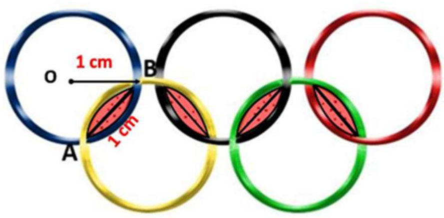
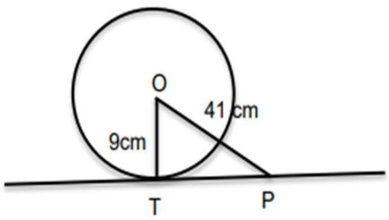
C.B.S.E. New Delhi, **MATHEMATICS-Standard** **SOLUTIONS**

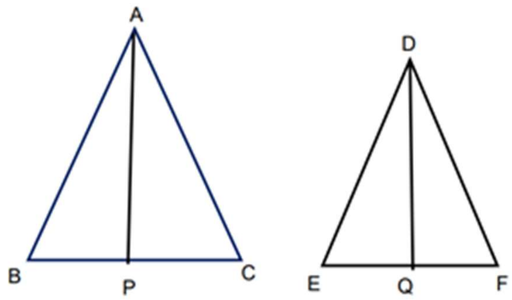
Class: **X** **2025-26**

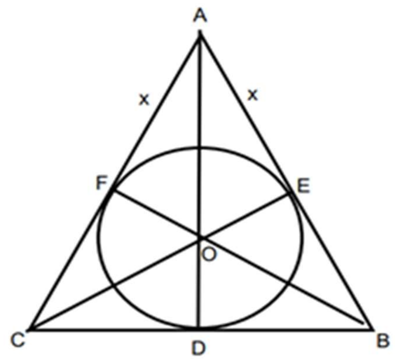
MM: **80**

Q.No.	Section A	Marks
1.	(C) 3 LCM$(a,b,c) = 2^2 \times 3^x \times 5 \times 7 = 3780$ $140 \times 3^x = 3780$ $3^x = 27 = 3^3$ $x = 3$	**1**
2.	(A) 2 As shortest distance from (2, 3) to y-axis is the x coordinate, i.e., 2.	**1**
3.	(B) k$\neq\frac{15}{4}$ $\frac{3}{2}\neq\frac{2k}{5}$, hence k$\neq\frac{15}{4}$	**1**
4.	(C) 6cm AB+CD=AD+BC AB+4=3+7 AB=6cm	**1**
5.	(D) $\frac{1}{x}$ $\frac{1}{sec\theta+tan\theta} = \frac{(sec\theta-tan\theta)}{(sec\theta+tan\theta)(sec\theta-tan\theta)} = \frac{(sec\theta-tan\theta)}{1}$ = secΘ-tanΘ	**1**
6.	(D) $(x+2)(x+1) = x^2+2x+3$, so, $x^2+3x+2 = x^2+2x+3$ gives $x-1=0$ It's not a quadratic equation.	**1**
7.	D) 8[$\frac{\pi}{6}$ - $\frac{\sqrt{3}}{4}$] cm^2  Required Area=8 × area of one segment (with r = 1cm and $\theta = 60^\circ$) =8x ($\frac{60^\circ}{360^\circ}$ x π x $1^2 - \frac{\sqrt{3}}{4}$ x 1^2) = 8[$\frac{\pi}{6} - \frac{\sqrt{3}}{4}$] cm^2	**1**

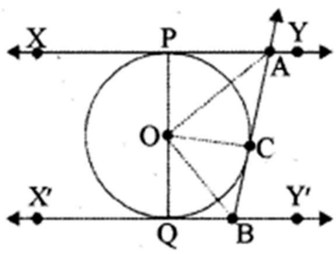
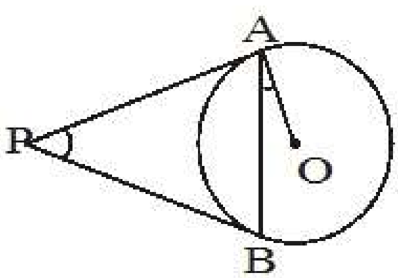
	For Visually Impaired candidates: (D) 9πcm^2 area of circle=$\pi(3^2)$ =9 π cm^2	
8.	(B) $\frac{31}{36}$ Probability of getting sum 8 is $\frac{5}{36}$ Probability of not getting sum 8 is $\frac{31}{36}$	**1**
9.	(B) $12°$ $\sin 5x \ = \frac{\sqrt{3}}{2}$ So, $5x \ = \ 60°$ And hence $x \ = 12°$	**1**
10.	(C) 4 Since HCF=81, the numbers can be 81x and 81y 81x +81y =1215 x + y =15 which gives four pairs as (1,14), (2,13), (4,11), (7,8)	**1**
11.	(D) 5cm $\pi r^2 = 51$ V=$\frac{1}{3}\times\ \pi r^2 \times$ h 85 =$\frac{1}{3}\times\ 51\ \times$ h h= $\frac{85}{17} = 5cm$	**1**
12.	(D) As for equal roots to the corresponding equation, b^2 =4ac Hence ac = $\frac{b^2}{4}$ And hence ac > 0⇒ c and a must have same signs	**1**
13.	(C) 231 Area of sector $= \frac{1}{2} \times l \times$ r $= \frac{1}{2} \times 22 \times 21$ = 231cm^2	**1**

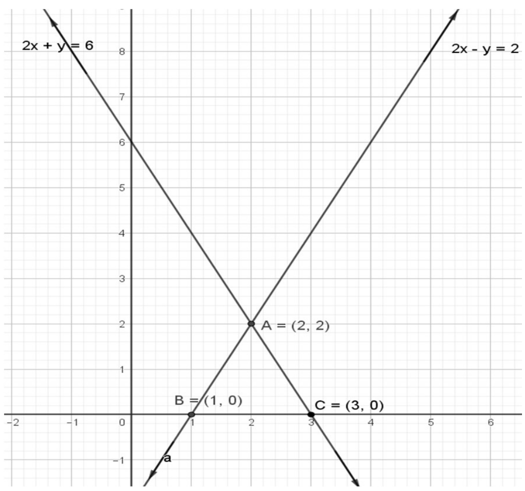
14.	(C) 18cm $\Delta ABC \sim \Delta DEF$ $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF} = \frac{Perimeter\ of\ \Delta ABC}{Perimeter\ of\ \Delta DEF}$ $\frac{6}{9} = \frac{Perimeter\ of\ \Delta ABC}{27}$ Perimeter of ∆ ABC= 18cm	**1**
15.	(B) $\frac{9}{4}$ Probability of getting vowels in the word Mathematics is $\frac{4}{11}$, So, $\frac{2}{2x+1} = \frac{4}{11}$ $\Rightarrow x = \frac{9}{4}$	**1**
16.	(C) Parallelogram By visualising the figure by plotting points in co-ordinate plane it can be concluded it is a Parallelogram.	**1**
17.	(A) median is increased by 2	**1**
18.	(A) 40cm  Since, tangent is perpendicular to the radius at the point of contact In ∆OPT, right angled at T $OP^2=OT^2+TP^2$ $41^2=9^2+TP^2$ $TP^2= 1681-81=1600$ TP=40cm	**1**
19.	(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)	**1**
20.	(A) $\cos A+\cos^2 A=1$ ---------(i) gives $\cos A= \sin^2 A$------(ii) (using $\sin^2 A+ \cos^2 A=1$) Substituting value of cos A from (ii) in (i) $\sin^2 A +\sin^4 A=1$ ∴ Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)	**1**

(Section – B)		
21. **(A)**	n =60, a =8 and d=2 t_{60}= 8 + 59(2) =126 t_{51}= 108 Hence t_{51} + t_{52}+……..+ t_{60}= $\frac{10}{2}$(108 +126) =1170	½ ½ **1**
	OR	
(B)	230 = 6 + (n -1)7 gives n=33 ∴ Middle Term = t_{17}= 6 + (16)(7) = 118	**1** **1**
22.	A+B = 90° and A – B= 30° A=60° and B =30°	**1** **1**
23.	 △ABC~△DEF ⇒$\frac{AB}{DE}$ =$\frac{BC}{EF}$ $\frac{AB}{DE}$ =$\frac{2B}{2EQ}$ (AP and DQ are the medians) $\frac{AB}{DE}$ =$\frac{BP}{EQ}$ In △ABP and △DEQ $\frac{AB}{DE}$ =$\frac{BP}{EQ}$ ∠B=∠E (△ABC~△DEF) ⇒△ABP ~△DEQ Hence, $\frac{AB}{DE}$ = $\frac{AP}{DQ}$	½ ½ ½ ½
24.(A)	area of grass field that can be grazed by them =$\frac{\theta_1}{360°} \times \pi\, r^2$ +$\frac{\theta_2}{360°} \times \pi\, r^2$ + $\frac{\theta_3}{360°}\, x\, \pi\, r^2$ =$\frac{\pi r^2}{360°}$ $(\theta_1 + \theta_2 + \theta_3)$ =$\frac{\pi\, r^2}{360°} \times 180^{\circ}$ = $\frac{22}{7} \times \frac{14\ X\ 14}{2}$ =308 m^2	**1** **1**

	OR	
(B)	Area of minor segment= Area of sector − area of triangle $=\frac{90^\circ}{360^\circ}\pi r^2 - \frac{1}{2}\times r^2$ $=(\frac{25}{4}\pi - \frac{25}{2})$ cm^2 Area of major segment = Area of circle – Area of minor segment $= \pi 5^2 - (\frac{25}{4}\pi - \frac{25}{2})$ $= 25\pi - \frac{25}{4}\pi + \frac{25}{2}$ $= (\frac{75}{4}\pi + \frac{25}{2})$ cm^2	**1** **1**
25.	 Let r be the radius of the inscribed circle BD=BE=10cm CD=CF=8cm Let AF=AE= x ar(△ABC) =ar(△AOC) + ar(△BOC) + ar(△AOB) $=\frac{1}{2}\times$ r x AC + $\frac{1}{2}\times r\times$ BC +$\frac{1}{2}\times r\times$ AB 90 $= \frac{1}{2}\times 4\ (x + 8 + 18 + x + 10)$ x = 4.5cm ∴ AB=4.5+10=14.5cm AC=4.5+8=12.5cm **For Visually Impaired candidates:** $AC^2=AB^2+BC^2= 24^2+7^2=625$ AC=25cm Area of ΔABC=$\frac{1}{2}\times 7\times 24=84$cm^2 -----(i) Let r=radius of circle Also, Area of ΔABC=$\frac{1}{2}$ (24r+25r+7r) $=\frac{1}{2}\times 56$ r --------(ii) From (i) and (ii), we get r=3cm	½ ½ ½ ½ ½ ½ ½ ½

(Section – C)

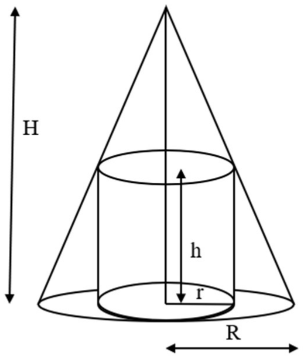
Q. No.	Solution	Marks
26.		
	In ΔAPO and ΔACO	
	AP=AC (Tangents from External Point)	
	AO=AO (common)	
	OP=OC (radii)	
	$\Delta APO \cong \Delta ACO$	1
	$\angle POQ=180^\circ$ (PQ is the diameter)	
	$\angle POA+\angle COA+\angle QOB+\angle COB=180^\circ$	1
	$2\angle COA+2\angle COB=180^\circ$	
	$\angle AOB = 90^\circ$	1
	For Visually Impaired candidates:	
		
	PA=PB (Tangents from external point to a circle)	
	$\angle PAB=\angle PBA= x$ (angles opposite to equal sides)	½
	In ΔPAB, $\angle PAB+\angle PBA+\angle APB=180^\circ$	
	$x + x +\angle APB=180^\circ$	
	$\angle APB=180^\circ-2x$ ------(i)	
	Also,	1
	$\angle PAB+\angle OAB=90^\circ$ (radius is perpendicular to the tangent at the point of contact)	
	$x +\angle OAB=90^\circ$	
	$x =90^\circ-\angle OAB$ --------(ii)	
	Substituting (ii) in (i), we get	1
	$\angle APB=180^\circ-2(90^\circ-\angle OAB)$	
	$\angle APB=2\angle OAB$	½
27.	HCF (36,60,84) =12	**1 ½**
	Required number of rooms= $\frac{36}{12}+\frac{60}{12}+\frac{84}{12}$	**1**
	=3+5+7	
	=15	½
28.	$2x^2-(1+2\sqrt{2})x+\sqrt{2}$	
	$= 2x^2 - x - 2\sqrt{2}x + \sqrt{2}$	1
	$= (2x-1)(x-\sqrt{2})$ Hence the zeroes are $\frac{1}{2}$ and $\sqrt{2}$.	1
	Now $\frac{-b}{a} = \frac{2\sqrt{2}+1}{2} = \sqrt{2}+\frac{1}{2}$ and $\frac{c}{a} = \frac{\sqrt{2}}{2} = \frac{1}{2}\times\sqrt{2}$	1

29.	$sin\theta + cos\theta = \sqrt{3}$ gives $(sin\theta + cos\theta)^2 = 3$. Hence $1 + 2sin\theta cos\theta = 3$ So $2sin\theta cos\theta = 2$ $\Rightarrow sin\theta\ cos\theta = 1$ $\therefore \tan\theta + cot\theta = \frac{1}{sin\theta cos\theta}$ =1 **OR** $\frac{cosA-sinA+}{cosA+sinA-} = \frac{(cosA-sinA+\ )(cosA+sinA+1)}{(cosA+sinA-1)(cosA+sinA+\ )}$ $= \frac{cos^2A+2cosA+1-sin^2A}{2sinAcosA}$ $= \frac{2cosA(1+cosA)}{2sinAcosA} = \frac{1+cosA}{sinA} = cosecA + cotA$	**1** **1** **1** **1** **1** **1**
30.	P(Vidhi drives the car) = $\frac{3}{8}$ as favourable outcomes are HHT,THH,HHH P(Unnati drives the car) = $\frac{4}{8}$ as favourable outcomes are THT,THH,HTH,TTH As $\frac{4}{8} > \frac{3}{8}$ Unnati has greater probability to drive the car	**1** **1** **1**
31.	Let the income of Aryan and Babban be $3x$ and $4x$ respectively And let their expenditure be $5y$ and $7y$ respectively. Since each saves ₹ 15,000, we get $3x - 5y = 15000$ $4x - 7y = 15000$ Hence $x = 30000$ Their income thus become ₹90,000 and ₹1,20,000 respectively. **OR** 	**1** **1** **1** **2 for correct Graph**

	Hence, the solution is $x = 2, y = 2$ Area= 2 sq. units **For Visually Impaired candidates** Let the present age of father be x and son be y So, $(x + 5) = 3(y + 5) \Rightarrow x - 3y = 10$ $x - 5 = 7(y - 5) \Rightarrow x - 7y = -30$ So, $x = 40, y = 10$. Hence the present ages of father and son are 40 years and 10 years Respectively	½ ½ **1** **1** **1**
Section D		
32.	Let the original speed of train be x km/hr Distance =63km, time(t_1) =$\frac{63}{x}$ hrs Faster speed = (x +6) km/hr time (t_2)=$\frac{72}{x+6}$ hrs Now t_1 + t_2 = 3 hrs So $\frac{63}{x} + \frac{72}{x+6} = 3$ $63(x + 6) + 72x = 3(x + 6)x$ $135x + 378 = 3x^2 + 18x$ $3x^2 - 117x - 378 = 0$ $x^2 - 39x - 126 = 0$ $x^2 - 42x + 3x - 126 = 0$ gives $(x + 3)(x - 42) = 0$ As x can't be negative, so $x = 42$ km/hr The original speed of train=42 km/hr	 **1** **1** **1** **1** **1**
33.	Correct given, figure and construction Correct Proof since LM is parallel to QR Let PM= x $\frac{PL}{PQ} = \frac{PM}{PR}$ $\frac{5.7}{15.2} = \frac{x}{x+5.5}$ x =PM=3.3cm	**2** **2** ½ ½

34.

(A)



Slant height of the cone $L = \sqrt{R^2 + H^2} = \sqrt{12^2 + 6^2}$
$= 3\sqrt{20}\ cm$ — ½

Curved Surface area of cone= $\pi RL = \pi \times 12 \times 3\sqrt{20}$
$= (36\sqrt{20})\ \pi\ cm^2$ — 1

Area of base circle of cone (= area of outer circle – area of inner circle + top circular area of cylinder)
$= \pi R^2 = \pi \times (12)^2$
$= 144\pi\ cm^2$ — 1

Curved Surface area of cylinder= $2\pi rh = 2\pi \times 4 \times 3$
$= 24\ \pi\ cm^2$ — 1

Surface area of the remaining solid= Curved surface of cone
+ area of base circle of cone
+ curved surface area of cylinder — 1
$= (36\sqrt{20})\pi + 144\pi + 24\pi$
$= (168 + 36\sqrt{20})\pi\ cm^2$ — ½

OR

(B) Volume of cone= $\frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \times 3 \times 3 \times 12 = 36\pi cm^3$
Volume of ice-cream in the cone= $\frac{5}{6} \times 36\pi cm^3 = 30\pi\ cm^3$ — 2

Volume of ice-cream in the hemispherical part= $\frac{2}{3}\pi r^3 = \frac{2}{3}\pi \times 3 \times 3 \times 3 = 18\pi\ cm^3$ — 1+½
Total volume of the ice-cream = $(30\pi + 18\pi) = 48\ \pi = 150.86 cm^3$ (approx.) — 1+½

35.

(A) Mode of the frequency distribution = 55
Modal class is 45-60. Lower limit is 45 Class Interval (h) =15 — ½
Now, Mode = $l + (\frac{f_1 - f_0}{2f_0 - f_1 - f_2}) \times h$
$55 = 45 + \frac{15-x}{30-x-} \times 5$ — 1
So, $x = 5$ — 1

CI	f_i	x_i	$f_i x_i$
0-15	10	7.5	75
15-30	7	22.5	157.5
30-45	5	37.5	187.5
45-60	15	52.5	787.5
60-75	10	67.5	675
75-90	12	82.5	990
	59		2872.5

— 1 ½

Mean= $\bar{x} = \frac{2872.5}{59} = 48.68$ — 1

	OR **(B)**	

Height (in cm)	**Number of girls**	**Class Interval**	**frequency**
less than 140	04	135-140	4
less than 145	11	140-145	7
less than 150	29	145-150	18
less than 155	40	150-155	11
less than 160	46	155-160	6
less than 165	51	160-165	5

1

Median = l +$\left(\frac{\frac{N}{2}-Cf}{f}\right) x$ h **1**

=145 + $\left(\frac{\frac{51}{2}-11}{18}\right)$×5 **1**

=149.03

Median height = 149.03cm **1**

3×Median= Mode +2× Mean **1**

3×149.03=148.05+2× Mean

Mean=149.52

Section E

36.

(i) Common difference of first progression= 3

Common difference of first progression= −3

Sum of common difference=0. **1**

(ii) t_{34} = 187 +(34-1) (−3)

So, t_{34} =88 **1**

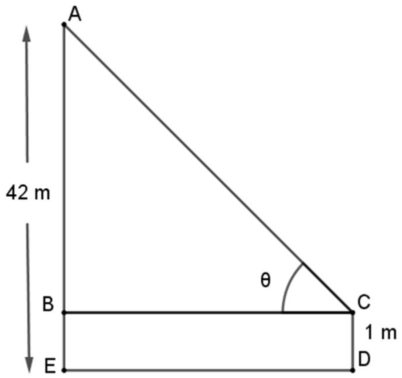
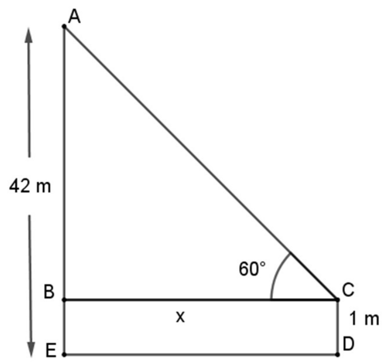
(iii) (A) Sum = $\frac{10}{2}[2(-5) + (10-1)(3)]$ **1**

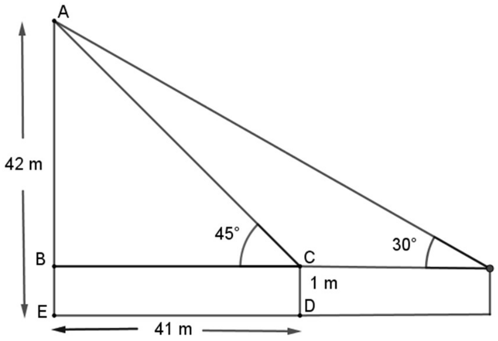
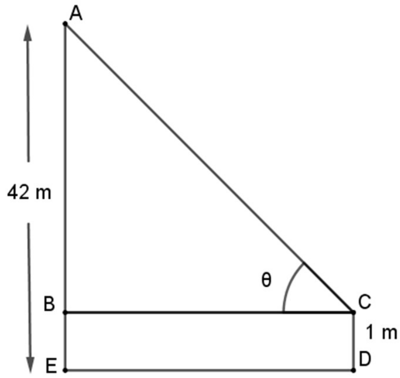
$= 85$ **1**

OR

(B) −5 +(n−1)3 = 187 +(n−1) (−3) **1**

n = 33 **1**

37.	(i) PR= $\sqrt{(8-2)^2+(3-5)^2}$ = $2\sqrt{10}$ (ii) Co-ordinates of Q (4,4). The mid-point of PR is (5,4) $\therefore$Q is not the mid-point of PR (iii) (A) Let the point be (x,0) So, $\sqrt{(2-x)^2+25}$ = $\sqrt{(4-x)^2+16}$ Hence $x = \frac{3}{4}$.Therefore the point is ($\frac{3}{4}$,0). **OR** (B) The coordinates of S will be $\left(\frac{2\times4+3\times2}{2+3}, \frac{2\times4+3\times5}{2+3}\right)$ $= \left(\frac{14}{5}, \frac{23}{5}\right)$	**1** ½ ½ **1** **1** **1** **1**
38.	 (i) Distance from India gate = 41m, Height of monument = 42m, Shreya's height =1m So, $\tan\theta = \frac{41}{41}$ =1 Angle of elevation $= \theta =$ 45°.  (ii) Angle of elevation =60° Perpendicular = 41m Let the distance from the India Gate be x m Hence tan 60°= $\frac{41}{x}$ $\Longrightarrow x = \frac{41}{\sqrt{3}}$ $\therefore$ Shreya is standing at a distance of $\frac{41\sqrt{3}}{3}$ m	 ½ ½ ½ ½

	 (iii) (A) Distance from the India Gate = 41 m Let the distance moved back be x m Then, $\tan 30^{o} = \frac{41}{41+x}$ $x = (41\sqrt{3} - 41)$ m = $41(\sqrt{3}-1)$ m ∴ The distance moved back = $41(\sqrt{3}-1)$ m	**1** **1**
	OR	
	 (B) Let the angle of elevation of be θ Now, $\tan\theta = \frac{41}{\frac{41}{\sqrt{3}}} = \sqrt{3}$ This gives $\theta = 60^{o}$	**1** **1**

Note: This guess paper has been prepared with the aim of helping students score good marks; however, it does not guarantee that the Board examination will contain exactly the same questions.