 3x - 1$ Zeroes are $\frac{1}{4}, -1$ New zeroes 4, -1 Sum of new zeroes = $4 + (-1) = 3$ Product of zeroes = $4 \times (-1) = -4$ Required polynomial is $(x^2 - 3x - 4)$	1m $\frac{1}{2}$ m $\frac{1}{2}$ m $\frac{1}{2}$ m $\frac{1}{2}$ m
28 (b)	$(1 - p)(1 - q) = 1 - q - p + pq$ $1 - (p + q) + pq$ $p + q = \frac{-b}{a} = \frac{-(-1)}{21} = \frac{1}{21}$ $pq = \frac{c}{a} = \frac{-2}{21}$ $1 - (p + q) + pq = 1 - \frac{1}{21} + \left(-\frac{2}{21}\right)$ $= 1 - \frac{3}{21}$ $= 1 - \frac{1}{7} = \frac{6}{7}$	$\frac{1}{2}$ m $\frac{1}{2}$ m $\frac{1}{2}$ m $\frac{1}{2}$ m + $\frac{1}{2}$ m $\frac{1}{2}$ m

29	Let the length and breadth of rectangle be x and y respectively. $x+y=35$...(i) and $x-2y=5$... (ii) Solving (i) and (ii), we get $x=25$ and $y=10$ Hence the length and breadth of rectangle are 25 cm and 10 cm respectively.	1m 1m $\frac{1}{2}m+\frac{1}{2}m$																																			
30	<table><tr><th>Class Interval</th><th>x_i</th><th>f_i</th><th>$u_i=\frac{x_i-225}{50}$</th><th>$f_i u_i$</th></tr><tr><td>100 – 150</td><td>125</td><td>4</td><td>- 2</td><td>- 8</td></tr><tr><td>150 – 200</td><td>175</td><td>5</td><td>- 1</td><td>- 5</td></tr><tr><td>200 – 250</td><td>225</td><td>y</td><td>0</td><td>0</td></tr><tr><td>250 – 300</td><td>275</td><td>2</td><td>1</td><td>2</td></tr><tr><td>300 – 350</td><td>325</td><td>2</td><td>2</td><td>4</td></tr><tr><td></td><td></td><td>$13 + y$</td><td></td><td>- 7</td></tr></table> Correct table:1 $\frac{1}{2}m$ Mean = 211 $\Rightarrow 225 + ((-7) / (13+y)) \times 50 = 211$ $\Rightarrow y = 12$	Class Interval	x_i	f_i	$u_i=\frac{x_i-225}{50}$	$f_i u_i$	100 – 150	125	4	- 2	- 8	150 – 200	175	5	- 1	- 5	200 – 250	225	y	0	0	250 – 300	275	2	1	2	300 – 350	325	2	2	4			$13 + y$		- 7	1 m $\frac{1}{2}m$
Class Interval	x_i	f_i	$u_i=\frac{x_i-225}{50}$	$f_i u_i$																																	
100 – 150	125	4	- 2	- 8																																	
150 – 200	175	5	- 1	- 5																																	
200 – 250	225	y	0	0																																	
250 – 300	275	2	1	2																																	
300 – 350	325	2	2	4																																	
		$13 + y$		- 7																																	
31	Let the consecutive odd numbers be x and $x + 2$ $\therefore x^2 + (x + 2)^2 = 650$ $2x^2 + 4x - 646 = 0$ or $x^2 + 2x - 323 = 0$ $\Rightarrow (x + 19)(x - 17) = 0$ $\Rightarrow x = 17$ $\therefore$ Odd numbers are 17 , 19	$\frac{1}{2}m$ $\frac{1}{2}m$ $\frac{1}{2}m$ $\frac{1}{2}m$ $\frac{1}{2}m$ $\frac{1}{2}m$																																			
Section D																																					
32	Given, To prove & Construction (2$\frac{1}{2}m$) Correct proof (1$\frac{1}{2}m$) $\frac{x}{x-2} = \frac{x+2}{x-1}$ $\Rightarrow x=4$ (1m)																																				

33

(i)

Ans.



$$A\left(\frac{2-4}{2}, \frac{2-4}{2}\right)$$

$$A = (-1, -1)$$

 $\frac{1}{2}$ m

$$AR = \sqrt{(5+1)^2 + (-8+1)^2}$$

$$= \sqrt{36+49}$$

$$= \sqrt{85}$$

 $\frac{1}{2}$ m $\frac{1}{2}$ m $\frac{1}{2}$ m

(ii)

$$AB^2 = (-2-7)^2 + (5-10)^2 = (-9)^2 + (-5)^2 = 81 + 25 = 106$$

$$BC^2 = (3-(-2))^2 + (-4-5)^2 = (5)^2 + (-9)^2 = 25 + 81 = 106$$

$$AC^2 = (3-7)^2 + (-4-10)^2 = (-4)^2 + (-14)^2 = 16 + 196 = 212$$

$$AB = BC = \sqrt{106} \text{ Therefore, } \triangle ABC \text{ is an isosceles triangle.}$$

$$AB^2 + BC^2 = 106 + 106 = 212 \quad AB^2 + BC^2 = AC^2$$

$\triangle ABC$ is an isosceles right – angled triangle.

 $\frac{1}{2}$ m $\frac{1}{2}$ m $\frac{1}{2}$ m $\frac{1}{2}$ m $\frac{1}{2}$ m $\frac{1}{2}$ m

OR

(b)

$$\frac{AP}{PB} = \frac{1}{2}$$

$$x = \frac{mx_2 + nx_1}{m+n} = \frac{1(5) + 2(2)}{1+2} = \frac{5+4}{3} = \frac{9}{3} = 3$$

$$y = \frac{my_2 + ny_1}{m+n} = \frac{1(-8) + 2(1)}{1+2} = \frac{-8+2}{3} = \frac{-6}{3} = -2$$

$$2(3) - (-2) + k = 0$$

$$6 + 2 + k = 0$$

$$k = -8$$

1 m

1 m

1 m

1 m

1 m

34
a)

Class Interval	f	cf
0-15	15	15
15-30	10	25
30-45	12	37
45-60	9	46
60-75	8	54
75-90	10	64
90-105	6	70

$$\text{Median} = 30 + \frac{35 - 25}{12} \times 15$$

$$= \frac{85}{2} = 42.5$$

Modal class is 0 - 15

$$\text{Mode} = 0 + \frac{15 - 0}{30 - 0 - 10} \times 15$$

$$= \frac{45}{4} = 11.25$$

Correct Table 1 ½ m

1 m + ½ m

$$\frac{70}{2} = 35, \text{Median class is } 30 - 45$$

Given, Median = 137

∴ Median Class is 125 - 145.

$$125 + \left[\frac{\frac{68}{2} - (9+x)}{20} \right] \times 20 = 137$$

$$\Rightarrow x = 13$$

$$\text{Also, } 47 + x + y = 68$$

$$\therefore 47 + 13 + y = 68 \Rightarrow y = 8$$

½ m

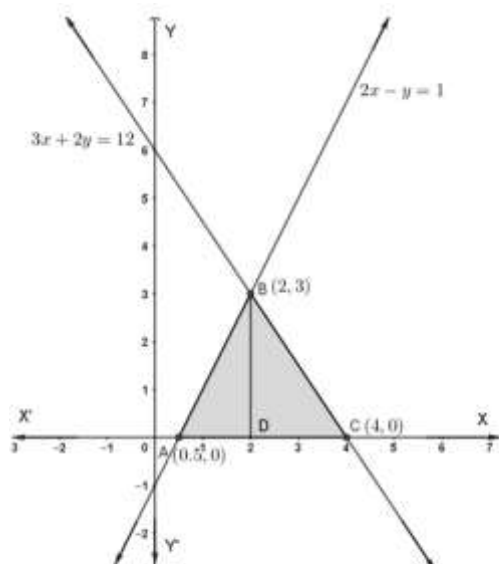
1½
m

½ m

Class	f	cf
65 - 85	4	4
85 - 105	5	9
105 - 125	x	9 + x
125 - 145	20	29 + x
145 - 165	14	43 + x
165 - 185	y	43 + x + y
185 - 205	4	47 + x + y

Correct Table - 2m

35



Drawing correct graph

Coordinates of vertices of ΔABC are A (0.5, 0), B (2, 3), C (4, 0)

Drawing Correct graph:

(2m + 2m)

Coordinates of vertices
1m

	SECTION E- Case Study Based	
36	(i) Total number of outcomes = 18 $P(\text{number } 12) = \frac{1}{18}$ 1m (ii) (a) Odd numbers: 1, 3, 5, 7, 9, 11, 13, 15, 17 Number of odd numbers = 9 ½ m $P(\text{an odd number}) = \frac{9}{18}$ or $\frac{1}{2}$ 1½ m OR b) Multiples of 4: 4, 8, 12, 16 ½ m $P(\text{a multiple of 4}) = \frac{4}{18}$ or $\frac{2}{9}$ 1½ m (iii) Even numbers: 12, 14, 16, 18 ½ m $P(\text{a striped ball and bears an even number}) = \frac{4}{18}$ or $\frac{2}{9}$ ½ m	
37	(ii)(a) $210 = 2 \times 3 \times 5 \times 7$ $252 = 2^2 \times 3^2 \times 7$ $294 = 2 \times 3 \times 7^2$ $\text{HCF}(210, 252, 294) = 2 \times 3 \times 7 = 42$ The maximum number of teachers in each room = 42 OR (ii) (b) $15 = 3 \times 5$ $18 = 3^2 \times 2$ $30 = 2 \times 3 \times 5$ $\text{LCM}(15, 18, 30) = 3^2 \times 2 \times 5 = 90$ All three events will commence together again at 10:30 AM (iii) $\text{HCF} \times \text{LCM} = a \times b$. $= 15 \times 18 = 270$ (½ m + ½ m)	1m ½ m ½ m 1m ½ m ½ m

38

(i) Let the uniform speed of the train be x km/h.

Time taken at reduced speed $= \frac{480}{x-8}$

1m

$$(ii) \quad \frac{480}{x-8} - \frac{480}{x} = 3$$

$$(iii)(a) \quad \frac{480}{x-8} - \frac{480}{x} = 3$$

$$\frac{160}{x-8} - \frac{160}{x} = 1$$

$$160 \left(\frac{x - (x-8)}{x(x-8)} \right) = 1$$

$$160 \left(\frac{8}{x^2 - 8x} \right) = 1$$

$$x^2 - 8x - 1280 = 0$$

$$x^2 - 40x + 32x - 1280 = 0$$

$$(x-40)(x+32)=0$$

$x = 40$, $x = -32$ (rejected) Speed of the train = 40 km/hr

½ m

½ m

½ m

½ m

OR

(b) Solving equation as above.

$$\text{Time} = \frac{480}{x} = \frac{480}{40} = 12 \text{ hrs}$$

1½ m + ½ m
