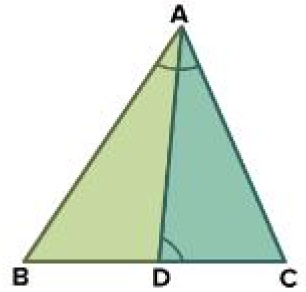
MARKING SCHEME BSEH PRACTICE PAPER 3,10TH MATHS(Standard) , March2024

(ENGLISH MEDIUM)

Q. no.	Expected solutions	marks
	Section-A	
1	(d)2520	1
2	(d) p+1	1
3	(b) -10	
4	(a) $\frac{2}{3}$	1
5	(b) -6lmn	1
6	(b) 7	1
7	(b) 8cm	1
8	(a) 3cm	1
9	one	1
10	0	1
11	False	1
12	$\frac{25}{8}$	1
13	28cm	1
14	(b) $\frac{\theta}{360} \times \pi r^2$	1
15	(a) $4\pi r^2$	1
16	(b) 25	1
17	(b)Mode= 3median-2mean	1
18	(d)$\frac{17}{16}$	1
19	(a)Both Assertion(A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion(A).	1
20	(d) Assertion(A) is false but Reason(R) is true.	1
	SECTION-B	
21.	Here $a_1=3,b_1=-1,c_1=-5$ $a_2=6,b_2=-2,c_2=-k$ …………………………………………………………………………………	1/2

	For no solution; $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ …………………………………………………………………………………………… $\Rightarrow \frac{3}{6} = \frac{-1}{-2} \neq \frac{-5}{-k}$ $\Rightarrow \frac{1}{2} \neq \frac{5}{k}$ …………………………………………………………………………………………… $\Rightarrow k \neq 10$	1/2 1/2 1/2
OR 21	$x + y + 40^0 = 180^0$ [sum of all angles of a triangle] $\Rightarrow x + y = 140^0$ ....(1) $x - y = 30^0$ .....(2) …………………………………………………………………………………………… By solving the equation (1) $y = 140^0 - x$...(3) Substitute $y = 40^0 - x$ in equation (2), we get $x - (140^0 - x) = 30^0$ $2x - 140^0 = 30^0$ …………………………………………………………………………………………… $2x = 30^0 + 140^0$ $2x = 170^0$ $x = 85^0$ …………………………………………………………………………………………… Substituting $x = 85^0$ in equation (3), we get $y = 140^0 - 85^0$ $y = 55^0$ Thus, $x = 85^0$, $y = 55^0$	1/2 1/2 1/2 1/2
22.		



1/2

………

In ΔABC and ΔDAC

∠BAC = ∠ADC (Given in the statement)

∠ACB = ∠ACD (Common angles) 1/2

⇒ ΔABC ~ ΔDAC (AA criterion)

………

If two triangles are similar, then their corresponding sides are proportional

⇒ CA / CD = CB / CA 1/2

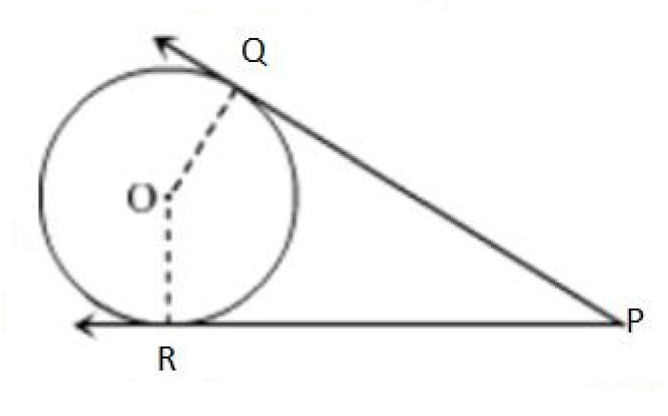
………

1/2

⇒ $CA^2 = CB \times CD$

Hence, proved.

23.



1/2

	…………………………………………………………………………………………… Since tangent at a point to a circle is perpendicular to the radius through the point $\therefore OQ \perp QP$ $\& OR \perp RP$ $\Rightarrow \angle OQP=90^\circ \& \angle ORP=90^\circ$ $\Rightarrow \angle OQP+\angle ORP=90^\circ+90^0=180^\circ----(i)$ …………………………………………………………………………………………… In quadrilateral, OQPR, $\angle OQP+\angle QPR+\angle QOR+\angle ORP=360^0$ $\Rightarrow(\angle QPR+\angle QPR)+(\angle OQP+\angle ORP)=360^\circ$ $\Rightarrow\Rightarrow\angle QPR+\angle QOR + 180^0= 360^0$ (From(i) …………………………………………………………………………………………… $\Rightarrow\angle QPR+\angle QOR=180\circ--------(ii)$ From (i)&(ii), we can say that quadrilateral QORP is cyclic**.**	1/2 1/2 1/2
24.	$\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}=\frac{1-\sin^2\theta}{1-\cos^2\theta}$ …………………………………………………………………………… $= \frac{\cos^2\theta}{\sin^2\theta}=$ …………………………………………………………………… $=\cot^2\theta$ $=\left(\frac{7}{8}\right)^2$ …………………………………………………………………………… $=\frac{49}{64}$	1/2 1/2 1/2 1/2
OR 24.	We know that $\sin^2\theta + \cos^2\theta = 1$	1/2

	………	
	Let us cube on both sides	
	$(\sin^2 \theta + \cos^2 \theta)^3 = 1$	1/2
	………	
	By using the algebraic identity	
	$(a + b)^3 = a^3 + b^3 + 3ab\,(a + b)$	
	$(\sin^2 \theta)^3 + (\cos^2 \theta)^3 + 3 \sin^2 \theta \cos^2 \theta\, (\sin^2 \theta + \cos^2 \theta) = 1$	1/2
	………	
	So we get	
	$\sin^6 \theta + \cos^6 \theta + 3 \sin^2 \theta \cos^2 \theta = 1$	1/2
	Therefore, it is proved.	
25.	We have to find the area of the shaded region.	
	From the figure,	
	Here, radius = 21 cm	
	Area of sector = $\pi r^2\theta/360°$	
	$\theta_1 + \theta_2 + \theta_3 + \theta_4 = 360°$	1/2
	………	
	Therefore area of shaded region = $\pi r_1^2\theta_1/360° + \pi r_2^2\theta_2/360° + \pi r_3^2\theta_3/360° + \pi r_4^2\theta_4/360°$	1/2
	………	
	$= \pi r^2\,(\theta_1 + \theta_2 + \theta_3 + \theta_4)\,/360°$ $\quad \because r_1 = r_2 = r_3 = r_4$	
	$= (22/7)(21)^2(360°)/360°$	

	= (22)(3)(21) .... Area of the shaded region = 1386 cm^2 Therefore, the area of the shaded region is 1386 cm^2	1/2 1/2
	SECTION-C	
26.	Let's assume that 3 + 2√5 is rational. .... If 3 + 2√5 is rational that means it can be written in the form of a/b where a and b are integers that have no common factor other than 1 and b ≠ 0. 3 + 2√5 = a/b .... b(3 + 2√5) = a 3b + 2√5b = a .... 2√5b = a - 3b √5 = (a - 3b)/2b .... Since (a - 3b)/2b is a rational number, then √5 is also a rational number. .... But, we know that √5 is irrational. Therefore, our assumption was wrong that 3 + 2√5 is rational. Hence, 3 + 2√5 is irrational.	1/2 1/2 1/2 1/2 1/2 1/2
27.	$x^2 + \frac{1}{6}x - 2 = \frac{1}{6}(6x^2 + x - 12) = \frac{1}{6}(3x-4)(2x+3)$ Hence, $\frac{4}{3}$ and $\frac{-3}{2}$ are the zeroes of the given polynomial. .... Sum of zeroes= $\frac{4}{3} + \left(\frac{-3}{2}\right) = \frac{-1}{6} = \frac{-\text{coefficient of x}}{\text{coefficient of } x^2}$	1 1

……………………………………………………………………………………………………

Product of zeroes = $\frac{4}{3}\times\left(\frac{-3}{2}\right) =-2 = \frac{\text{constant term}}{\text{coefficient of x}^2}$ 1

28. Given linear equations are:

x – y +1 = 0

3x +2y -12=0

From eq. (i)
y = x + 1

x	-1	0
y	0	1

1

Points are (–1, 0) and (0, 1).

………………………………………………………………………………………………………

From(ii), 3x +2y -12=0⇒
y= $\frac{12-3x}{2}$

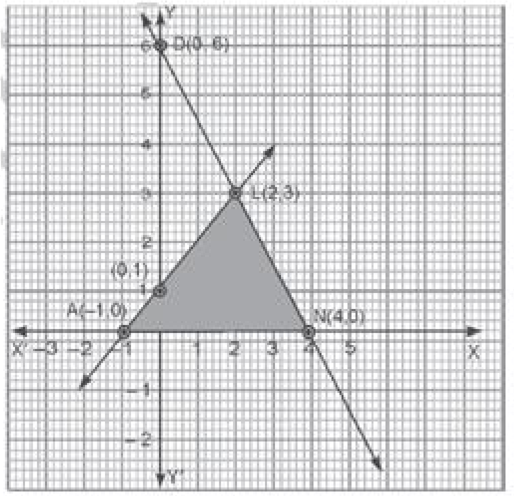
x	4	0
y	0	6

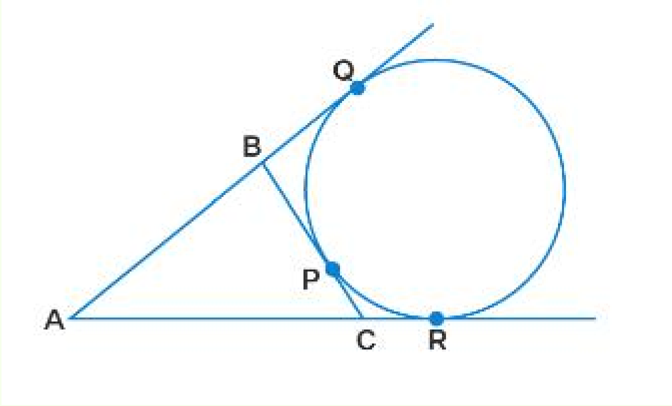
1

Points are (4, 0) and (0, 6).

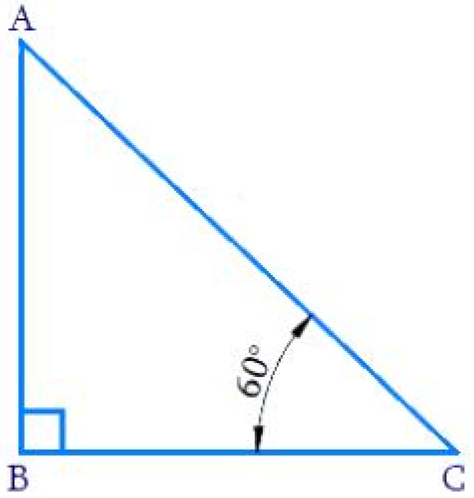
……………………………………………………………………………………………………

We plot these points and draw the lines.

	 .... From the graph, we see that the vertices of the required triangle are A(–1, 0), N(4, 0) and L(2, 3).	1/2 1/2
OR 28.	Let unit's digit be y and ten's digit be x.Then number is 10x+y and number obtained on reversing the digits is 10y+x .... given x + y =9........(i)	1/2 1/2

	and 9(10x+y) =2(10y+x) ⇒ 90x+9y=20y+2x ⇒ 88x-11y=0⇒8x-y=0............(ii)	1/2
	Adding (i) and (ii),we get x+ y +8x-y=9+0 ⇒ 9x=9 ⇒ x=1	1/2
	Substituting the value of x in (i),we get y=8	1/2
	Hence, the number is 18.	1/2
29.		1/2
	Given: A circle touching the side BC of ΔABC at P and AB, AC produced at Q and R respectively. To Prove: AQ=1/2(Perimeter of ΔABC)	1/2
	Proof: Lengths of tangents drawn from an external point to a circle are equal. ⇒AQ = AR, BQ = BP, CP = CR.	1/2
	Perimeter of Δ ABC = AB + BC + CA = AB + (BP + PC) + (AR - CR)	1/2
	= (AB + BQ) + (PC) + (AQ - PC) [∵AQ = AR, BQ = BP, CP = CR]	1/2
	= AQ + AQ	

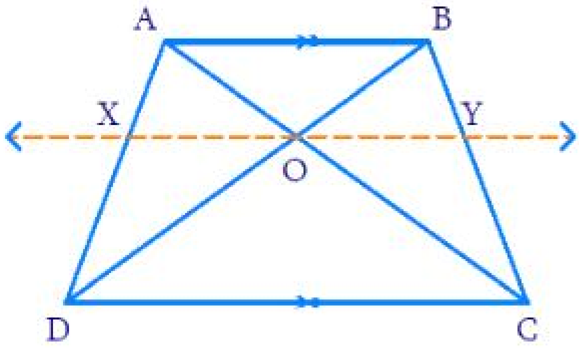
	= 2AQ ⇒AQ=1/2 (Perimeter of ΔABC) ∴AQ is the half of the perimeter of ΔABC.	1/2
30.	LHS=$\frac{\sin\theta-\cos\theta+1}{\sin\theta+\cos\theta-1}=\frac{\frac{\sin\theta-\cos\theta+1}{\cos\theta}}{\frac{\sin\theta+\cos\theta-1}{\cos\theta}}$ …………………………………………………………………………………… $=\frac{\tan\theta-1+\sec\theta}{\tan\theta+1-\sec\theta}=$ …………………………………………………………………………………… $=\frac{(\tan\theta+\sec\theta)-1}{(\tan\theta-\sec\theta)+1}$ $=\frac{\{(\tan\theta+\sec\theta)-1\}(\sec\theta-\tan\theta)}{\{(\tan\theta-\sec\theta)+1\}(\sec\theta-\tan\theta)}=$ …………………………………………………………………………………… $=\frac{(\sec^2\theta-\tan^2\theta)-(\sec\theta-\tan\theta)}{(\tan\theta-\sec\theta+1)(\sec\theta-\tan\theta)}=$ …………………………………………………………………………………… $=\frac{(1-\sec\theta+\tan\theta)}{(\tan\theta-\sec\theta+1)(\sec\theta-\tan\theta)}$ $\{\because\ \sec^2\theta-\tan^2\theta=1\}$ …………………………………………………………………………………… $=\frac{1}{\sec\theta-\tan\theta}$	1/2 1/2 1/2 1/2 1/2 1/2
Or 30	We take the height of the flying kite as AB, the length of the string as AC, and the inclination of the string with the ground at ∠C.	

		1/2
	In ΔABC, $\sin C = AB / AC$ $\sin 60° = 60/AC$	1/2
	$\sqrt{3}/2 = 60/AC$	1/2
	$AC = (60 \times 2/\sqrt{3})$	1/2
	$= (120 \times \sqrt{3}) / (\sqrt{3} \times \sqrt{3})$ $= 120\sqrt{3}/3$	1/2
	$= 40\sqrt{3}$ Length of the string $AC = 40\sqrt{3}$ m.	1/2
31.	Total discs are 90,numbered from 1 to 90.	

	(i)Favourable two-digit numbered discs are 81(10,11,12,..........,90) ∴ probability of getting a two digit numbered disc $=\frac{81}{90}=\frac{9}{10}$	1
	(ii)Favourable cases for a perfect square number are 9 (1,4,9,16,25,36,49,64,81) ∴ probability of getting a perfect square numbered disc $=\frac{9}{90}=\frac{1}{10}$	1
	(iii) Favourable cases for a number divisible by 5 are 18 (5,10,15,.....,90) ∴ probability of getting a disc numbered divisible by 5 $=\frac{18}{90}=\frac{1}{5}$	1
	SECTION-D	
32.	In a right triangle, altitude is one of the sides. Let the base be x cm. The altitude will be (x - 7) cm. .... We can now apply the Pythagoras theorem to the given right triangle. Pythagoras theorem: Hypotenuse^2 = (side 1)^2 + (side 2)^2 $(13)^2 = x^2 + (x - 7)^2$ .... $169 = x^2 + x^2 - 14x + 49$ $169 = 2x^2 - 14x + 49$ $2x^2 - 14x + 49 -169 = 0$ $2x^2 - 14x - 120 = 0$ $(2x^2 - 14x - 120) / 2 = 0$ $x^2 - 7x - 60 = 0$ .... $x^2 - 12x + 5x - 60 = 0$ .... $x(x - 12) + 5 (x - 12) = 0$	1/2 1 1 1/2

	(x + 5) (x - 12) = 0	
	x - 12 = 0 and x + 5 = 0	1
	x = 12 and x = - 5	
	....	
	We know that the value of the base cannot be negative.	
	Therefore, Base = 12 cm, Altitude = 12 - 7 = 5 cm	1
OR 32.	Let Breadth = x.	
	Given that length is twice its breadth.	
	Length of the rectangle = 2x.	
	And given that Area of rectangle = 800 m^2	1
	....	
	But Area of rectangle = l x b = 2x × x	1/2
	....	
	$\Rightarrow 2x^2 = 800m^2$	1
	....	
	$\Rightarrow x^2 = 400m^2$	
	$\Rightarrow x = 20$ m (-20 is rejected.)	1
	....	
	∴ Length of the rectangle = 2x = 40 m.	
	Breadth of the rectangle = x = 20 m.	1
	....	
	∴ It is possible to design a rectangular mango grove.	1/2

33.



1/2

……

In trapezium ABCD,

AB || CD 1/2

Also, AC and BD intersect at ‘O’

……

Construct XY parallel to AB and CD (XY || AB, XY || CD) through ‘O’ 1/2

……

In ΔABC

OY || AB (construction)

∴ BY/CY = AO/OC................. (1) (Basic Proportionality Theorem) 1

……

In ΔBCD

OY || CD (construction)

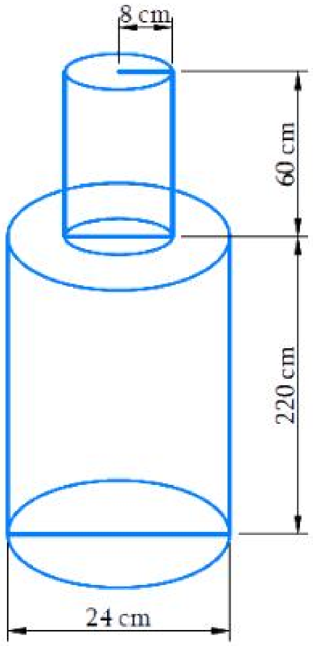
BY/CY = OB/OD................. (2) (Basic Proportionality Theorem) 1

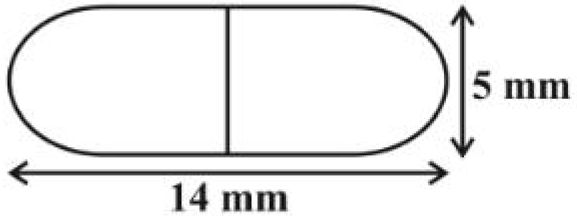
……

From equations (1) and (2)

OA/OC = OB/OD 1

……

	⇒ OA/OB = OC/OD Hence proved.	1/2
34.		1/2
	Radius of bigger cylinder = 12 cm, height of bigger cylinder = 220 cm Radius of smaller cylinder = 8 cm, height of smaller cylinder = 60 cm	1/2
	Volume of bigger cylinder=$\pi r^2 h$ $=\pi\times12^2\times220$ $=31680\ \pi cm^3$	1
	Volume of smaller cylinder=$\pi r^2 h$ $=\pi\times8^2\times60$ $=3840\pi\ cm^3$	1

	…… Volume of the solid iron pole = volume of bigger cylinder + volume of smaller cylinder $=31680\pi+3840\pi=35520\pi$ cm^3 …… Mass of the pole =Density × Volume$=8\times35520\pi = 8\times 35520 \times 3.14$ $=892262.4$ gm$=892.3$kg	1 1
OR 34	 …… Diameter of the capsule, d = 5 mm Radius of the hemisphere, r = d/2 = 5/2 mm Radius of the cylinder, r = 5/2 mm …… Length of the cylinder = Length of the capsule - 2 × radius of the hemisphere h = 14 mm - 2 × 5/2 mm = 9 mm …… Surface area of the capsule = 2 × CSA of hemispherical part + CSA of cylindrical part $= 2 \times 2\pi r^2 + 2\pi rh$ ……	1/2 1/2 1 1

$= 2\pi r\ (2r + h)$

$= [2 \times 22/7 \times 5/2 \text{ mm} \times (2 \times 5/2 \text{ mm} + 9 \text{ mm})]$ 1

……………………………………………………………………………………

$= 110/7 \text{ mm} \times 14 \text{ mm}$

$= 220 \text{ mm}^2$ 1

Thus, the surface area of the capsule is 220 mm^2.

35.

Concentration of SO_2 (in ppm)	Mid-point (x_i)	Frequency (f_i)	$f_i x_i$
0.00-0.04	0.02	4	0.08
0.04-0.08	0.06	9	0.54
0.08-0.12	0.10	9	0.90
0.12-0.16	0.14	2	0.28
0.16-0.20	0.18	4	0.72
0.20-0.24	0.22	2	0.44
		$\sum f_i = 30$	$\sum f_i x_i = 2.96$

…………………………[1]…………………………… $\left[\frac{1}{2}\right]$ ……………[1]……… $2\frac{1}{2}$

$\text{mean} = \bar{x} = \frac{\sum f_i x_i}{\sum f_i}$ 1

……………………………………………………………………………………

$= \frac{2.96}{30}$ 1/2

……………………………………………………………………………………

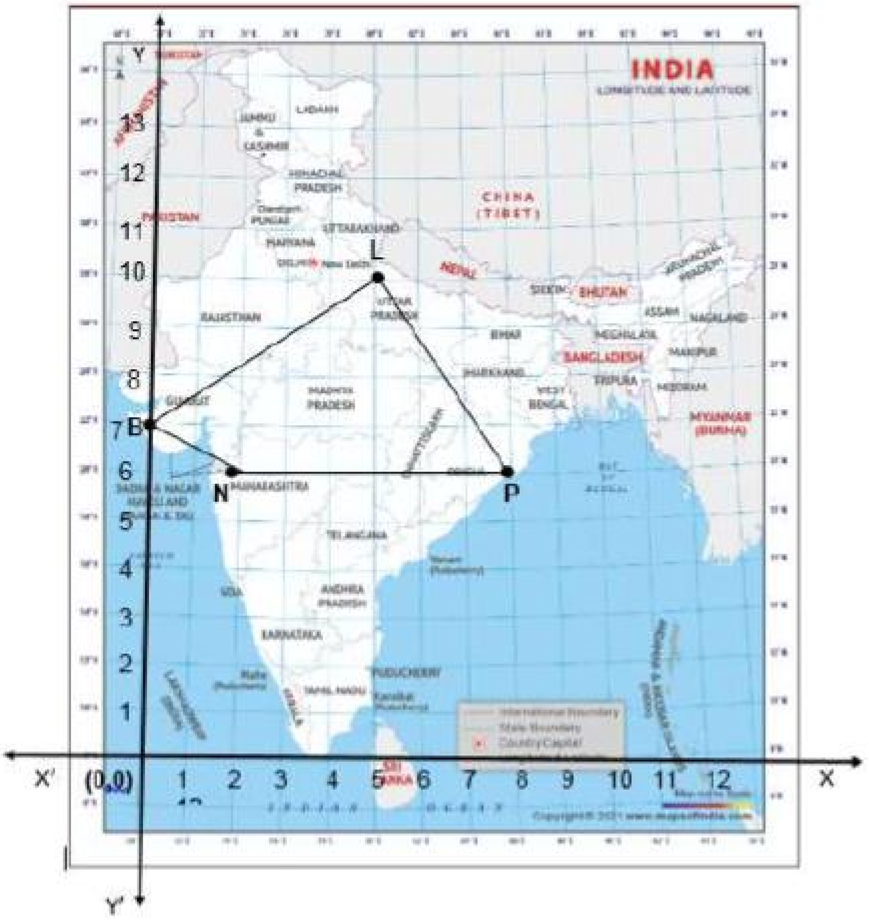
= 0.099 ppm. (approx.) 1

SECTION-E

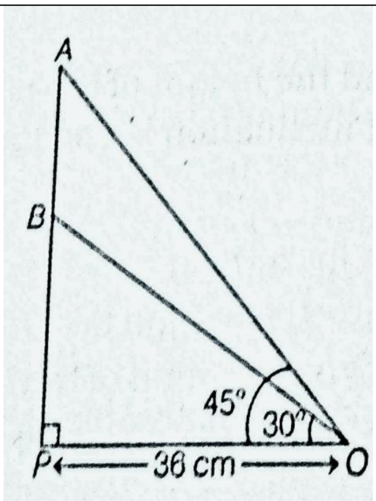
36. $a_6 = 16000$, $a_9 = 22600$

	⇒ a + 5d = 16000-----(1) a + 8d = 22600 ------(2) Substitute a = 1600 -5d from (1) into (2) 16000-5d + 8d = 22600 ⇒3d = 22600-16000 ⇒ 3d = 6600 ⇒ d = 6600/3 = 2200 Using value of d in (1),we get a = 16000 - 5(2200) ⇒ a = 16000 - 11000 ⇒a = 5000 (i) The production during 8th year,a_8 = a+(8-1)d = a+7d=5000+ 7×2200= 5000+15400= = 20400	1
	(ii)Total production in first 3 years=$\frac{n}{2}\{2a+(n-1)d\}=$ $=\frac{3}{2}(2\times 5000+2\times 2200)$=3(5000+2200)=21600	1
	(iii) a_6 = 16000, a_9 = 22600 ⇒ a + 5d = 16000-----(1) a + 8d = 22600 ------(2) Substitute a = 1600 -5d from (1) into (2) 16000-5d + 8d = 22600 ⇒3d = 22600-16000 ⇒ 3d = 6600 ⇒ d = 6600/3 = 2200 Using value of d in (1),we get a = 16000 - 5(2200) ⇒ a = 16000 - 11000 ⇒a = 5000 .... Let production in nth year be a_n = 29200, a = 5000, d = 2200 an = a + (n-1)d 29200 = 5000 + (n – 1)2200 29200 - 5000 = 2200n - 2200 24200 + 2200 = 2200n 26400 = 2200n n = 264/22 n = 12 ∴ the production in 12th year was 29200 .	1 1

	OR (iii) $a_6 = 16000$, $a_9 = 22600$	
	$\Rightarrow$ a + 5d = 16000-----(1)	
	a + 8d = 22600 ------(2)	
	Substitute a = 1600 -5d from (1) into (2)	
	16000-5d + 8d = 22600	
	$\Rightarrow$3d = 22600-16000	
	$\Rightarrow$ 3d = 6600	
	$\Rightarrow$ d = 6600/3 = 2200	
	Using value of d in (1),we get	
	a = 16000 - 5(2200)	
	$\Rightarrow$ a = 16000 - 11000	1/2
	$\Rightarrow$a = 5000	
	....	
	a_4 = a+3d = 5000 + 3 (2200) = 5000 + 6600 = 11600	1/2
	....	
	a_7 = a+6d = 5000 + 6 x 2200 = 5000 + 13200 = 18200	1/2
	....	
	a_7 - a_4 = 18200 - 11600 = 6600	1/2

37.		
	(i)LB = $\sqrt{(0-5)^2+(7-10)^2}$ =$\sqrt{(5)^2+(3)^2}$ …………………………………………………………………………………………… = $\sqrt{25+9}$ = $\sqrt{34}$ km	1/2 1/2
	(ii)Coordinates of Kota (k)= ($\frac{3\times0+2\times5}{3+2}$, $\frac{3\times7+2\times10}{3+2}$) =($\frac{0+10}{5}$, $\frac{21+20}{5}$) …………………………………………………………………………………………… $= (2,\frac{41}{5})$	1/2 1/2
	(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 ……………………………………………………………………………………………	1/2

	NP= $\sqrt{(8-2)^2+(6-6)^2}$ =$\sqrt{(6)^2+(0)^2}$ = 6	1/2
	PL= $\sqrt{(8-5)^2+(6-10)^2}$ =$\sqrt{(3)^2+(-4)^2}$ = $\sqrt{9+16}$ = $\sqrt{25}$ = 5	1/2
	As LN= PL $\neq$ NP, so ΔLNP is an isosceles triangle.	1/2
	OR (iii)Let A(0,y) be a point on the y-axis then AL=AP	1/2
	$\Rightarrow$ $\sqrt{(5-0)^2+(10-y)^2}$ = $\sqrt{(8-0)^2+(6-y)^2}$ $\Rightarrow$ $(5-0)^2+(10-y)^2$ = $(8-0)^2+(6-y)^2$	1/2
	$\Rightarrow$ 25+100-20y + y^2 = 64 +36 -12y + y^2 $\Rightarrow$ 8y=25 $\Rightarrow$ y= $\frac{25}{8}$	1/2
	So, the coordinates of point on y-axis are (0, $\frac{25}{8}$)	1/2

38.	 (i)In right angled $\Delta OPB,$ $\cos 30^0 = \frac{OP}{OB} = \frac{36}{OB}$ $\Rightarrow OB = \frac{36}{\cos 30°}$ .... $= \frac{36}{\frac{\sqrt{3}}{2}} = \frac{72}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$ $\Rightarrow OB = 24\sqrt{3}$ cm	1/2 1/2
	(ii) In right angled $\Delta APO,$ $\tan 45^0 = \frac{AP}{OP} \Rightarrow 1 = \frac{AP}{OP}$ .... ⇒ AP=OP ⇒ AP =36cm ∴ Height of the section A from base of the tower = AP =36cm	1/2 1/2
	(iii) In right angled $\Delta OPB,$ $\tan 30^0 = \frac{BP}{OP}$ $\Rightarrow \frac{72}{\sqrt{3}} = \frac{BP}{36}$ $\Rightarrow BP = \frac{36}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 12\sqrt{3}$ cm .... In right angled $\Delta APO,$ $\tan 45^0 = \frac{AP}{OP} \Rightarrow 1 = \frac{AP}{OP}$	1

	⇒ AP=OP ⇒ AP =36cm …………………………………………………………………………………………… ∴ Distance AB = AP-BP = 36 -12$\sqrt{3}$ = 12(3-$\sqrt{3}$) cm	1/2 1/2
	OR (iii) In right angled ΔOPB, tan30^0 = $\frac{BP}{OP}$ ⇒ BP= OP tan30^0 = 36× $\frac{1}{\sqrt{3}}$ = 12$\sqrt{3}$ cm …………………………………………………………………………………………… ∴ Area of $\Delta OPB = \frac{1}{2} \times OP \times BP = \frac{1}{2} \times 36 \times 12\sqrt{3} = 216\sqrt{3}$ cm^2	1 1