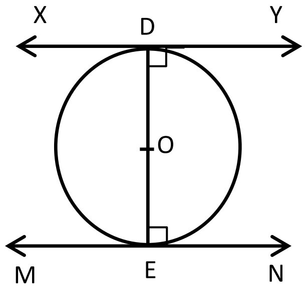
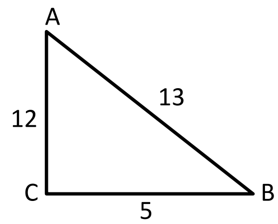
KENDRIYA VIDYALAYA SANGATHAN, ERNAKULAM REGION
PRE-BOARD EXAMINATION 2025-26
MATHEMATICS [STANDARD] (041)
MARKING SCHEME

Class: **X** Max. Marks: **80**

	Section A	
1	(d) 6	**1**
2	(a) 2p	**1**
3	(d) 1:12	**1**
4	(a) 2	**1**
5	(a) 2p+q, 2p–q	**1**
6	(c) 10	**1**
7	(c) $x = \frac{ay}{a+b}$	**1**
8	(a) a = 6, b = 3	**1**
9	(d) 8 cm	**1**
10	(b) 2	**1**
11	(b) 6 cm	**1**
12	(b) 128 cm^2	**1**
13	(d) 72^o	**1**
14	(d) 10^o	**1**
15	(c) 1:4	**1**
16	(d) $\frac{5}{6}$	**1**
17	(a) $\frac{1}{7}$	**1**
18	(c) $\frac{23}{3}$	**1**
19	(a) Both (A) and (R) are true and (R) is the correct explanation of (A)	**1**
20	(a) Both (A) and (R) are true and (R) is the correct explanation of (A)	**1**
	Section B	
21	$a_3 = 16$ $a_7 = a_5 + 12$ $a + 2d = 16$ $(a + 6d) – (a + 4d) = 12$ $d = 6$	 ½ ½

	a + 2 x (6) = 16 a = 4 OR The numbers are 110, 120, …… 990 $a_n = a + (n - 1)d$ 990 = 110 + (n – 1)d 880 = (n – 1) 10 n = 89	 ½ ½ **1**
22	In ΔAOD and ΔCOB, $\frac{OA}{OC} = \frac{OD}{OB} \Rightarrow \frac{OA}{OD} = \frac{OC}{OB}$ ∴ ∠AOD = ∠COB (VOA) ie, ∠1 = ∠2 ΔAOD ~ ΔCOB (SAS criterion of similarity) ⇒ ∠A = ∠C and ∠B = ∠D	½ ½ **1**
23	 Since tangent is perpendicular to radius, XY ⊥ DE ∠YDE = 90° MN ⊥ DE ∠NED = 90° DE is a transversal for the lines XY and MN ∴ ∠YDE = ∠NED Thus, alternate interior angles are equal. Therefore, lines must be parallel. Hence, XY || MN	 ½ ½ ½ ½
24	 $AB^2 = \sqrt{12^2 + 5^2}$ ie, 13 cm sin B = $\frac{12}{13}$ sec B = $\frac{13}{5}$	 **1** **1**
25	c = 2πr 22 = 2 x $\frac{22}{7}$ x r	 ½

	$r = \frac{7}{2}$ Area of quadrant of circle = ¼ π r^2 $= \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times \frac{1}{4} = \frac{77}{8}$ cm^2 **OR** Length of an arc of a sector of an angle θ = $\frac{\theta}{360} \times 2\pi r$ θ = 30° $\frac{\theta}{360} \times 2\pi r = 8.8$ $\frac{30}{360} \times 2 \times \frac{22}{7} \times r = 8.8$ r = 16.8 cm (length of the pendulum)	½ **1** ½ ½ **1**
	Section C	
26	Correct proof	**3**
27	$x^2 + \frac{1}{6}x - 2 = \frac{1}{6}(6x^2 + x - 12)$ $\frac{1}{6}(6x^2 + x - 12) = 0$ $(3x - 4) \times (2x + 3) = 0$ $3x - 4 = 0,\ 2x + 3 = 0$ $x = \frac{4}{3}, \frac{-3}{2}$ Sum of the roots is equal to $\frac{4}{3} + \frac{-3}{2} = \frac{-1}{6}$ Product of the roots is $\frac{4}{3} \times \frac{-3}{2} = -2$ Sum of the roots is equal to $\frac{-b}{a} = \frac{-1}{6}$ Product of the roots is $\frac{c}{a} = \frac{-12}{6} = -2$ Therefore, the relation between the coefficient and the zeros of the polynomial are verified.	 **1** **1** **1**
28	Let son's age one year ago be x years Man's age = 8x years Present age of son = (x + 1) years Man's present age = (8x + 1) years $8x + 1 = (x + 1)^2$ $x^2 - 6x = 0$ $x(x - 6) = 0$ x = 6 Present age of son = x + 1 = 7 years Present age of man = 8x + 1 = 49 years	½ ½ **1** ½ ½
29	Correct figure Correct proof	**1** **2**

30	LHS $= \frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta}$ $= \frac{\sin\theta\,(1-2\sin^2\theta)}{\cos\theta\,(2\cos^2\theta - 1)}$ $= \frac{\sin\theta\,(1-2\sin^2\theta)}{\cos\theta\,[2\,(1-\sin^2\theta) - 1]}$ $= \frac{\sin\theta}{\cos\theta}\ \frac{(1-2\sin^2\theta)}{(2-2\sin^2\theta-1)}$ $= \frac{\sin\theta\,(1-2\sin^2\theta)}{\cos\theta\,(1-2\sin^2\theta)}$ = tan θ = RHS LHS = RHS proved. **OR** LHS = $(\sin\theta + \text{cosec}\,\theta)^2 + (\cos\theta + \sec\theta)^2$ $= \sin^2\theta + 2\sin\theta\,\text{cosec}\,\theta + \text{cosec}^2\theta + \cos^2\theta + 2\cos\theta\sec\theta + \sec^2\theta$ $= \sin^2\theta + \cos^2\theta + 2 + \text{cosec}^2\theta + 2 + \sec^2\theta$ $= 1 + 2 + 2 + \text{cosec}^2\theta + \sec^2\theta$ $= 1 + 2 + 2 + 1 + \cot^2\theta + 1 + \tan^2\theta$ $= 7 + \tan^2\theta + \cot^2\theta$ = RHS LHS = RHS proved	½ 1 1 ½ 1 1 1
31	Outcomes are (H, H, H), (H, H, T), (H, T, H), (T, H, H), (H, T, T), (T, H, T), (T, T, H), (T, T, T) (a) p(*getting exactly two heads*) = No. of favourable outcomes/Total no. of outcomes = $\frac{3}{8}$ (b) p(*getting at least two tails*) = No. of favourable outcomes/Total no. of outcomes = $\frac{4}{8} = \frac{1}{2}$ (c) p(*getting exactly one head*) = No. of favourable outcomes/Total no. of outcomes = $\frac{3}{8}$ **OR** Total no. of outcomes = 48 (a) Numbers divisible by 7 = 7, 14, 21, 28, 35, 42, 49 p(*card number divisible by 7*) = No. of favourable outcomes/Total no. of outcomes = $\frac{7}{48}$ (b) No. of cards having perfect square = 4, 9, 16, 25, 36, 49 p(*card number having perfect square*) = No. of favourable outcomes/Total no. of outcomes = $\frac{6}{48} = \frac{1}{8}$	1 1 1 1 1

	(c) Multiples of 6 = 6, 12, 18, 24, 30, 36, 42, 48 p(*card number having multiples of 6*) = No. of favourable outcomes/Total no. of outcomes = $\frac{8}{48} = \frac{1}{6}$	**1**
	Section D	
32	(a) Graph + shading (b) Coordinates of triangles (1, 4), (-1, 0), (3, 0) + solution (1, 4)	**3** **1+1**
33	(a) Proof with figure and statement (b) PQ || MN $\frac{KP}{PM} = \frac{KQ}{QN}$ (By BPT) $\frac{4}{13} = \frac{KQ}{20.4-KQ}$ 4 (20.4 – KQ) = 13 KQ KQ = 4.8 cm	**3½** **½** **1**
34	h = length of the cylindrical part of gulab jamun = (5 – 1.4 – 1.4) = 2.2 cm Radius of cylindrical part and hemispherical part of gulab jamun = 1.4 cm Let v be the volume of the gulab jamun v = vol. of two hemispherical part + vol. of cylindrical part $= 2\left(\frac{2}{3}\pi r^3\right) + \pi r^2 h$ $= \frac{4}{3}\pi r^3 + \pi r^2 h$ $= \pi r^2\left(\frac{4}{3} r + h\right) = \frac{22}{7} \times 1.4 \times 1.4 \times \left(\frac{4}{3} \times 1.4 + 2.2\right) = \frac{75.152}{3}\ cm^3$ Volume of 45 gulab jamun = $\frac{75.152}{3} \times 45 = 1127.28\ cm^3$ Volume of syrup = 30% x 1127.28 cm^3 = 338.184 cm^3 **OR** Radius of the cylinder, r = radius of the hemispherical end = 18 cm Height of the cylinder, h = 108 – 18 – 18 = 72 cm Surface area of the solid = CSA of the cylinder + SA of the hemisphere $= (2\pi rh + 2 \times 2\pi r^2)\ cm^2$ $= (2\pi rh + 4\pi r^2)\ cm^2$ $= 2\pi r(h + 2r)\ cm^2 = 2 \times \frac{22}{7} \times 1.8\ (72 + 36)\ cm^2 = 12219.42\ cm^2$ Rate of polishing = 7 paise per sq.cm Cost of polishing = $12219.42 \times \frac{7}{100}$ = Rs. 855.36	**½** **1** **1** **1** **1** **½** **½** **1** **1** **1½** **1**

35

Correct table- 2

Class interval	Frequency (fi)	xi	fi xi
0 – 20	7	10	70
20 – 40	P	30	30P
40 – 60	10	50	500
60 – 80	9	70	630
80 – 100	13	90	1170
	Σ fi = 39+P		Σ fi xi = 2370 + 30P

Correct total- 1

Arithmetic mean, $\bar{x} = \frac{\Sigma \text{ fi xi}}{\Sigma \text{ fi}}$

$54 = \frac{2370 + 30P}{39+P}$ **1**

54 (39+P) = 2370+30P

P = 11 **1**

OR

Correct table 2

Class interval	Frequency (f)	cf
0 – 10	5	5
10 – 20	x	5+x
20 – 30	20	25+x
30 – 40	15	40+x
40 – 50	y	40+x+y
50 – 60	5	45+x+y
	N = 60	

Median = 28.5 which lies in the class interval 20-30. So 20-30 is the median class.

l = 20, h = 10, f = 20, cf = 5+x, N = 60 **1**

Median = $l + \frac{\left(\frac{N}{2} - cf\right) \times h}{f} = 28.5$

$= 20 + \frac{(30 - (5+x) \times 10}{20} = 28.5$ **1½**

x = 8

45 + x+ y = 60

x + y = 15 **½**

y = 7

Section E

36

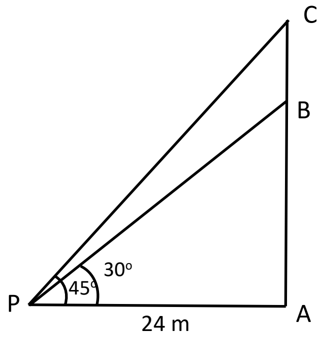
a) $(4, \frac{13}{3})$ **1**

OR **1**

Let A(x,0) **2**

$AP^2 = AQ^2$

$(x-2)^2 + 25 = (x-4)^2 + 169/9$

	Solving x= 13/9 So the required point is $(\frac{13}{9}, 0)$ b) Coordinates of the mid-point of P and R is (5, 4) c) (6, 2)	
37	(a) 20 + 4n = 20 + 4 x 1 = 24 is the number on the first spot. (b) 20 + 4n = 112, n = 23, the spot numbered as 112 is the 23rd spot (c) $S_{10} = \frac{10}{2}$ [2 x 24 + (10 – 1)]24 = 420 **OR** Put n = n – 2, A_n = 20 + 4(n – 2) = 12 + 4n	1 1 2
38	 (a) In ΔPAB, $\tan 30 = \frac{AB}{PA} = \frac{1}{\sqrt{3}} = \frac{AB}{24}$ AB = 13.85 m **OR** Taking AC as the new height of the shop including signboard in ΔAPC, $\tan 45 = \frac{AC}{AP} = 1 = \frac{AC}{24}$ AC = 24 m (b) Height of the signboard, BC = AC – AB = 24 – 13.85 = 10.15 m (c) In ΔAPC, $\cos 45 = \frac{AP}{PC} = \frac{1}{\sqrt{2}} = \frac{24}{PC}$ PC = $24\sqrt{2}$ m	2 1 1