COMMON PREBOARD EXAMINATION

AY 2025-26

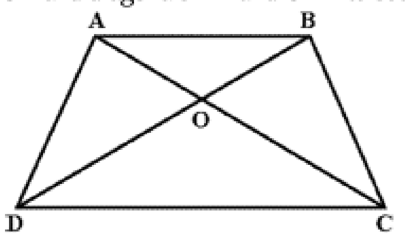
SUBJECT: MATHEMATICS (041)

MARKING SCHEME (SET 1)

Grade: 10 **Duration: 3 Hours**

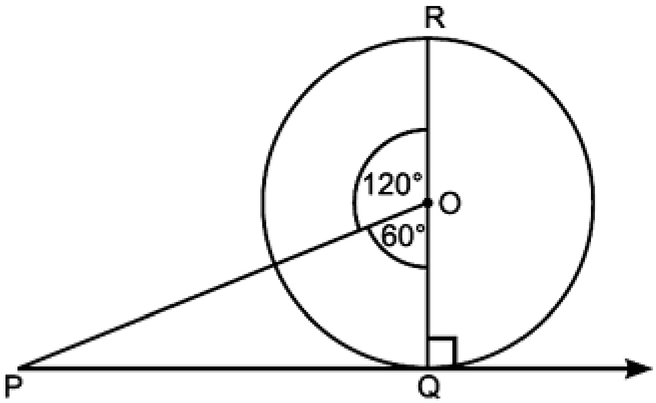
Max. Marks: 80

Qn. No:	ANSWER KEY	STEP WISE MARKING
	SECTION A *This section comprises Multiple Choice Questions (MCQs) of 1 mark each.* $(20 \times 1 = 20)$	
1	(B) 4	1
2	(C) $\left(\frac{5}{2}, 0\right)$	1
3	(B) 10	1
4	(B) $x = 0, x = \frac{25}{4}$	1
5	(C) $BC.DE = AB.EF$	1
6	(C) $(-4, 6)$	1
7	(C) $\frac{1}{2}$	1
8	(B) $1 : 4$	1
9	(A) $50°$	1
10	(D) $16: 9$	1
11	(B) 3 units	1
12	(B) $cosec\theta$	1
13	(B) $4\ cm$	1
14	(A) $\frac{9}{13}$	1
15	(C) 194400	1
16	(C) 132 cm	1
17	(B) 29.6	1
18	(C) $1 - p$	1
19	(D) Assertion (A) is false, but Reason (R) is true.	1
20	(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)	1
	SECTION B *This section comprises Very Short Answer (VSA) type questions of 2 marks each.* $(5 \times 2 = 10)$	
21	The multiples of 7 lying between 20 to 300 are 21, 28, 35,………., 294 in A.P. with First term= 21 Common difference, $d = 7$ and last term a_n=294	0.5

	Let n multiples of 7 lie between 20 to 300 $a_n = a + (n-1)d$ $294 = 21 + (n-1) \times 7$ $294 = 21 + 7n - 7$ $7n = 280$ $n = 40$ **OR** Given A.P. is 27, 24, 21. . . We know that, $S_n = \frac{n}{2}[2a + (n-1)d]$ Here we have, the first term $(a) = 27$ The sum of n terms $(S_n) = 0$ Common difference of the A.P. $(d) = a_2 - a_1 = 24 - 27 = -3$ On substituting the values in S_n, we get $\Rightarrow 0 = \frac{n}{2}[2(27) + (n-1)(-3)]$ $\Rightarrow 0 = n[54 + (n-1)(-3)]$ $\Rightarrow 0 = n[54 - 3n + 3]$ $\Rightarrow 0 = n[57 - 3n]$ Further we have, $n = 0$ Or, $57 - 3n = 0 \Rightarrow 3n = 57 \Rightarrow n = 19$ The number of terms cannot be zero, Hence, the numbers of terms (n) is 19.	0.5 0.5 0.5 0.5 0.5 0.5 0.5
22	ABCD is a trapezium with AB‖CD and diagonals AB and CD intersecting at O.  In △OAB and △OCD ∠AOB =∠DOC [Vertically opposite angles] ∠ABO = ∠CDO [Alternate angles] ∠BAO = ∠OCD [Alternate angles] ∴ △OAB ~ △OCD [AAA similarity] We know that if triangles are similar, their corresponding sides are in proportional $\therefore \frac{OA}{OC} = \frac{OB}{OD}$ **OR** In ΔABC, ∠1 = ∠2 ∴ AB = BD ………(i) Given, $\frac{AD}{AE} = \frac{AC}{BD}$ Using equation (i), we get $\frac{AD}{AE} = \frac{AC}{AB}$ ……….(ii) In ΔBAE and ΔCAD, by equation (ii), $\frac{AC}{AB} = \frac{AD}{AE}$ and ∠A= ∠A (common) ∴ ΔBAE ~ ΔCAD [By SAS similarity criterion]	1 1 1 1
23	LHS = $(\sqrt{3} + 1)(3 - cot\ 30°)$ We know that $cot\ 30° = \sqrt{3}$	

	$= (\sqrt{3} + 1)(3 - \sqrt{3})$ $= (\sqrt{3} + 1)[\sqrt{3}(\sqrt{3} - 1)]$ $= \sqrt{3}[(\sqrt{3} + 1)(\sqrt{3} - 1)]$ $= \sqrt{3}[(\sqrt{3})^2 - (1)^2]$ $= \sqrt{3}(3 - 1)$ $= 2\sqrt{3}$ RHS $= tan^3\, 60° - 2\, sin\, 60°$ Since, $\tan 60° = \sqrt{3}$ and $\sin 60° = \frac{\sqrt{3}}{2}$, We get, $(\sqrt{3})^3 - 2\left(\frac{\sqrt{3}}{2}\right) = 3\sqrt{3} - \sqrt{3}$ $= 2\sqrt{3}$ Therefore, it is proved that LHS = RHS.	½ ½ ½ ½
24	Given, ∠QPT = 60° Since, OP is the radius of the circle. Now, ∠OPT = 90° ∴ ∠OPQ = ∠OPT – ∠QPT = 90° – 60° = 30° In ΔOPQ, OP = OQ [radii of circle] ∠OQP = ∠POQ = 30° [∵ Angles opposite to equal sides are equal] ∴ ∠POQ = 180° – (30° + 30°) = 120° ∴ Reflex ∠POQ = 360° – 120° = 240° We know that, angle subtended by an arc at the centre double the angle subtended by it on the remaining part of the circle. ∴ ∠PRQ = $\frac{1}{2}$ Reflex ∠POQ = 240°/2 = 120°	1 1
25	Centre O (2, – 3y) is the midpoint of AB $\therefore \frac{y+7}{2} = -3y$ $\Rightarrow y = -1$ Hence, $O(2, 3)$ Radius = $OB = \sqrt{(5-2)^2 + (7-3)^2} = 5$ **OR** Ans: We know that the lengths of the tangents drawn from an external point to the circle are equal. DR = DS ...... (i) BP = BQ ...... (ii) AP = AS ...... (iii) CR = CQ ...... (iv) Adding (i), (ii), (iii), (iv), we get DR + BP + AP + CR = DS + BQ + AS + CQ By rearranging the terms we get, (DR + CR) + (BP + AP) = (CQ + BQ) + (DS + AS) ⇒ CD + AB = BC + AD Hence it is proved AB + CD = AD + BC.	½ ½ 1 1 1
	SECTION C *This section comprises Short Answer (SA) type questions of 3 marks each.* $(6 \times 3 = 18)$	
26	Let us assume $7 - 2\sqrt{3}$ is a rational number. Then $7 - 2\sqrt{3} = \frac{a}{b}$ where a and b are integers and also co-primes, with $b \neq 0$ $7 - \frac{a}{b} = 2\sqrt{3}$	1

	$\frac{7b-a}{b} = 2\sqrt{3}$ Since a and b are integers, we know that $\frac{7b-a}{b}$ is rational and therefore $\sqrt{3}$ is also rational. But it is given that $\sqrt{3}$ is an irrational number, which contradicts our statement. ∴ 7 –2$\sqrt{3}$ is an irrational number.	1 1
27	$p(x) = x^2 + 6x + 9$ Since α, β are zeroes of $p(x)$ ∴ $\alpha + \beta = -6, \alpha\beta = 9$ Now $-\alpha-\beta = -(\alpha+\beta) = 6$ And $(-\alpha)(-\beta) = \alpha\beta = 9$ ∴ Required quadratic polynomial is given by $q(x) = x^2 - (-\alpha-\beta)x + (-\alpha)(-\beta)$ $q(x) = x^2 - 6x + 9$	1 1 1
28	Let length and breadth be x and y, Area = xy 1st condition: $(x - 5)(y + 3) = xy - 9$ ⇒ $3x - 5y = 6$ 2nd condition: $(x + 3)(y + 2) = xy + 67$ ⇒ $2x + 3y = 61$ Solve 1st and 2nd equations, we get $x = 17$ and $y = 9$ Hence, Length of rectangle = 17 units and breadth of rectangle = 9 units **OR** Let two numbers are x and y respectively such that its fraction = $\frac{x}{y}$. According to the question, $\frac{x}{y} = \frac{1}{3}$ ⇒ $3x = y$ ⇒ $y = 3x$...(i) Also, $\frac{x+5}{y+5} = \frac{1}{2}$ ⇒ $2x + 10 = y + 5$ ⇒ $2x - y = -5$ ...(ii) Putting the value of $y = 3x$ in (ii), we get $2x - 3x = -5$ ⇒ $-x = -5$ ⇒ $x = 5$ Putting the value of $x = 5$ in (i), we get $y = 3 \times 5 = 15$ Hence, Numbers are 5 and 15.	1 1 1 1 1 1
29	$7\,sin^2A + 3\,cos^2A = 4$ Dividing both sides by cos^2A, we get, $7\,tan^2A + 3 = 4\,sec^2A$ (using $sec^2\theta = 1 + tan^2\theta$) ⇒ $7\,tan^2A + 3 = 4(1 + tan^2A)$ ⇒ $7\,tan^2A + 3 = 4 + 4\,tan^2A$ ⇒ $3\,tan^2A = 1$ ⇒ $tan^2A = \frac{1}{3}$ ⇒ $tan\,A = \frac{1}{\sqrt{3}}$ Hence Proved	½ ½ 1 1

	OR LHS = $\dfrac{\tan\theta-1+\sec\theta}{\tan\theta+1-\sec\theta}$ (Dividing numerator and denominator by $\cos\theta$) $=\dfrac{\tan\theta+\sec\theta-1}{\tan\theta+1-\sec\theta}$ $=\dfrac{\tan\theta+\sec\theta-(\sec^2\theta-\tan^2\theta)}{\tan\theta+1-\sec\theta}$ $=\dfrac{(\sec\theta+\tan\theta)(1-\sec\theta+\tan\theta)}{\tan\theta+1-\sec\theta}$ $=\sec\theta+\tan\theta$ = RHS	½ ½ ½ ½
30	Let O be the centre and QOR = 8 cm is diameter of a circle. PQ is tangent such that ∠POR = 120°.  Now, OQ = OR = 8/2 = 4 cm ∠POQ = 180° – 120° = 60° (Linear pair) Also OQ ⊥ PQ Now, in right ΔPOQ, cos 60° = OQ/PO ⇒ 1/2 = OQ/PO ⇒ 1/2 = 4/PO ⇒ PO = 8 cm Again, tan 60° = PQ/OQ ⇒ √3 = PQ/4 ⇒ PQ = 4√3 cm.	½ 1 1 ½
31	(i) $\frac{11}{36}$ (ii) $\frac{25}{36}$ (iii) $\frac{1}{36}$	1 1 1
	SECTION D *This section comprises Long Answer (LA) type questions of 5 marks each.* $(4\times5=20)$	
32	Let the present age of Zeba be x years. Age before 5 years = $(x-5)$ years According to given condition, $(x-5)^2=5x+11$ $\Rightarrow x^2+25-10x=5x+11$ $\Rightarrow x^2-10x-5x+25-11=0$ $\Rightarrow x^2-15x+14=0$ $\Rightarrow x^2-14x-x+14=0$ $\Rightarrow x(x-14)-1(x-14)=0$ $\Rightarrow (x-1)(x-14)=0$ $\Rightarrow x-1=0$ or $x-14=0$ $\Rightarrow x=1$ or $x=14$	1 1 1 1

But present age cannot be 1 year. 1
Hence, Present age of Zeba is 14 years.

33 (i) State and Prove basic proportionality theorem. 3

(ii)

In ΔABC, $\frac{AP}{AB} = \frac{3}{5}$ ……. (i)

$\frac{AQ}{AC} = \frac{6}{10} = \frac{3}{5}$ ……. (ii) 1

From (i) and (ii), we get $\frac{AP}{AB} = \frac{AQ}{AC} \Rightarrow PQ \parallel BC$

In ΔABD, $PR \parallel BD \Rightarrow \frac{AP}{AB} = \frac{AR}{AD} \Rightarrow \frac{3}{5} = \frac{4.5}{AD} \Rightarrow AD = 7.5cm$ 1

34 Radius = $2m$, Slant height $l = 2.8\ m$, height $h = 2.1\ m$

Cost of canvas per m^2= ₹ 500

Area of canvas used = CSA of cone + CSA of cylinder 1

$= \pi rl + 2\pi rh$ 1

$= 22/7 \times 2 \times 2.8 + 2 \times 22/7 \times 2 \times 2.1$ 1

$= 17.6 + 26.4$

$= 44m^2$ 1

Cost of the canvas of tent = $44 \times 500 =$ ₹ 22,000 1

OR

Let h be the height of the cone and r be the radius of its base

Volume of wooden toy = $\frac{1}{3}\pi r^2 h + \frac{2}{3}\pi r^3$ 1

$= \frac{77}{6}(h + 7)$ 1

According to the question, $\frac{77}{6}(h + 7) = 166\ \frac{5}{6}$

$\Rightarrow h = 6\ cm$ 1

The height of the wooden toy= $6\ cm + 3.5\ cm = 9.5\ cm$

Curved surface area of the hemispherical part = $2\pi r^2 = 2\pi(3.5)^2 = 77\ cm^2$ 1

Hence,

The cost of painting the hemispherical part of the toy at the rate of ₹ 10 per cm^2 1

$= 77 \times 10 =$ ₹ 770

35

Class Interval	Frequency	Cumulative Frequency
0 – 100	2	2
100 – 200	5	7
200 – 300	x	$7 + x$
300 – 400	12	$19 + x$
400 – 500	17	$36 + x$
500 – 600	20	$56 + x$
600 – 700	y	$56 + x + y$
700 – 800	9	$65 + x + y$
800 – 900	7	$72 + x + y$
900 - 1000	4	$76 + x + y$

2

It is given that $n = 100$

So, $76 + x + y = 100$, i.e., $x + y = 24$ --------(1)

The median is 525, which lies in the class 500 - 600

So, l = 500, f = 20, cf = 36 + x, h = 100

	Using the formula: Median $= l + \left(\frac{(\frac{n}{2} - cf)}{f}\right) h$, we get i.e., $525 = 500 + \left(\frac{50-36-x}{20}\right) \times 100$ i.e., $525 - 500 = (14 - x) \times 5$ i.e., $25 = 70 - 5x$ i.e., $5x = 70 - 25 = 45$ i.e., $x = 9$ From (1), we get $9 + y = 24$ $y = 24 - 9 = 15$ The values of x, y are 9, 15 respectively.	1 1
	OR	

Income (in Rupees)	Number of workers	x_i	d_i	u_i
200 – 300	5	250	-300	-3
300 – 400	36	350	-200	-2
400 – 500	24	450	-100	-1
500 – 600	16	550	0	0
600 – 700	9	650	100	1
700 – 800	6	750	200	2
800 – 900	4	850	300	3

Marks: 1, 3

$\sum f_i = 100$
$\sum f_i u_i = -78$ — ½
$\bar{x} = a + h\left(\frac{\sum f_i u_i}{\sum f_i}\right)$ — ½
$= 550 + 100\left(\frac{-78}{100}\right)$ — ½
$= 550 - 78$
$= 472$
∴Mean, $\overline{x}$= ₹472 — ½

SECTION E

This section comprises 3 case study based questions of 4 marks each.

$(3 \times 4 = 12)$

36	(i) yes, $a = 24, d = 6$	1
	(ii) ₹ 108	1
	(iii) $n = 8$	2
	OR	
	$d = -5$	2
37	(i) 2 units	1
	(ii) 2 units	1
	(iii) (A) Distance between Shagun's house and Alia's house = 2 units Distance between Shagun's house and Library = 2 units Distance between Shagun's house and School = $\sqrt{5}$ units For Shagun, School is farther than Alia's house and library.	2
	OR	
	(B) Distance between Shagun's house and Alia's house = 2 units Distance between Shagun's house and Library = 2 units Distance between Alia's house and Library = $2\sqrt{2}$ units Therefore, A, B and C form an isosceles right triangle.	2

38	(i) (A) 14 m (approx.) OR (B) 24 m (ii) 10 m (iii) $24\sqrt{2}\ m$	2 2 1 1