COMMON PREBOARD EXAMINATION

AY 2025-26

SUBJECT: MATHEMATICS (041)

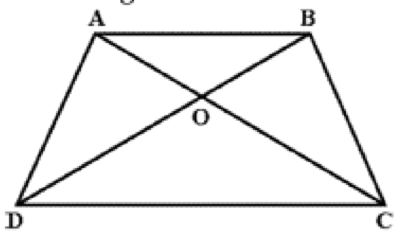
MARKING SCHEME (SET 3)

Grade: 10 **Duration: 3 Hours**

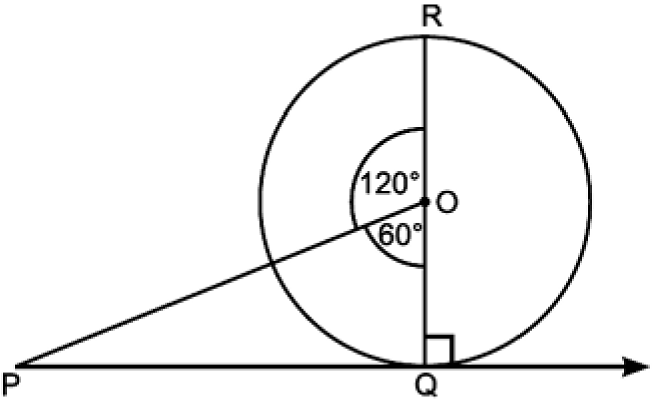
Max. Marks: 80

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	(A) $50°$	1
2	(D) $16: 9$	1
3	(C) $\frac{1}{2}$	1
4	(B) 3 units	1
5	(B) $1 : 4$	1
6	(B) 10	1
7	(C) $(-4, 6)$	1
8	(C) $BC.DE = AB.EF$	1
9	(B) $cosec\theta$	1
10	(B) $x = 0, x = \frac{25}{4}$	1
11	(B) 4	1
12	(A) $\frac{9}{13}$	1
13	(C) 194400	1
14	(C) $\left(\frac{5}{2}, 0\right)$	1
15	(B) 29.6	1
16	(C) 132 cm	1
17	(B) $4\ cm$	1
18	(C) $1 - p$	1
19	(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)	1
20	(D) Assertion (A) is false, but Reason (R) is true.	1
	SECTION B *This section comprises Very Short Answer (VSA) type questions of 2 marks each.* $(5 \times 2 = 10)$	

21	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
22	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
23	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 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 $\Longrightarrow 0 = \frac{n}{2}[2(27) + (n-1)(-3)]$ $\Longrightarrow 0 = n[54 + (n-1)(-3)]$ $\Longrightarrow 0 = n[54 - 3n + 3]$ $\Longrightarrow 0 = n[57 - 3n]$ Further we have, $n = 0$ Or, $57 - 3n = 0 \Longrightarrow 3n = 57 \Longrightarrow n = 19$ The number of terms cannot be zero,	0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5

	Hence, the numbers of terms (n) is 19.	
24	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 $\therefore \frac{OA}{OC} = \frac{OB}{OD}$	1 1
	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
25	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
	SECTION C *This section comprises Short Answer (SA) type questions of 3 marks each.* (6 × 3 = 18)	

26	$7\,sin^2A + 3\,cos^2A = 4$ Dividing both sides by cos^2A , we get, $7\,tan^2A + 3 = 4\,sec^2A$ (using $sec^2\theta = 1 + tan^2\theta$) $\Rightarrow 7\,tan^2A + 3 = 4\,(1 + tan^2A)$ $\Rightarrow 7\,tan^2A + 3 = 4 + 4\,tan^2A$ $\Rightarrow 3\,tan^2A = 1$ $\Rightarrow tan^2A = \frac{1}{3}$ $\Rightarrow tan\,A = \frac{1}{\sqrt{3}}$ Hence Proved **OR** LHS = $\frac{\tan\theta - 1 + \sec\theta}{\tan\theta + 1 - \sec\theta}$ (Dividing numerator and denominator by $\cos\theta$) $= \frac{\tan\theta + \sec\theta - 1}{\tan\theta + 1 - \sec\theta}$ $= \frac{\tan\theta + \sec\theta - (\sec^2\theta - \tan^2\theta)}{\tan\theta + 1 - \sec\theta}$ $= \frac{(\sec\theta + \tan\theta)(1 - \sec\theta + \tan\theta)}{\tan\theta + 1 - \sec\theta} = \sec\theta + \tan\theta$ = RHS	½ ½ 1 1 ½ ½ ½ ½
27	(i) $\frac{11}{36}$ (ii) $\frac{25}{36}$ (iii) $\frac{1}{36}$	1 1 1
28	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 $b \neq 0$ $7 - \frac{a}{b} = 2\sqrt{3}$ $\frac{7b-a}{b} = 2\sqrt{3}$ 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. $\therefore 7 - 2\sqrt{3}$ is an irrational number.	1 1 1
29	$p(x) = x^2 + 6x + 9$ Since α, β are zeroes of $p(x)$ $\therefore \alpha + \beta = -6\,,\alpha\beta = 9$ Now $-\alpha - \beta = -(\alpha + \beta) = 6$ And $(-\alpha)(-\beta) = \alpha\beta = 9$ $\therefore$ Required quadratic polynomial is given by $q(x) = x^2 - (-\alpha - \beta)\,x + (-\alpha)(-\beta)$ $q(x) = x^2 - 6x + 9$	1 1 1

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	Let length and breadth be x and y, Area = xy 1st condition: $(x-5)(y+3) = xy-9$ $\Rightarrow 3x-5y = 6$ 2nd condition: $(x+3)(y+2) = xy+67$ $\Rightarrow 2x+3y = 61$ 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, $\frac{x}{y} = \frac{1}{3}$ $\Rightarrow 3x = y \Rightarrow y = 3x$...(i) Also, $\frac{x+5}{y+5} = \frac{1}{2}$ $\Rightarrow 2x+10 = y+5$ $\Rightarrow 2x-y = -5$ ...(ii) Putting the value of $y = 3x$ in (ii), we get $2x-3x = -5 \Rightarrow -x = -5 \Rightarrow x = 5$ 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
	SECTION D *This section comprises Long Answer (LA) type questions of 5 marks each.* $(4 \times 5 = 20)$	

32

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
$= \frac{77}{6}(h + 7)$
According to the question, $\frac{77}{6}(h + 7) = 166\ \frac{5}{6}$ — 1
$\Rightarrow h = 6\ cm$ — 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

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 || BC

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

34

Let the present age of Zeba be x years.
Age before 5 years $= (x - 5)$ years
According to given condition, $(x - 5)^2 = 5x + 11$ — 1
$\Rightarrow x^2 + 25 - 10x = 5x + 11$
$\Rightarrow x^2 - 10x - 5x + 25 - 11 = 0$
$\Rightarrow x^2 - 15x + 14 = 0$
$\Rightarrow x^2 - 14x - x + 14 = 0$ — 1
$\Rightarrow x\,(x - 14) - 1\,(x - 14) = 0$
$\Rightarrow (x - 1)\,(x - 14) = 0$ — 1
$\Rightarrow x - 1 = 0$ or $x - 14 = 0$
$\Rightarrow x = 1$ or $x = 14$ — 1
But present age cannot be 1 year.
Hence, Present age of Zeba is 14 years. — 1

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

1

i.e., $525 = 500 + \left(\frac{50-36-x}{20}\right) \times 100$
i.e., $525 - 500 = (14 - x) \times 5$

1

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.

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

1

3

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

SECTION E

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

$(3 \times 4 = 12)$

36

(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
2
For Shagun, School is farther than Alia's house and library.

	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
37	(i) (A) $14\ m$ (approx.) OR (B) $24\ m$ (ii) $10\ m$ (iii) $24\sqrt{2}\ m$	2 2 1 1
38	(i) yes, $a = 24, d = 6$ (ii) ₹ 108 (iii) $n = 8$ OR $d = -5$	1 1 2 2