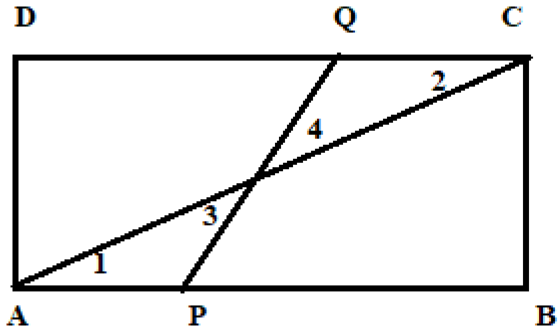
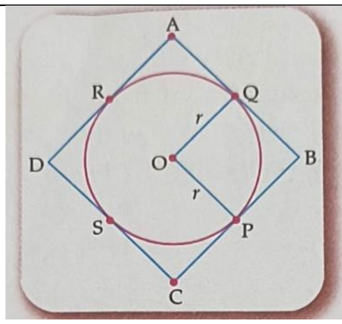
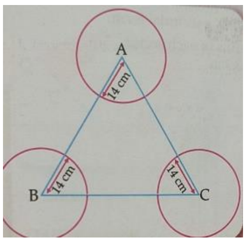
Pre – Board Examination (2025-26)
Class- X

Subject- Maths(Standard) 041– Marking Scheme

	Section A consists of 20 questions of 1 mark each.	
S.NO		Marks
1	(C) 35	1
2	(A) has no linear term and the constant term is negative.	1
3	(D) ab = 6	1
4	(B) $-x^2 + 4x - 4 = 0$	1
5	(A) 6	1
6	(B) $\frac{1}{2}$	1
7	(A) 62.5^0	1
8	(A) 220	1
9	(C) 3 cm	1
10	(D) $\sqrt{2}r$	1
11	(A) $4\sqrt{mn}$	1
12	(A) π	1
13	(A) $\sqrt{68}$ units	1
14	(A) r^2 squ. units	1
15	(C) 2:1	1
16	(C) 18	1
17	(A) $\frac{1}{30}$	1
18	(B) 25	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	
	Section B consists of 5 questions of 2 marks each.	
S.No		**Marks**
21	Let the three terms in AP be a – d, a, a + d. So, a – d + a + a + d = 33 or a = 11 Also, (a – d) (a + d) = a + 29 i.e., $a^2 - d^2 = a + 29$ i.e., $121 - d^2 = 11 + 29$ i.e., $d^2 = 81$ i.e., d = ± 9 So there will be two APs and they are : 2, 11, 20, ... and 20, 11, 2, ... OR	 ½ 1 ½

	Multiple of 2 as well as 9 means multiple of 18 a = 18, d = 18, n = 7 $S_7 = \frac{7}{2}\{2x18 + (7-1)18$ = 504	½ ½ 1
22	 AP = 2/5 AB CQ = 1/5 CD Consider ΔAOP, ΔCOQ ∠ 1 = ∠ 2 ∠ 3 = ∠ 4 ΔAOP ~ ΔCOQ (AA) $\frac{AO}{CO} = \frac{AP}{CQ}$ $\frac{AO}{CO} = \frac{\frac{2}{5}AB}{\frac{1}{5}CD}$ $\frac{AO}{CO} = \frac{\frac{2}{5}AB}{\frac{1}{5}AB}$ (AB = CD) $\frac{AO}{CO} = \frac{2}{1}$ $OC = \frac{1}{2}OA$	 ½ ½ ½ ½
23	 DR = DS = 5 cm (length of tangent from an external points are equal. AR = AD – DR = 18 cm AQ = AR = 18 cm QB = 29 – 18 = 11 cm In quadrilateral OQBP, ∠B = 90^0 Also ∠P = ∠Q = 90^0 Therefore OBPQ is a square Hence OQ = OP = BP = QB = 11 cm	½ ½ 1
24	$1 + \frac{cot^2\theta}{1 + cosec\theta}$ $1 + \frac{cosec^2\theta - 1}{1 + cosec\theta}$ $1 + \frac{(1 + cosec\theta)\ x\ ((cosec\theta - 1)}{1 + cosec\theta}$ 1 + cosecθ – 1 cosec θ = RHS	 1 ½ ½
25	Sum of Areas of sector A, B and C removed from the circle, let angles of sector be A,B and C.  $\frac{A\pi r^2}{360^0} + \frac{B\pi r^2}{360^0} + \frac{C\pi r^2}{360^0}$ $\pi r^2\left(\frac{A}{360^0} + \frac{B}{360^0} + \frac{C}{360^0}\right)$ $\pi r^2\left(\frac{A+B+C}{360^0}\right)$	½

	$\pi r^2 \left(\frac{180^0}{360^0}\right)$ $\frac{\pi r^2}{2}$ $\frac{\pi\ x\ 14\ x 14}{2}$ 308cm^2 OR area of minor segment = area of sector – area of triangle = (22/7) x 10 x 10 x ($60^0/360^0$) - (√3/4) x 10 x 10 (triangle will be equilateral) = (25 /21) (44 - 21√3) cm^2	1 ½ 1 ½ ½
	SECTION C	
	Section C consists of 6 questions of 3 marks each.	
S.No		**Marks**
26	**Number of students in each group** = HCF(60, 84, 108) 60 = 2x2x3x5 84 = 2x2x3x7 108 = 2x2x3x3x3 HCF = 12 **Number of groups in each art form** Music = 60/12 = 5 Dance = 84/12 = 7 Handicrafts = 108/12 = 9 **Number of rooms required** = 5 + 7 + 9 = 21	1 ½ 1 ½
27	$pqx^2 + (pr + qs)x + rs = 0$ $pqx^2 + prx + qsx + rs = 0$ $px(qx + r) + s(qx + r) = 0$ $(px + s)(qx + r) = 0$ $x = \frac{-s}{p}$ and $x = \frac{-r}{q}$ Verification: Sum of zeros = $\frac{-s}{p} + \frac{-r}{q} = -(\frac{sq+pr}{pq}) = -\frac{coeff.\ of\ x}{coeff.\ of\ x^2}$ Product of zeros $= \frac{-s}{p}$ x $\frac{-r}{q} = \frac{sr}{pq} = \frac{constant}{coeff.\ of\ x^2}$	1 ½ 1 ½
28	Let the cost price of the table be Rs *x* and the cost price of the chair be Rs *y*. The selling price of the table, when it is sold at a profit of 10% $= x + \frac{10x}{100} = \frac{110x}{100}$ The selling price of the chair when it is sold at a profit of 25% $= y + \frac{25y}{100} = \frac{125y}{100}$ ATQ	

$$\frac{110x}{100} + \frac{125y}{100} = 1050$$

$= 110x + 125y = 105000$ ----------------------------------(1)

When the table is sold at a profit of 25%, its selling price ½

$= x + \frac{25x}{100} = \frac{125x}{100}$

When the chair is sold at a profit of 10%, its selling price

$= y + \frac{10y}{100} = \frac{110y}{100}$

So,

$$\frac{125x}{100} + \frac{110y}{100} = 1065$$

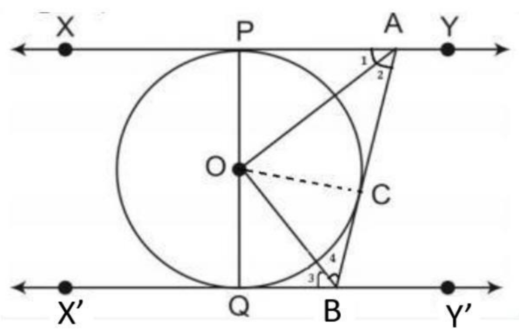
$= 125x + 110y = 106500$ ---(2) ½

On adding these equations,
$235x + 235y = 211500$
i.e., $x+y = 900$ --(3)
On subtracting these equations,
$15x – 15y = 1500$
i.e $x – y = 100$ --(4)
Solving Equations (3) and (4), we get 1
$x = 500$, $y = 400$
So, the cost price of the table is Rs 500 and the cost price of the chair is Rs 400. 1

OR

Correct graph plotting 1 ½
Vertices of the rectangle OABC are O (0, 0), A (0, 3), B (–2, 3), C (–2, 0) 1
Area of rectangle = = 2 x 3 = 6 sq. units. ½

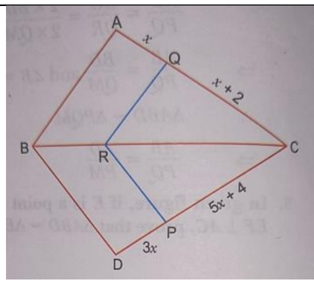
29



Join OC
In Δ OPA and Δ OCA
OP = OC (radii of same circle)
PA = CA (length of two tangents from an external point)
AO = AO (Common)
Therefore, Δ OPA ≅ Δ OCA (By SSS congruency criterion) 1
Hence, ∠ 1 = ∠ 2 (CPCT)
Similarly ∠ 3 = ∠ 4
∠PAB + ∠QBA =180°(co interior angles are supplementary as XY∥X’Y’)
2∠2 + 2∠4 = 180° 1
∠2 + ∠4 = 90°-------------------------(1)
∠2 + ∠4 +∠AOB = 180° (Angle sum property)
Using (1), we get, ∠AOB = 90° 1

30

$\sin\theta + \cos\theta = x$, squaring both sides
$\sin^2\theta + \cos^2\theta + 2\sin\theta\cos\theta = x^2$ 1

	$1 + 2\sin\theta\cos\theta = x^2$ $\sin\theta\cos\theta = \frac{x^2-1}{2}$ Now $\sin^4\theta + \cos^4\theta = (\sin^2\theta + \cos^2\theta)^2 - 2\sin^2\theta.\cos^2\theta$ $= 1 - 2\sin^2\theta.\cos^2\theta$ $= 1 - 2\frac{(x^2-1))^2}{4}$ $= \frac{2-(x^2-1)^2}{2}$ **OR** Given , $\sin\theta + \sin^2\theta = 1$ $\sin\theta = 1 - \sin^2\theta = \cos^2\theta$ -----(1) Now $\cos^{12}\theta + 3\cos^{10}\theta + 3\cos^8\theta + \cos^6\theta + 2\cos^4\theta + 2\cos^2\theta - 2$ $(\cos^{12}\theta + 3\cos^{10}\theta + 3\cos^8\theta + \cos^6\theta) + 2(\cos^4\theta + \cos^2\theta - 1)$ $(\cos^4\theta + \cos^2\theta)^3 + 2(\cos^4\theta + \cos^2\theta - 1)$ $(\sin^2\theta + \cos^2\theta)^3 + 2(\sin^2\theta + \cos^2\theta - 1)$ $1 + 2(1-1)$ 1	½ ½ 1 ½ ½ 1 ½ ½
31	(i) $P = \frac{11}{36}$ (ii) $\frac{2}{9}$ (iii) $\frac{1}{6}$	1*3=3
	Section D consists of 4 questions of 5 marks each.	
S.No		**Marks**
32	(i) Statement of BPT, Given , To prove, figure Correct proof  Getting relation from figure using BPT $\frac{CQ}{QA} = \frac{CR}{BR}$ --------------(I) $\frac{CP}{PD} = \frac{CR}{BR}$ -------------(II) $\frac{CQ}{QA} = \frac{CP}{PD}$ $\frac{x+2}{x} = \frac{5x+4}{3x}$ On solving x = 1	1 2 1 1
33	Let the original duration of a tour be x days. Total expenditure on tour = ₹ 10800 Expenditure per day = ₹ $\frac{10800}{x}$ Duration of the extended tour = (x + 4)days Expenditure per day according to new schedule = ₹ $\frac{10800}{x+4}$ $\frac{10800}{x} - \frac{10800}{x+4} = 90$ $\frac{10800x + 43200 - 10800x}{x^2 + 4x} = 90$ $\frac{43200}{x^2 + 4x} = 90$ $43200 = 90x^2 + 360x$ $90x^2 + 360x - 43200 = 0$ $x^2 + 4x - 480 = 0$	½ ½ ½ 1 ½

$x^2 + 24x - 20x - 480 = 0$

$x(x + 24) - 20(x + 24) = 0$

$x + 24 = 0$ or $x - 20 = 0$

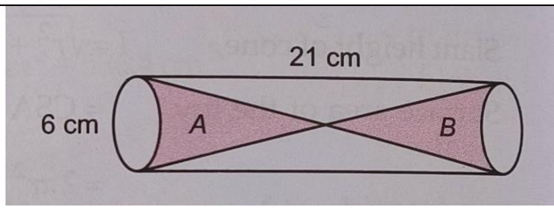
$x = -24$ or $x = 20$ 1 ½

Since number of days cannot be negative, $x \neq -24$

So, $x = 20$ ½

Hence, the original duration of the tour is 20 days

34



Radius of each cone = 6/2 = 3 cm ½

Let h_A and h_B the heights of two cones.

$$\frac{Volume\ of\ cone\ A}{Volume\ of\ cone\ B} = \frac{\frac{1}{3}\ \pi r^2 h_A}{\frac{1}{3}\ \pi r^2 h_B}$$

$$\frac{h_A}{h_B} = 2$$ ½

$h_A = 2h_B$

Also $h_B + h_A = 21$ ½

So $h_A = 14\ cm$ and $h_B = 7\ cm$

Volume of cone A = $\frac{1}{3}\ x\ \frac{22}{7} x\ 3^2 x\ 14 = 132 cm^3$ 1

Volume of cone B = $\frac{1}{3}\ x\ \frac{22}{7} x\ 3^2 x\ 7 = 66 cm^3$ 1

Volume of whole cylinder = $\frac{22}{7} x\ 3^2 x\ 21 = 594 cm^3$ 1

Volume of remaining portion of cylinder = Volume of cylinder – Volume of (cone A + cone B)

= 594 – (132+66) = 396 cm^3 ½

OR

Radius of conical part = radius of cylindrical part = r = ½ m ½

Height of conical part (h) = 1.2 m

Height of cylindrical part (H) = 3.3 – 1.2 = 2.1 m ½

Capacity of tank = $\frac{1}{3}\ \pi r^2 h\ +\ \pi r^2 H$ ½

$= \pi r^2 (\frac{1}{3}\ h\ +\ H)$

$= \frac{22}{7}\ x\ \frac{1}{4}\ (\frac{1}{3} x\ 1.2\ +\ 2.1)$ 1

$= 1.96\ m^3$ ½

Now, level of liquid in the tank is 0.7 m from the top, the height of cylindrical part in contact with liquid , H’ = 2.1 – 0.7 = 1.4 m ½

Slant height of conical part = $\sqrt{(0.5^2 + 1.2^2} = 1.3\ m$ ½

Surface area of the tank in contact with liquid = $\pi r l + 2\pi r H'$

$= \pi r\ (l + 2H')$ ½

$= \frac{22}{7}\ x\ \frac{1}{2}\ (1.3 + 2x1.4\ )$ ½

$= 6.44\ m^2$

35

CLASS INTERVAL	FREQUENCY	CUMULATIVE FREQUENCY
0-2	10	10
2-4	p	10 +p

4-6	60	70 + p	
6-8	q	70 + p + q	1 ½
8-10	5	75 + p + q	
	N = 120		

75 + p + q = 120

p + q = 45 --------------------(i) ½

N/2 = 120/2 = 60

Since median = 5

So Median class = 4-6 ½

$$\text{Median} = l + \left(\frac{\frac{N}{2} - CF}{f}\right) x\ h$$

$$5 = 4 + \frac{60 - (10 + p)}{60}\ x\ 2$$

p = 20 1 ½

from (i)

20 + q = 45

q = 25 ½

Now, 3Median = 2 Mean + Mode

3x5 = 2 Mean + 5.01 ½

Mean ≈ 5

OR

Daily allowance	Number of children(f_i)	Class mark(x_i)	$f_i x_i$
11-13	7	12	84
13-15	6	14	84
15-17	9	16	144
17-19	13	18	234
19-21	f	20	20f
21- 23	5	22	110
23-25	4	24	96
Total	$\sum f_i = 44 + f$		$\sum f_i x_i = 752+20f$

1 ½

Mean = 18

Using Direct method

$$\text{Mean} = \frac{\sum fi\ xi}{\sum fi}$$ ½

$$18 = \frac{752+20f}{44+f}$$

1

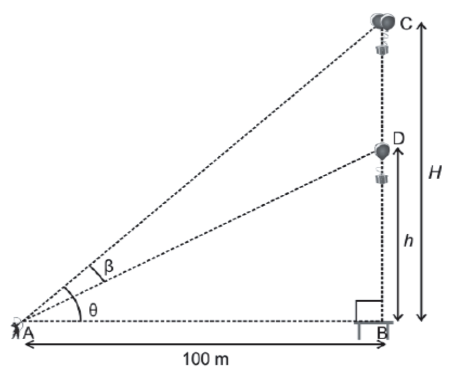
On solving: f = 20

Mode

$$\text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) x\ h$$ 1

$$\text{Mode} = 19 + \left(\frac{20 - 13}{2x20 - 13 - 5}\right) x\ 2$$ 1

= 19.64

	SECTION E	
	Case study based questions are compulsory.	
36	Series : 105, 112, 119 ……………994 (i) a + 4d = 105 + 28 = 133 (ii) 105 + (n-1)7 = 994 n = 128 **OR** S_{10} = (10/2)(2x105 + 9x7) = 1365 (iii) a_7 = 994 – 6x7 = 952	1 1 1 1 1 1
37	(i) LB = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ ⇒ LB = $\sqrt{(0-5)^2 + (7-10)^2}$ LB = $\sqrt{(5)^2 + (3)^2}$ ⇒ LB = $\sqrt{25+9}$ LB = $\sqrt{34}$ units Hence the distance is 150$\sqrt{34}$ km (ii) (2 ,41/5) (iii) L(5, 10), N(2,6), P(8,6) LN = $\sqrt{(2-5)^2 + (6-10)^2} = \sqrt{(3)^2 + (4)^2} = \sqrt{9+16} = \sqrt{25} = 5$ NP = $\sqrt{(8-2)^2 + (6-6)^2} = \sqrt{(6)^2 + (0)^2} = 6$ PL = $\sqrt{(8-5)^2 + (6-10)^2} = \sqrt{(3)^2 + (4)^2} = \sqrt{9+16} = \sqrt{25} = 5$ as LN = PL ≠ NP, so Δ LNP is an isosceles triangle. **[OR]** Let A (0, b) be a point on the y – axis then AL = AP ⇒ $\sqrt{(5-0)^2 + (10-b)^2} = \sqrt{(8-0)^2 + (6-b)^2}$ ⇒ $(5)^2 + (10-b)^2 = (8)^2 + (6-b)^2$ ⇒ $25 + 100 - 20b + b^2 = 64 + 36 - 12b + b^2$ ⇒ 8b = 25 ⇒ b = 25/8 So, the coordinate on y axis is (0, 25/8)	 1 1 2 2
38	 (Note: The figure is not to scale.) (Use √3 = 1.73, √2 = 1.41) **(i) Triangle ABC** tan $45^0 = \frac{BC}{AB}$ $1 = \frac{H}{100}$ H = 100 (ii) Distance covered by the arrow. **Triangle ABD** Angle = $45^0 - 15^0 = 30^0$ cos $30^0 = \frac{AB}{AD}$ $\frac{\sqrt{3}}{2} = \frac{100}{AD}$ $AD = \frac{200}{\sqrt{3}}\ m$ (iii) Initial height of box(H) = 100 m Height after one balloon burst (h)(triangle ABD)	 1 1

	tan $30^0 = \frac{BD}{AB}$ $\frac{1}{\sqrt{3}} = \frac{BD}{100}$ h = $\frac{100}{\sqrt{3}}$ Difference in height = $\left(100 - \frac{100}{\sqrt{3}}\right) m$ **OR** (iv) tan $60^0 = \frac{BC}{AB}$ $\sqrt{3} = \frac{H}{100}$ H = $100\sqrt{3}$ Now Angle = $60^0 - 30^0 = 30^0$ tan $30^0 = \frac{BD}{AB}$ $\frac{1}{\sqrt{3}} = \frac{BD}{100}$ h = $\frac{100}{\sqrt{3}}$ Therefore $\frac{H}{h} = \frac{100\sqrt{3}}{\frac{100}{\sqrt{3}}} = 3:1$	½ 1 ½ ½ ½ ½ ½