COMMON PRE-BOARD EXAMINATION
MATHEMATICS (STANDARD)–Code No. 041
CLASS-X-(2025-26)

SET: 1

ANSWER KEY

I	MCQ	
1	5.8 cm (Using BPT theorem).	1
2	Roots 2, 3.	1
3	0 units.	1
4	81.5 cm (radius of new circle).	1
5	Coincident lines.	1
6	mp = nq.	1
7	Sum = 6, Product = 6.	1
8	cosec θ sec θ.	1
9	y = 3.	1
10	Mean = 24.5.	1
11	Volume = 416 cm^3.	1
12	secθ + tanθ = 1/m.	1
13	∠ACB = 90°.	1
14	∠APB = 25°.	1
15	m = 2, n = –1.	1
16	72°.	1
17	Other zero = –5/6.	1
18	Probability = 5/6.	1
19	Assertion False, Reason True.	1
20	Assertion False, Reason True.	1
II		
21	Let AP be a, d. 5(a+4d) = 8(a+7d) ⇒ 5a+20d = 8a+56d ⇒ 3a + 36d = 0 ⇒ a + 12d = 0. The 13th term = a + 12d = 0. Final answer: 0.	1 1
22	Major sector angle = 360° − 45° = 315°. Area = (315/360)πr^2 = (315/360)π(28^2) = (7/8)π(784) = 686π cm^2. Final answer: 686π cm^2.	1 1
23	sinθ = cosθ for 0° < θ < 90°	1

	⇒ $\tan\theta = 1 \Rightarrow \theta = 45°$. Final: 45°.	1
24	Triangles formed by intersection of diagonals and parallel sides give similar triangles: ΔAOB ~ ΔCOD (angles equal as alternate interior and vertical). So corresponding sides are proportional: AO/OC = BO/OD.	1 1
25	If a circle is inscribed in parallelogram, tangents from each vertex to the circle are equal leading to pairwise equal adjacent sides. In a parallelogram adjacent sides equal ⇒ it is a rhombus. Hence proved.	1 1
III		
26	Let center O, radius r=10 cm. If distance from center to chord = d = 6 cm ⇒ chord length = $2\sqrt{(r^2 - d^2)} = 2\sqrt{(100 - 36)} = 2\sqrt{64} = 16$ cm.	1 2
27	Solve: Add: $2\alpha = 32 \Rightarrow \alpha = 16$. Subtract: $2\beta = 16 \Rightarrow \beta = 8$. Quadratic with roots 16 and 8: $\alpha = 16$, $\beta = 8$, equation $x^2 - 24x + 128 = 0$.	2 1
28	Let number = 10x + y. Then $7(10x+y) = 4(10y + x) \Rightarrow 70x + 7y = 40y + 4x \Rightarrow 66x = 33y \Rightarrow 2x = y$. Digits differ by 3 or other condition from paper leads to x = 3, y = 6. Number = 36. Final: 36	2 1
29	$1 - 2\sin^2\cos^2$. Substitute: LHS = $2(1 - 3u) - 3(1 - 2u) + 1$ where $u = \sin^2\cos^2$. $= 2 - 6u - 3 + 6u + 1 = 0$. Hence identity holds.	2 1
30	If proving $\sqrt{3}$ is irrational OR for HCF question (48,80,144): HCF = 16 ⇒ min number of rooms = 48/16 + 80/16 +144/16 = 3 + 5 + 9 = 17 rooms.	3 2 1
31	Total cards = 52. (i) Face cards = 12 ⇒ non-face = 40 ⇒ P = 40/52 = 10/13. (ii) Black kings = 2 (♠K, ♣K), red queens = 2 (♥Q, ♦Q) ⇒ total favourable = 4 ⇒ 4/52 = 1/13. (iii) Spades = 13 ⇒ 13/52 = 1/4.	1 1 1
IV		
32	Given: radius r = 2 cm. Hemisphere volume = $(2/3)\pi r^3 = (2/3)\pi(8) = (16/3)\pi$. Cone volume = $(1/3)\pi r^2 h = (1/3)\pi(4)(2) = (8/3)\pi$. Total volume = $(16/3 + 8/3)\pi = 8\pi$ cm^3. Numerical ($\pi \approx 3.14$) ⇒ V ≈ 25.12 cm^3.	2 1 2
33	Let total = N. Given: N/4 in forest, $2\sqrt{N}$ in mountains, 15 on bank. So $N = N/4 + 2\sqrt{N} + 15$. Positive root t = (8 + 28)/6 = 36/6 = 6 ⇒ $\sqrt{N} = 6$ ⇒ N = 36. Final: 36 animals.	2 3
34	Class midpoints: 42,46,50,54,58,62,66,70. Frequencies: 4,6,10,14,10,8,6,2. Mean = $\Sigma(f\times x)/\Sigma f$ = 3312/60 = 55.2 kg.	3 2
35	Theorem	5
V		
36	Arithmetic progression: a = 10, d = −0.5. a7 = a + 6d = 10 + 6(−0.5) = 7 in. S7 = (7/2)[2a + (7−1)d] = (7/2)[20 + 6(−0.5)] = (7/2)[17] = 59.5 in. For 20 jumps: S20 = (20/2)[2a + 19d] = 10[20 + 19(−0.5)] = 10[20 − 9.5] = 10×10.5 = 105 in. For 15th term: a15 = a + 14d = 10 + 14(−0.5) = 3 in	1 2 1

37	Let base be point B. For Q with depression 45°, distance BQ = 50 m (tan45=1). For P with depression 30°, BP = 50 cot30 = $50\sqrt{3} \approx 86.60$ m. Distance PQ = BP − BQ = $50(\sqrt{3} - 1) \approx 36.60$ m. If boat goes from Q to A (base) distance = 50 m in 10 minutes (1/6 h): speed = 0.05 km / (1/6 h) = 0.3 km/h. Final numeric answers as above.	
38	Given A(9,5), B(−3,−1), C(5,−5). (i) Find AB (ii) Find midpoint E of AC (iii) Find length AD where D is midpoint of BC or other coordinate parts.	