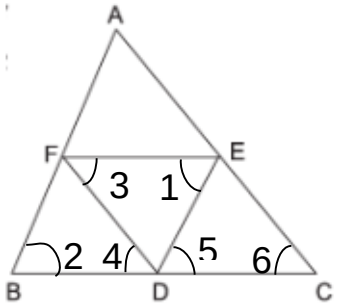
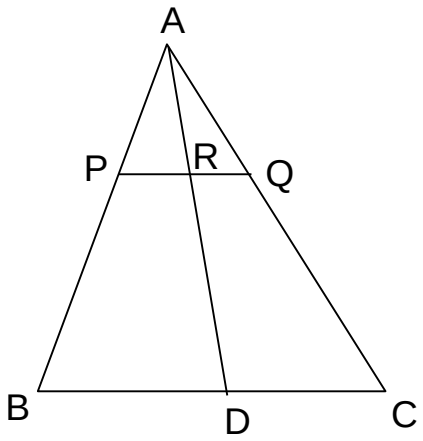
Marking Scheme
Class X Session 2024-25
MATHEMATICS STANDARD (Code No.041)

TIME: 3 hours MAX.MARKS: 80

Q.No.	Section A	Marks
1.	D) -6,6	1
2.	B) -5	1
3.	D) From a point inside a circle only two tangents can be drawn.	1
4.	A) 7	1
5.	B) 20 cm	1
6.	A) $\frac{11}{9}$	1
7.	C) 140^{O}	1
8.	B) $8x^2$- 20	1
9.	C) 30	1
10.	B) isosceles and similar	1
11.	A) Irrational and distinct	1
12.	C) $\frac{3}{\sqrt{3}}$	1
13.	B) $\frac{594}{7}$	1
14.	B) $\frac{3}{8}$	1
15.	B) (-4, 0)	1
16.	A) median	1
17.	C) (3,0)	1
18.	D) $\frac{3}{26}$	1
19.	B)	1
20.	D)	1

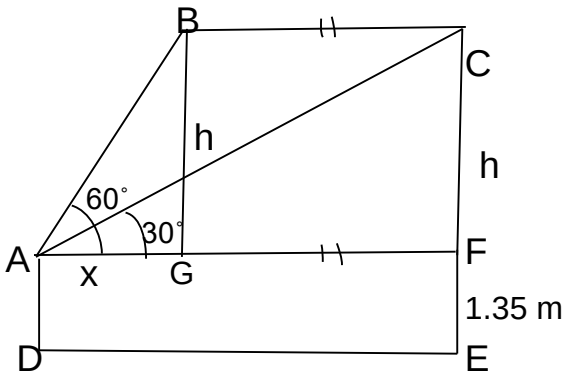
	Section B	
21. (A)	$480 = 2^5 \times 3 \times 5$ $720 = 2^4 \times 3^2 \times 5$ LCM (480,720) = $2^5 \times 3^2 \times 5 = 1440$ HCF (480, 720) = $2^4 \times 3 \times 5 = 240$ OR	½ ½ ½ ½
(B)	85 = 5x17, 238 = 2x7x17 HCF(85, 238) = 17 17 = 85xm -238 m = 3	 1 1
22.(A)	Total number of possible outcomes = 6x6=36 For a product to be odd, both the numbers should be odd. Favourable outcomes are (7,7) (7,9) (7,11) (9,7) (9,9) (9, 11) (11,7) (11,9) (11,11) no. of favourable outcomes = 9 P (product is odd) = $\frac{9}{36}$ or $\frac{1}{4}$ OR	½ 1 ½
(B)	Total number of three-digit numbers = 900. Numbers with hundredth digit 8 & and unit's digit 5 are 805,815, 825,....,895 Number of favourable outcomes = 10 P(selecting one such number) = $\frac{10}{900}$ or $\frac{1}{90}$	½ 1 ½
23.	$\frac{2\ (\frac{\sqrt{3}}{2})^2 - (\frac{1}{\sqrt{3}})^2}{(\sqrt{2})^2} = \frac{7}{12}$	1 ½ ½
24	Let the required point be (x,0) $\sqrt{(8-x)^2 + 25} = \sqrt{41}$ => $(8-x)^2 = 16$ => 8 - x = ±4 => x = 4 , 12 Two points on the x-axis are (4,0) & (12,0).	½ ½ 1

25.	AB = $\sqrt{(3+5)^2 + (0-6)^2}$ = 10 BC = $\sqrt{(9-3)^2 + (8-0)^2}$ = 10 AC = $\sqrt{(9+5)^2 + (8-6)^2}$ = $10\sqrt{2}$ Since AB = BC, therefore Δ ABC is isosceles	½ ½ ½ ½
	Section C	
26.(A)	 Since D, E, F are the mid points of BC, CA, AB respectively Therefore, EF||BC, DF||AC, DE||AB BDEF is a parallelogram $\angle$ 1= $\angle$ 2 & $\angle$ 3 = $\angle$ 4 Δ FBD ~ Δ DEF Also, DCEF is a parallelogram $\angle$ 3= $\angle$ 6 & $\angle$ 1 = $\angle$ 2 (proved above) Δ DEF ~ Δ ABC	1 1 1
	OR	
(B)	 Since PQ//BC therefore Δ APR ~ Δ ABD => $\frac{AP}{AB} = \frac{PR}{BD}$ …….. (i)	1

	Δ AQR ~ Δ ACD => $\frac{AQ}{AC} = \frac{RQ}{DC}$ …….. (ii) Now, $\frac{AP}{AB} = \frac{AQ}{AC}$ …….(iii) Using (i), (ii) & (iii), $\frac{PR}{BD} = \frac{RQ}{DC}$ But, BD = DC => PR = RQ or AD bisects PQ	1 1
27.	Let the numbers be x and 18-x. $\frac{1}{x} + \frac{1}{18-x} = \frac{9}{40}$ => 18×40 = 9x(18-x) => x^2 -18 x + 80=0 => (x-10)(x-8) =0 => x=10, 8. => 18-x =8, 10 Hence two numbers are 8 and 10.	½ 1 1 ½
28.	From given polynomial $\alpha + \beta = \frac{5}{6}$, $\alpha\beta = \frac{1}{6}$ $\alpha^2 + \beta^2 = (\frac{5}{6})^2 - 2 \times \frac{1}{6} = \frac{13}{36}$ And $\alpha^2 \beta^2 = (\frac{1}{6})^2 = \frac{1}{36}$ $x^2 - \frac{13}{36}x + \frac{1}{36}$ ⇨ Required polynomial is $36x^2 - 13x + 1$	1 1 ½ ½
29.	$(cos\theta + sin\theta)^2 + (cos\theta - sin\theta)^2 = 2\,(cos^2\theta + sin^2\theta) = 2$ => $(1)^2 + (cos\theta - sin\theta)^2 = 2$ => $(cos\theta - sin\theta)^2 = 1$ => $cos\theta - sin\theta = \pm 1$	1 ½ 1 ½
30.(A)	Angle described by minute hand in 5 min = 30°. length of minute hand =18 cm = r. Area swept by minute hand in 35 minutes =($\frac{22}{7}$x18x18×$\frac{30}{360}$) x 7 = 594 cm^2. OR	2 1
(B)	Area of minor segment = Ar. Sector OAB- Ar. Δ OAB =$\frac{90}{360}$x $\frac{22}{7}$ × 14x14 - $\frac{\sqrt{3}}{4}$ x 14x14 = 69.23 cm^2	2 1

31.	Let √3 be a rational number. $\therefore \sqrt{3} = \frac{p}{q}$, where q≠0 and let p & q be co-prime. $3q^2 = p^2 \Longrightarrow p^2$ is divisible by 3 $\Longrightarrow$ p is divisible by 3 ----- (i) $\Longrightarrow$ p = 3a, where 'a' is some integer $9a^2 = 3q^2 \Longrightarrow q^2 = 3a^2 \Longrightarrow q^2$ is divisible by 3 $\Longrightarrow$ q is divisible by 3----- (ii) (i) and (ii) leads to contradiction as 'p' and 'q' are co-prime.	½ 1 1 ½
	Section D	
32.(A)	x+2y=3, 2x-3y+8=0 Correct graph of each equation Solution x=-1 and y=2	2+2 = 4 1
	OR	
(B)	Let car I starts from A with speed x km/hr and car II Starts from B with speed y km/hr (x>y) Case I- when cars are moving in the same direction. Distance covered by car I in 9 hours = 9x. Distance covered by car II in 9 hours = 9y Therefore 9 (x-y) = 180 => x-y= 20 ……. (i) case II- when cars are moving in opposite directions. Distance covered by Car I in 1 hour = x Distance covered by Car II in 1 hour = y Therefore x + y=180 …….. (ii) Solving (i) and (ii) we get, x=100 km/hr, y=80 km/hr.	2 2 1
33.	Correct given, to prove, construction, figure Correct proof AR = AQ = 7cm BP = BR = AB-AR = 3cm CP =CQ = 5cm BC = BP+PC = 3+5 = 8 cm	1 2 ½ ½ ½ ½

34.



Let A be the eye level & B, C are positions of balloon
Distance covered by balloon in 12 sec = 3x12 = 36 m
BC = GF = 36 m

Correct figure 1mark

1

tan 60^0 = $\sqrt{3}$ = $\frac{h}{x}$
=> h = $x\sqrt{3}$ …….. (i)

1

1

tan 30^0 = $\frac{1}{\sqrt{3}}$ = $\frac{h}{x+36}$
=> h = $\frac{x+36}{\sqrt{3}}$ …….. (ii)
Solving (i) and (ii) h= $18\sqrt{3}$ = 31.14 m
Height of balloon from ground = 1.35 + 31.14 = 32.49 m

1

35.

Class	x	f	u=$\frac{x-102.5}{5}$	fu	cf
85-90	87.5	15	-3	-45	15
90-95	92.5	22	-2	-44	37
95-100	97.5	20	-1	-20	57
100-105	102.5	18	0	0	75
105-110	107.5	20	1	20	95
110-115	112.5	25	2	50	120
		Σf = 120		Σfu = -39	

Correct table 2marks

Mean = $\bar{x}$ = 102.5 - 5 x $\frac{39}{120}$
= 100.875

1

Median class is 100-105

½

Median = 100 + $\frac{5}{18}$ (60-57) = 100.83

½

1

OR

Monthly Expenditure	f_i	x_i	f_ix_i
1000-1500	24	1250	30,000
1500-2000	40	1750	70,000
2000-2500	33	2250	74,250
2500-3000	**X=28**	**2750**	**77,000**
3000-3500	30	3250	97,500
3000-4000	22	3750	82,500
4000-4500	16	4250	68,000
4500-5000	7	4750	33,250

Correct table 2marks

172+x=200 — 1

X=28 — 1

Mean= $\frac{532500}{200}$

= 2662.5 — 1

Section E

36.(i) First term a = 3, A.P is 3, 6, 9, 12…..,24 — ½

common difference d = 6-3 = 3 — ½

(ii) 34 = 3+ (n-1)3

=> n = 34/3 = $11\frac{1}{3}$ which is not a positive integer. — ½

Therefore, it is not possible to have 34 jars in a layer if the given pattern is continued. — ½

(iii)(A) — ½

$S_n = \frac{n}{2}$ [2x3 + (n-1) 3]

$= \frac{n}{2}$ [6 + 3n-3] — 1

$= \frac{n}{2}$ [3+3n]

$= 3\frac{n}{2}$ [1+n]

$s_8 = 3 \times \frac{8}{2}$ (1+8) — ½

= 108

OR

(iii) (B)

A.P will be 6, 9, 12, ….. — ½

a= 6, d=3

t_5 = 6 + (5-1)3 — 1

= 6 + 12

= 18 — ½

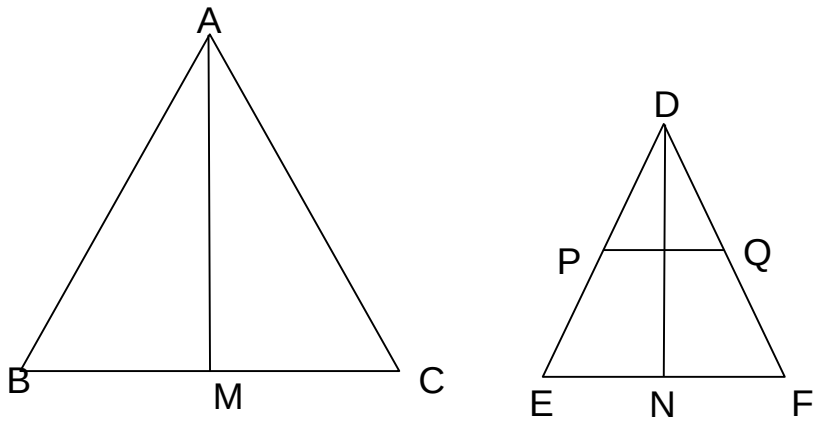
37. (i) ∠DPQ = ∠DEF

∠PDQ =∠EDF — 1

(ii) Therefore Δ DPQ ~ Δ DEF

DE = 50 + 70 = 120 cm — ½

$\frac{DP}{DE} = \frac{PQ}{EF}$

(iii) (A)	Therefore $\frac{PQ}{EF} = \frac{50}{120}$ or $\frac{5}{12}$ $\frac{AB}{DE} = \frac{5}{2} = \frac{BC}{EF} = \frac{AC}{DF}$ $\Rightarrow$ AB = $\frac{5}{2}$ DE $\frac{perimeter\ of\ \triangle ABC}{perimeter\ of\ \triangle DEF} = \frac{\frac{5}{2}(DE+EF+FD)}{DE+EF+FD} = \frac{5}{2}$ (Constant) OR	½ 1 1
(iii)(B)	 $\frac{AB}{DE} = \frac{BC}{EF} = \frac{BC/2}{EF/2} = \frac{BM}{EN}$ Also ∠B =∠E Therefore △ ABM ~ △ DEN.	Correct fig. ½ mark 1 ½
38. (i)	l= $\sqrt{r^2 + h^2}$ = $\sqrt{(1.5)^2 + (2)^2}$ = $\sqrt{2.25 + 4}$ = $\sqrt{6.25}$ = 2.5 m	½ ½
(ii)	CSA of cone = Πrl = $\frac{22}{7}$ x 1.5 x 2.5 = 11.78 m^2	½ ½
(iii) (A)	CSA of cylinder = 2Π rh = 2 x $\frac{22}{7}$ x 1.5 x 7 = 66 m^2 Cost of metal sheet used = 66 x 2000 = ₹1,32,000	1 1
(iii) (B)	OR Volume of cylinder = Π r^2 h = $\frac{22}{7}$ x $(1.5)^2$ x 7 = 49.5 m^3	½

	Volume of cone = $\frac{1}{3}\Pi r^2$ h =$\frac{1}{3}$ x $\frac{22}{7}$ x $(1.5)^2$ x 2 = 4.71 m^3 Total capacity = 49.5 + 4.71 = 54.21 m^3	1 ½