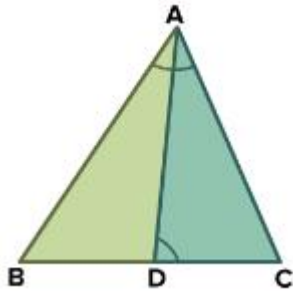


**MARKING SCHEME BSEH PRACTICE PAPER 3,10TH MATHS(Standard) ,
March2024
(ENGLISH MEDIUM)**

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

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



1/2

.....
 In $\triangle ABC$ and $\triangle DAC$

$\angle BAC = \angle ADC$ (Given in the statement)

$\angle ACB = \angle ACD$ (Common angles)

1/2

$\Rightarrow \triangle ABC \sim \triangle DAC$ (AA criterion)

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

1/2

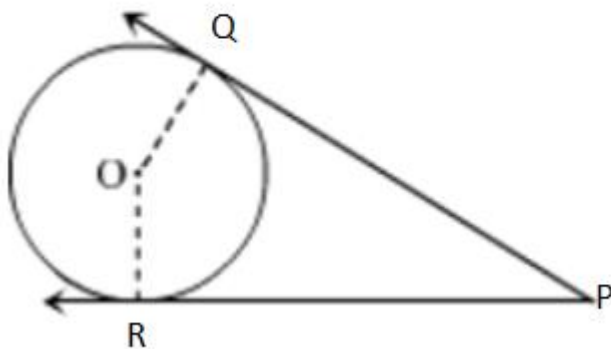
$\Rightarrow CA / CD = CB / CA$

.....
 $\Rightarrow CA^2 = CB \times CD$

1/2

Hence, proved.

23.



1/2

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

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

	<p>$= (22)(3)(21)$</p> <p>.....</p> <p>Area of the shaded region = 1386 cm^2</p> <p>.....</p> <p>Therefore, the area of the shaded region is 1386 cm^2</p>	<p>1/2</p> <p>1/2</p>
SECTION-C		
26.	<p>Let's assume that $3 + 2\sqrt{5}$ is rational.</p> <p>.....</p> <p>If $3 + 2\sqrt{5}$ 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 $b \neq 0$.</p> <p>$3 + 2\sqrt{5} = a/b$</p> <p>.....</p> <p>$b(3 + 2\sqrt{5}) = a$</p> <p>$3b + 2\sqrt{5}b = a$</p> <p>.....</p> <p>$2\sqrt{5}b = a - 3b$</p> <p>$\sqrt{5} = (a - 3b)/2b$</p> <p>.....</p> <p>Since $(a - 3b)/2b$ is a rational number, then $\sqrt{5}$ is also a rational number.</p> <p>.....</p> <p>But, we know that $\sqrt{5}$ is irrational.</p> <p>.....</p> <p>Therefore, our assumption was wrong that $3 + 2\sqrt{5}$ is rational. Hence, $3 + 2\sqrt{5}$ is irrational.</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>
27.	<p>$x^2 + \frac{1}{6}x - 2 = \frac{1}{6}(6x^2 + x - 12) = \frac{1}{6}(3x-4)(2x+3)$</p> <p>Hence, $\frac{4}{3}$ and $\frac{-3}{2}$ are the zeroes of the given polynomial.</p> <p>.....</p> <p>Sum of zeroes = $\frac{4}{3} + \left(\frac{-3}{2}\right) = \frac{-1}{6} = \frac{-\text{coefficient of } x}{\text{coefficient of } x^2}$</p>	<p>1</p> <p>1</p>

.....

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

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

Points are (-1, 0) and (0, 1).

.....

From(ii), $3x + 2y - 12 = 0 \Rightarrow$

$$y = \frac{12 - 3x}{2}$$

x	4	0
y	0	6

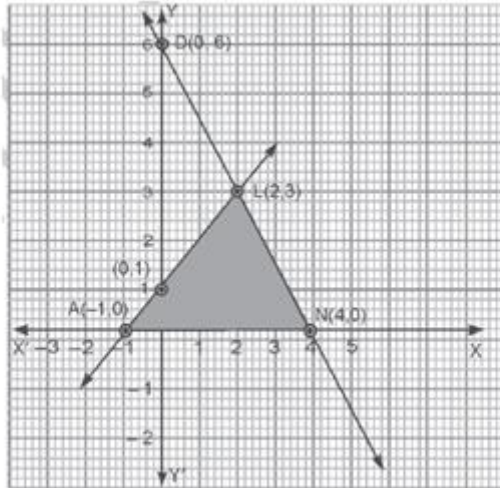
Points are (4, 0) and (0, 6).

.....

We plot these points and draw the lines.

1

1



1/2

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

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
 $10y+x$

1/2

given $x + y = 9$(i)

1/2

and $9(10x+y) = 2(10y+x)$
 $\Rightarrow 90x+9y=20y+2x$
 $\Rightarrow 88x-11y=0 \Rightarrow 8x-y=0 \dots \dots \dots (ii)$

1/2

.....
 Adding (i) and (ii), we get
 $x + y + 8x - y = 9 + 0$
 $\Rightarrow 9x = 9 \Rightarrow x = 1$

1/2

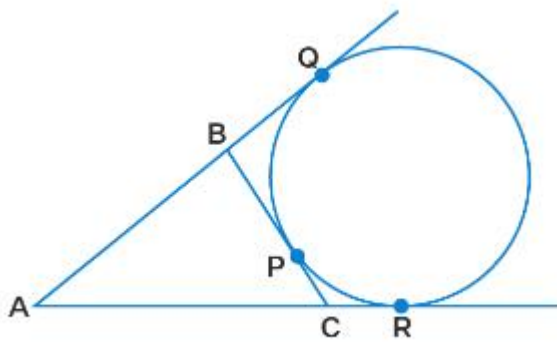
.....
 Substituting the value of x in (i), we get $y = 8$

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: $AQ = \frac{1}{2}(\text{Perimeter of } \Delta ABC)$

1/2

.....
 Proof: Lengths of tangents drawn from an external point to a circle are equal.

$\Rightarrow AQ = AR, BQ = BP, CP = CR.$

1/2

.....
 Perimeter of $\Delta ABC = AB + BC + CA$
 $= AB + (BP + PC) + (AR - CR)$

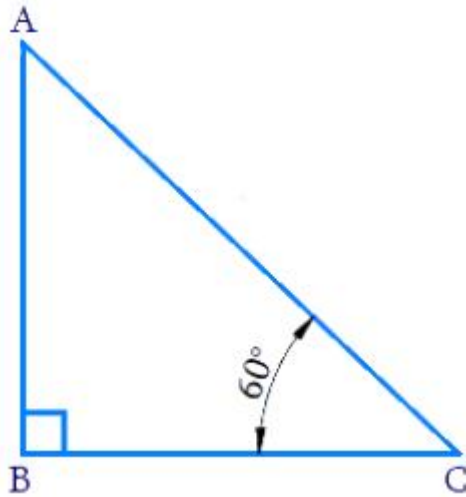
1/2

$= (AB + BQ) + (PC) + (AQ - PC) \quad [\because AQ = AR, BQ = BP, CP = CR]$

1/2

.....
 $= AQ + AQ$

	$= 2AQ$ $\Rightarrow AQ = \frac{1}{2}$ (Perimeter of ΔABC) $\therefore AQ$ is the half of the perimeter of ΔABC .	1/2
30.	$\text{LHS} = \frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \frac{\frac{\sin \theta - \cos \theta + 1}{\cos \theta}}{\frac{\sin \theta + \cos \theta - 1}{\cos \theta}}$ <p>.....</p> $= \frac{\tan \theta - 1 + \sec \theta}{\tan \theta + 1 - \sec \theta} =$ <p>.....</p> $= \frac{(\tan \theta + \sec \theta) - 1}{(\tan \theta - \sec \theta) + 1}$ $= \frac{\{(\tan \theta + \sec \theta) - 1\}(\sec \theta - \tan \theta)}{\{(\tan \theta - \sec \theta) + 1\}(\sec \theta - \tan \theta)} =$ <p>.....</p> $= \frac{(\sec^2 \theta - \tan^2 \theta) - (\sec \theta - \tan \theta)}{(\tan \theta - \sec \theta + 1)(\sec \theta - \tan \theta)} =$ <p>.....</p> $= \frac{(1 - \sec \theta + \tan \theta)}{(\tan \theta - \sec \theta + 1)(\sec \theta - \tan \theta)} \quad \{\because \sec^2 \theta - \tan^2 \theta = 1\}$ <p>.....</p> $= \frac{1}{\sec \theta - \tan \theta}$	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 $\angle C$.	



1/2

In ΔABC ,

$$\sin C = AB / AC$$

1/2

$$\sin 60^\circ = 60/AC$$

$$\sqrt{3}/2 = 60/AC$$

1/2

$$AC = (60 \times 2/\sqrt{3})$$

1/2

$$= (120 \times \sqrt{3}) / (\sqrt{3} \times \sqrt{3})$$

1/2

$$= 120\sqrt{3}/3$$

$$= 40\sqrt{3}$$

1/2

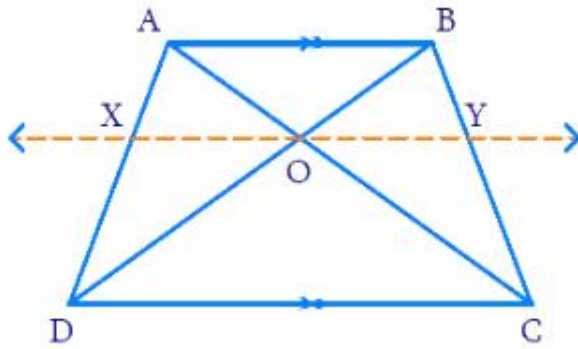
Length of the string $AC = 40\sqrt{3}$ m.

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.	<p>In a right triangle, altitude is one of the sides.</p> <p>Let the base be x cm.</p> <p>The altitude will be (x - 7) cm.</p> <p>.....</p> <p>We can now apply the Pythagoras theorem to the given right triangle.</p> <p>Pythagoras theorem: Hypotenuse² = (side 1)² + (side 2)²</p> <p>(13)² = x² + (x - 7)²</p> <p>.....</p> <p>169 = x² + x² - 14x + 49</p> <p>169 = 2x² - 14x + 49</p> <p>2x² - 14x + 49 - 169 = 0</p> <p>2x² - 14x - 120 = 0</p> <p>(2x² - 14x - 120) / 2 = 0</p> <p>x² - 7x - 60 = 0</p> <p>.....</p> <p>x² - 12x + 5x - 60 = 0</p> <p>.....</p> <p>x(x - 12) + 5(x - 12) = 0</p>	<p>1/2</p> <p>1</p> <p>1</p> <p>1/2</p>

	$(x + 5)(x - 12) = 0$ $x - 12 = 0$ and $x + 5 = 0$ $x = 12$ and $x = -5$ We know that the value of the base cannot be negative. Therefore, Base = 12 cm, Altitude = $12 - 7 = 5$ cm	1 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 But Area of rectangle = l x b = $2x \times x$ $\Rightarrow 2x^2 = 800\text{m}^2$ $\Rightarrow x^2 = 400\text{m}^2$ $\Rightarrow x = 20\text{ m}$ (-20 is rejected.) \therefore Length of the rectangle = $2x = 40\text{ m}$. Breadth of the rectangle = $x = 20\text{ m}$ \therefore It is possible to design a rectangular mango grove.	 1 1/2 1 1 1 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)

$\therefore BY/CY = AO/OC$ (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

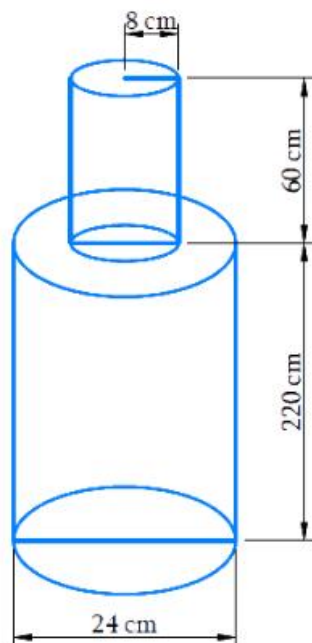
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$$\Rightarrow OA/OB = OC/OD$$

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

$$\begin{aligned} \text{Volume of bigger cylinder} &= \pi r^2 h \\ &= \pi \times 12^2 \times 220 \\ &= 31680 \pi \text{ cm}^3 \end{aligned}$$

1

$$\begin{aligned} \text{Volume of smaller cylinder} &= \pi r^2 h \\ &= \pi \times 8^2 \times 60 \\ &= 3840 \pi \text{ cm}^3 \end{aligned}$$

1

	<p>.....</p> <p>Volume of the solid iron pole = volume of bigger cylinder + volume of smaller cylinder</p> $= 31680\pi + 3840\pi = 35520\pi \text{ cm}^3$ <p>.....</p> <p>Mass of the pole = Density \times Volume = $8 \times 35520\pi = 8 \times 35520 \times 3.14$</p> $= 892262.4 \text{ gm} = 892.3 \text{ kg}$	<p>1</p> <p>1</p>
<p>OR 34</p>	<div data-bbox="320 667 895 887" data-label="Diagram"> </div> <p>.....</p> <p>Diameter of the capsule, $d = 5 \text{ mm}$</p> <p>Radius of the hemisphere, $r = d/2 = 5/2 \text{ mm}$</p> <p>Radius of the cylinder, $r = 5/2 \text{ mm}$</p> <p>.....</p> <p>Length of the cylinder = Length of the capsule - $2 \times$ radius of the hemisphere</p> $h = 14 \text{ mm} - 2 \times 5/2 \text{ mm} = 9 \text{ mm}$ <p>.....</p> <p>Surface area of the capsule = $2 \times$ CSA of hemispherical part + CSA of cylindrical part</p> $= 2 \times 2\pi r^2 + 2\pi rh$ <p>.....</p>	<p>1/2</p> <p>1/2</p> <p>1</p> <p>1</p>

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

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

.....

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

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

Thus, the surface area of the capsule is 220 mm².

1

1

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].....

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

.....

$$= \frac{2.96}{30}$$

.....

$$= 0.099 \text{ ppm. (approx.)}$$

$2\frac{1}{2}$

1

1/2

1

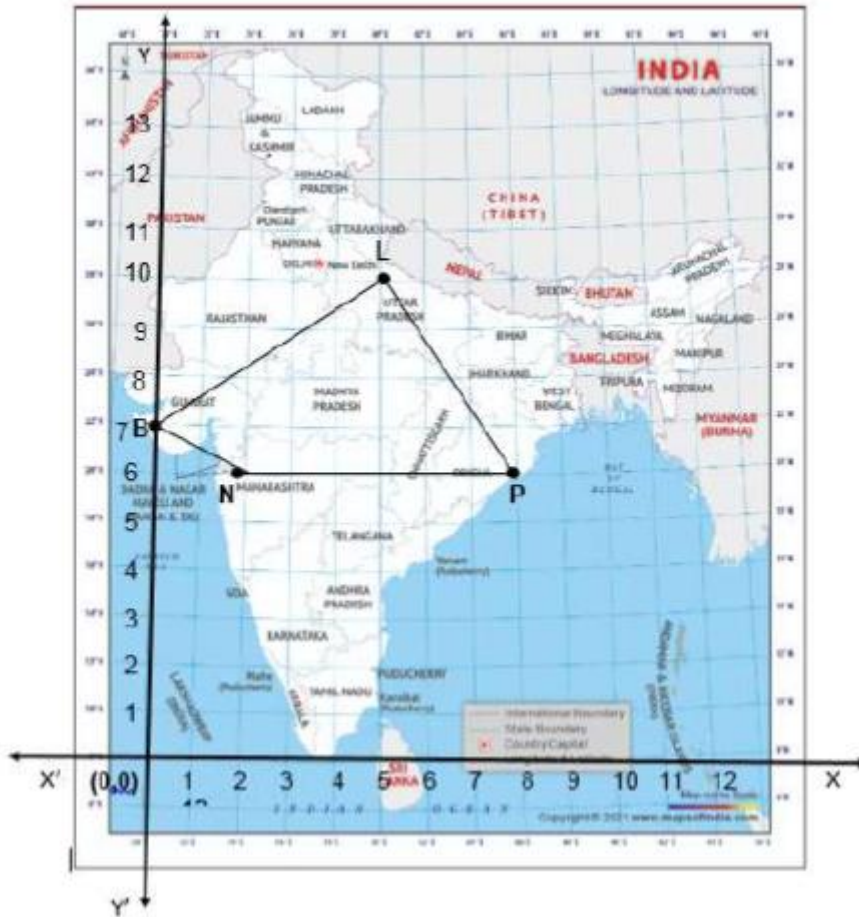
SECTION-E

36. a₆ = 16000, a₉ = 22600

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

	<p>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 $a = 16000 - 5(2200)$ $\Rightarrow a = 16000 - 11000$ $\Rightarrow a = 5000$</p> <p>.....</p> $a_4 = a + 3d = 5000 + 3(2200) = 5000 + 6600 = 11600$ <p>.....</p> <p>.....</p> $a_7 = a + 6d = 5000 + 6 \times 2200 = 5000 + 13200 = 18200$ <p>.....</p> $a_7 - a_4 = 18200 - 11600 = 6600$	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>

37.



$$(i) LB = \sqrt{(0 - 5)^2 + (7 - 10)^2} = \sqrt{(5)^2 + (3)^2}$$

1/2

$$= \sqrt{25 + 9} = \sqrt{34} \text{ km}$$

1/2

$$(ii) \text{Coordinates of Kota (k)} = \left(\frac{3 \times 0 + 2 \times 5}{3 + 2}, \frac{3 \times 7 + 2 \times 10}{3 + 2} \right)$$

$$= \left(\frac{0 + 10}{5}, \frac{21 + 20}{5} \right)$$

1/2

$$= \left(2, \frac{41}{5} \right)$$

1/2

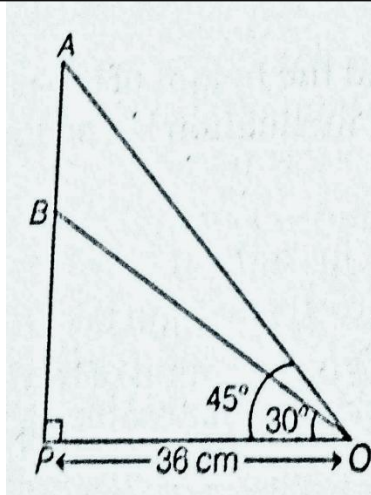
$$(iii) L(5, 10), N(2, 6), P(8, 6)$$

$$LN = \sqrt{(2 - 5)^2 + (6 - 10)^2} = \sqrt{(-3)^2 + (-4)^2} = \sqrt{9 + 16} = \sqrt{25} = 5$$

1/2

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

38.

(i) In right angled ΔOPB ,

$$\cos 30^\circ = \frac{OP}{OB} = \frac{36}{OB}$$

$$\Rightarrow OB = \frac{36}{\cos 30^\circ}$$

$$= \frac{36}{\frac{\sqrt{3}}{2}} = \frac{72}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$$

$$\Rightarrow OB = 24\sqrt{3} \text{ cm}$$

1/2

1/2

(ii) In right angled ΔAPO ,

$$\tan 45^\circ = \frac{AP}{OP} \Rightarrow 1 = \frac{AP}{OP}$$

$$\Rightarrow AP = OP$$

$$\Rightarrow AP = 36 \text{ cm}$$

\therefore Height of the section A from base of the tower = $AP = 36 \text{ cm}$

1/2

1/2

(iii) In right angled ΔOPB ,

$$\tan 30^\circ = \frac{BP}{OP}$$

$$\Rightarrow \frac{72}{\sqrt{3}} = \frac{BP}{36}$$

$$\Rightarrow BP = \frac{36}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 12\sqrt{3} \text{ cm}$$

In right angled ΔAPO ,

$$\tan 45^\circ = \frac{AP}{OP} \Rightarrow 1 = \frac{AP}{OP}$$

1

	$\Rightarrow AP=OP$ $\Rightarrow AP =36\text{cm}$ $\therefore \text{Distance } AB = AP-BP = 36 -12\sqrt{3} = 12(3-\sqrt{3}) \text{ cm}$	1/2 1/2
	OR (iii) In right angled ΔOPB , $\tan 30^\circ = \frac{BP}{OP}$ $\Rightarrow BP= OP \tan 30^\circ = 36 \times \frac{1}{\sqrt{3}} = 12\sqrt{3} \text{ cm}$ $\therefore \text{Area of } \Delta OPB = \frac{1}{2} \times OP \times BP = \frac{1}{2} \times 36 \times 12\sqrt{3} = 216\sqrt{3} \text{ cm}^2$	1 1

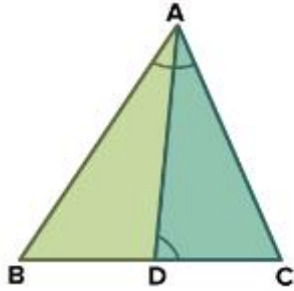
**MARKING SCHEME, BSEH PRACTICE PAPER 3,10TH गणित (मानक),
March 2024 (हिंदी माध्यम)**

Q. no.	Expected solutions	marks
	खण्ड-क	
1	(d) 2520	1
2	(d) p+1	1
3	(b) -10	1
4	(a) $\frac{2}{3}$	1
5	(b) -6lmn	1
6	(b) 7	1
7	(b) 8cm	1
8	(a) 3cm	1
9	एक	1
10	0	1
11	गलत	1
12	$\frac{25}{8}$	1
13	28 cm	1
14	(b) $\frac{\theta}{360} \times \pi r^2$	1
15	(a) $4\pi r^2$	1
16	(b) 25	1
17	(b) बहुलक = 3 माध्यक - 2 माध्य	1
18	(d) $\frac{17}{16}$	1
19	(a) अभिकथन (A) और तर्क (R) दोनों सही हैं और तर्क (R), अभिकथन (A) की सही व्याख्या करता है।	1
20	(d) अभिकथन (A) ग़लत है, परन्तु तर्क (R) सही है।	1

	खण्ड -ख	
21.	<p>यहाँ $a_1=3, b_1=-1, c_1=-5$ $a_2=6, b_2=-2, c_2=-k$</p> <p>.....</p> <p>कोई हल नहीं के लिए ; $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$</p> <p>.....</p> <p style="text-align: center;">$\Rightarrow \frac{3}{6} = \frac{-1}{-2} \neq \frac{-5}{-k}$ $\Rightarrow \frac{1}{2} \neq \frac{5}{k}$</p> <p>.....</p> <p style="text-align: center;">$\Rightarrow k \neq 10$</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>
अथवा 21	<p>$x + y + 40^\circ = 180^\circ$ [त्रिभुज के सभी कोणों का योग] $\Rightarrow x + y = 140^\circ$(1) $x - y = 30^\circ$(2)</p> <p>.....</p> <p>समीकरण (1) को हल करके $y = 140^\circ - x$.....(3)</p> <p>समीकरण (2) में $y = 140^\circ - x$ रखने पर हमें प्राप्त होता है $x - (140^\circ - x) = 30^\circ$ $2x - 140^\circ = 30^\circ$</p> <p>.....</p> <p>$2x = 30^\circ + 140^\circ$ $2x = 170^\circ$ $x = 85^\circ$</p> <p>.....</p> <p>समीकरण (3) में $x = 85^\circ$ प्रतिस्थापित करने पर, हमें प्राप्त होता है $y = 140^\circ - 85^\circ$ $y = 55^\circ$</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>

अतः $x = 85^\circ, y = 55^\circ$

22.



1/2

.....
 ΔABC और ΔDAC में

$\angle BAC = \angle ADC$ (दिया है)

$\angle ACB = \angle ACD$ (उभयनिष्ठ कोण)

1/2

$\Rightarrow \Delta ABC \sim \Delta DAC$ (AA कसौटी)

.....
यदि दो त्रिभुज समरूप हों तो उनकी संगत भुजाएँ समानुपाती होती हैं

1/2

$\Rightarrow CA / CD = CB / CA$

	हम कह सकते हैं कि चतुर्भुज QORP चक्रीय है।	
24.	$\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)} = \frac{1-\sin^2\theta}{1-\cos^2\theta}$ <p>.....</p> $= \frac{\cos^2\theta}{\sin^2\theta}$ <p>.....</p> $= \cot^2\theta = \left(\frac{7}{8}\right)^2$ <p>.....</p> $= \frac{49}{64}$	1/2 1/2 1/2 1/2
अथवा 24.	<p>हम जानते हैं कि</p> $\sin^2\theta + \cos^2\theta = 1$ <p>.....</p> <p>दोनों तरफ घन करने पर</p> $(\sin^2\theta + \cos^2\theta)^3 = 1$ <p>.....</p> <p>बीजीय सर्वसमिका $(a + b)^3 = a^3 + b^3 + 3ab(a + b)$ का उपयोग करने पर</p> $(\sin^2\theta)^3 + (\cos^2\theta)^3 + 3\sin^2\theta\cos^2\theta(\sin^2\theta + \cos^2\theta) = 1$ <p>.....</p> <p>हमें मिलता है</p> $\sin^6\theta + \cos^6\theta + 3\sin^2\theta\cos^2\theta = 1$	1/2 1/2 1/2

	यही सिद्ध करना था ।	
25.	<p>चारों शीर्षों पर चार त्रिज्यखण्ड बने हैं जिनमें प्रत्येक की त्रिज्या $r = 21 \text{ cm}$ तथा शीर्ष केन्द्रीय कोण $\angle A, \angle B, \angle C$ एवं $\angle D$ हैं। $[\because \angle A + \angle B + \angle C + \angle D = 360^\circ$ चतुर्भुज के शीर्ष कोणों का योग]</p> <p>.....</p> <p>छायांकित क्षेत्र का क्षेत्रफल = $\pi r_1^2 \theta_1 / 360^\circ + \pi r_2^2 \theta_2 / 360^\circ + \pi r_3^2 \theta_3 / 360^\circ + \pi r_4^2 \theta_4 / 360^\circ$</p> <p>.....</p> <p>= $\pi r^2 (\theta_1 + \theta_2 + \theta_3 + \theta_4) / 360^\circ \quad \because r_1 = r_2 = r_3 = r_4$ = $\pi r^2 (360^\circ) / 360^\circ$ = πr^2</p> <p>.....</p> <p>= $227 (21)^2$ = 22×63 = 1386 cm^2 .</p> <p>अतः छायांकित क्षेत्र का अभीष्ट क्षेत्रफल = 1386 cm^2 है।</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>
	खण्ड -ग	
26.	<p>आइए मान लें कि $3 + 2\sqrt{5}$ परिमेय है।</p> <p>.....</p> <p>..</p> <p>यदि $3 + 2\sqrt{5}$ परिमेय है तो इसका अर्थ है कि इसे a/b के रूप में लिखा जा सकता है जहां a और b पूर्णांक हैं जिनका 1 और $b \neq 0$ के अलावा कोई सांझा गुणनखंड नहीं है।</p> <p>$3 + 2\sqrt{5} = a/b$</p> <p>.....</p> <p>$b(3 + 2\sqrt{5}) = a$</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p>

	$3b + 2\sqrt{5}b = a$ $2\sqrt{5}b = a - 3b$ $\sqrt{5} = (a - 3b)/2b$ चूँकि $(a - 3b)/2b$ एक परिमेय संख्या है, तो $\sqrt{5}$ भी एक परिमेय संख्या है। लेकिन, हम जानते हैं कि $\sqrt{5}$ अपरिमेय है। इसलिए, हमारी धारणा गलत थी कि $3 + 2\sqrt{5}$ परिमेय है। अतः, $3 + 2\sqrt{5}$ अपरिमेय है।	 1/2 1/2 1/2
27.	$x^2 + \frac{1}{6}x - 2 = \frac{1}{6}(6x^2 + x - 12) = \frac{1}{6}(3x-4)(2x+3)$ अतः, $\frac{4}{3}$ and $\frac{-3}{2}$ दिए गए बहुपद के शून्यक हैं। शून्यकों का योगफल = $\frac{4}{3} + \left(\frac{-3}{2}\right) = \frac{-1}{6} = \frac{-x \text{ का गुणांक}}{x^2 \text{ का गुणांक}}$ शून्यकों का गुणनफल = $\frac{4}{3} \times \left(\frac{-3}{2}\right) = -2 = \frac{\text{अचर पद}}{x^2 \text{ का गुणांक}}$	 1 1 1
28.	दिए गए रैखिक समीकरण हैं:	

$$x - y + 1 = 0 \dots\dots(i)$$

$$3x + 2y - 12 = 0 \dots\dots(ii)$$

समीकरण (i) से

$$y = x + 1$$

x	-1	0
y	0	1

सम्बंधित बिंदु (-1, 0) और (0, 1) हैं

.....

समीकरण(ii)से , $3x + 2y - 12 = 0 \Rightarrow$

$$y = \frac{12 - 3x}{2}$$

x	4	0
y	0	6

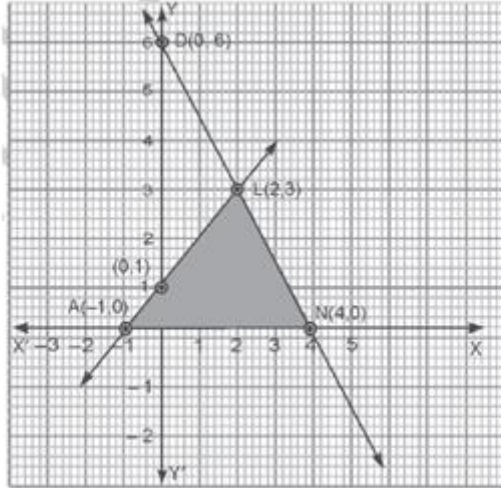
सम्बंधित बिंदु (4, 0) और (0, 6) हैं

.....

हम इन बिंदुओं को आलेखित करते हैं और रेखाएँ खींचते हैं।

1

1



1/2

.....

ग्राफ से, हम देखते हैं कि अभीष्ट त्रिभुज के शीर्ष A(-1, 0), N(4, 0) और L(2, 3) हैं।

1/2

अथवा
28.

माना इकाई का अंक y है और दहाई का अंक x है। तब संख्या $10x+y$ है और अंकों को उलटने पर प्राप्त संख्या $=10y+x$

1/2

.....

दिया है $x + y = 9$(i)

1/2

.....

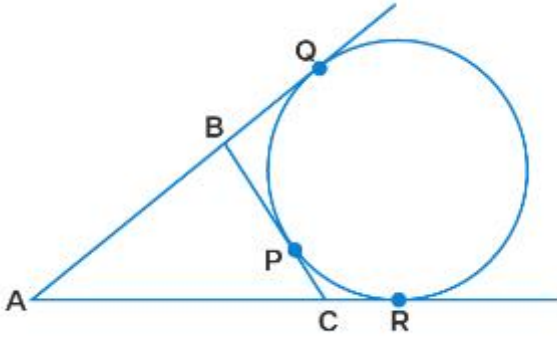
और $9(10x+y) = 2(10y+x)$
 $\Rightarrow 90x+9y=20y+2x$
 $\Rightarrow 88x-11y=0 \Rightarrow 8x-y=0$(ii)

1/2

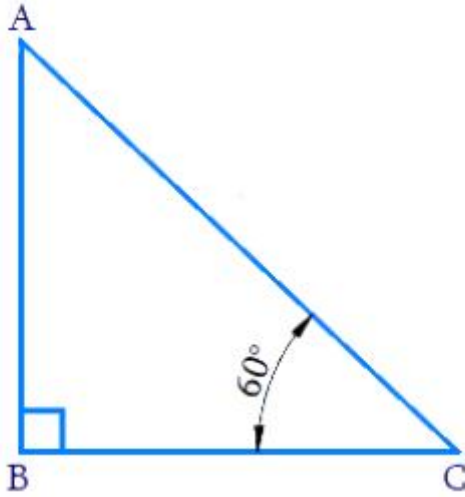
.....

(i) और (ii) जोड़ने पर, हमें प्राप्त होता है
 $x + y + 8x - y = 9 + 0$

1/2

	<p>$\Rightarrow 9x=9 \Rightarrow x=1$</p> <p>.....</p> <p>(i) में x का मान प्रतिस्थापित करने पर, हमें $y=8$ प्राप्त होता है</p> <p>.....</p> <p>अतः संख्या 18 है।</p>	<p>1/2</p> <p>1/2</p>
<p>29.</p>	 <p>.....</p> <p>दिया है: एक वृत्त ΔABC की भुजा BC को P पर और AB तथा AC को क्रमशः Q और R तक बढ़ाने पर स्पर्श करता है।</p> <p>सिद्ध करना है : $AQ = \frac{1}{2}(\Delta ABC \text{ का परिमाप})$</p> <p>.....</p> <p>प्रमाण: किसी बाह्य बिंदु से वृत्त पर खींची गई स्पर्श रेखाओं की लंबाई बराबर होती है।</p> <p>$\Rightarrow AQ = AR, BQ = BP, CP = CR.$</p> <p>.....</p> <p>$\Delta ABC$ का परिमाप = $AB + BC + CA$</p> <p>= $AB + (BP + PC) + (AR - CR)$</p> <p>.....</p> <p>= $(AB + BQ) + (PC) + (AQ - PC)$ [$\because AQ = AR, BQ = BP, CP = CR$]</p> <p>.....</p> <p>= $AQ + AQ$</p> <p>= $2AQ$</p> <p>$\Rightarrow AQ = \frac{1}{2}(\Delta ABC \text{ का परिमाप})$</p> <p>$\therefore AQ, \Delta ABC$ के परिमाप का आधा है।</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>

30.	$\text{LHS} = \frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \frac{\frac{\sin \theta - \cos \theta + 1}{\cos \theta}}{\frac{\sin \theta + \cos \theta - 1}{\cos \theta}}$ <p>.....</p> $= \frac{\tan \theta - 1 + \sec \theta}{\tan \theta + 1 - \sec \theta} =$ <p>.....</p> $= \frac{(\tan \theta + \sec \theta) - 1}{(\tan \theta - \sec \theta) + 1}$ $= \frac{\{(\tan \theta + \sec \theta) - 1\}(\sec \theta - \tan \theta)}{\{(\tan \theta - \sec \theta) + 1\}(\sec \theta - \tan \theta)}$ <p>.....</p> $= \frac{(\sec^2 \theta - \tan^2 \theta) - (\sec \theta - \tan \theta)}{(\tan \theta - \sec \theta + 1)(\sec \theta - \tan \theta)} =$ <p>.....</p> $= \frac{(1 - \sec \theta + \tan \theta)}{(\tan \theta - \sec \theta + 1)(\sec \theta - \tan \theta)}$ <p style="text-align: right;">{∵ $\sec^2 \theta - \tan^2 \theta = 1$}</p> <p>.....</p> $= \frac{1}{\sec \theta - \tan \theta}$	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>
अथवा 30.	हम उड़ती पतंग की ऊंचाई AB, डोर की लंबाई AC और जमीन के साथ डोर का झुकाव $\angle C$ पर लेते हैं।	



1/2

.....

ΔABC में ,

$$\sin C = AB / AC$$

1/2

$$\sin 60^\circ = 60/AC$$

.....

$$\Rightarrow \sqrt{3}/2 = 60/AC$$

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

$$= 40\sqrt{3}$$

.....

डोरी की लंबाई $AC = 40\sqrt{3}$ m.

1/2

31.

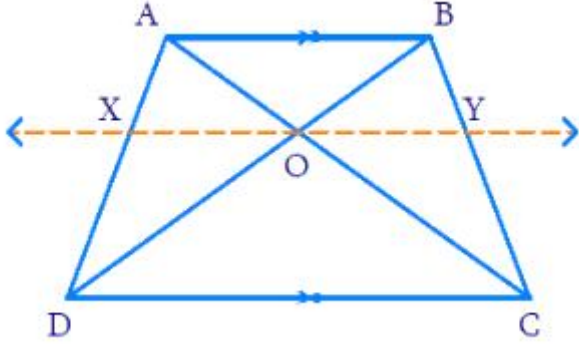
(i) कुल डिस्क 90 हैं, जिनकी संख्या 1 से 90 तक है।

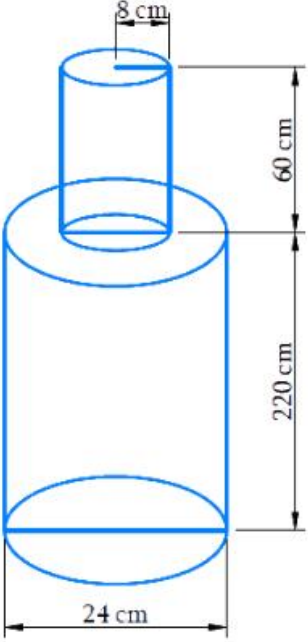
अनुकूल दो-अंकीय क्रमांकित डिस्क 81(10,11,12,.....,90) हैं

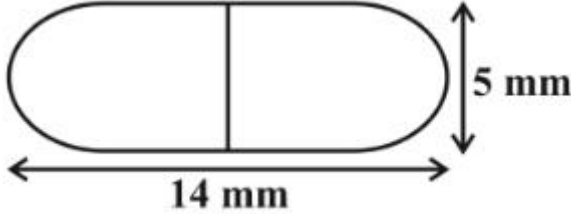
$$\therefore \text{दो अंकीय क्रमांकित डिस्क प्राप्त होने की प्रायिकता} = \frac{81}{90} = \frac{9}{10}$$

1

	$(2x^2 - 14x - 120) / 2 = 0$ $x^2 - 7x - 60 = 0$ <p>.....</p> $x^2 - 12x + 5x - 60 = 0$ <p>.....</p> <p>..</p> $x(x - 12) + 5(x - 12) = 0$ $(x + 5)(x - 12) = 0$ $x - 12 = 0 \text{ and } x + 5 = 0$ $x = 12 \text{ and } x = -5$ <p>.....</p> <p>.</p> <p>हम जानते हैं कि आधार का मान ऋणात्मक नहीं हो सकता।</p> <p>इसलिए, आधार = 12 सेमी, ऊंचाई = 12 - 7 = 5 सेमी</p>	<p>1/2</p> <p>1</p> <p>1</p>
<p>अथवा 32.</p>	<p>माना चौड़ाई = x.</p> <p>दिया गया है कि लंबाई इसकी चौड़ाई से दोगुनी है। आयत की लंबाई = 2x.</p> <p>और दिया गया है कि आयत का क्षेत्रफल = 800 m² है</p> <p>.....</p> <p>लेकिन आयत का क्षेत्रफल = l x b = 2x x x</p>	<p>1</p> <p>1/2</p>

	<p>.....</p> $\Rightarrow 2x^2 = 800m^2$ <p>.....</p> $\Rightarrow x^2 = 400m^2$ $\Rightarrow x = 20 \text{ m} \quad (-20 \text{ अस्वीकृत है.})$ <p>.....</p> <p>\therefore आयत की लंबाई = $2x = 40$ मीटर। आयत की चौड़ाई = $x = 20$ मीटर.</p> <p>.....</p> <p>\therefore एक आयताकार आम के बगीचे का डिज़ाइन बनाना संभव है।</p>	<p>1</p> <p>1</p> <p>1</p> <p>1/2</p>
33.	 <p>.....</p> <p>समलंब ABCD में, $AB \parallel CD$ साथ ही, AC और BD 'O' पर प्रतिच्छेद करते हैं</p> <p>.....</p> <p>AB और CD के समानांतर O से गुजरने वाले XY की रचना करें ($XY \parallel AB, XY \parallel CD$)</p> <p>.....</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p>

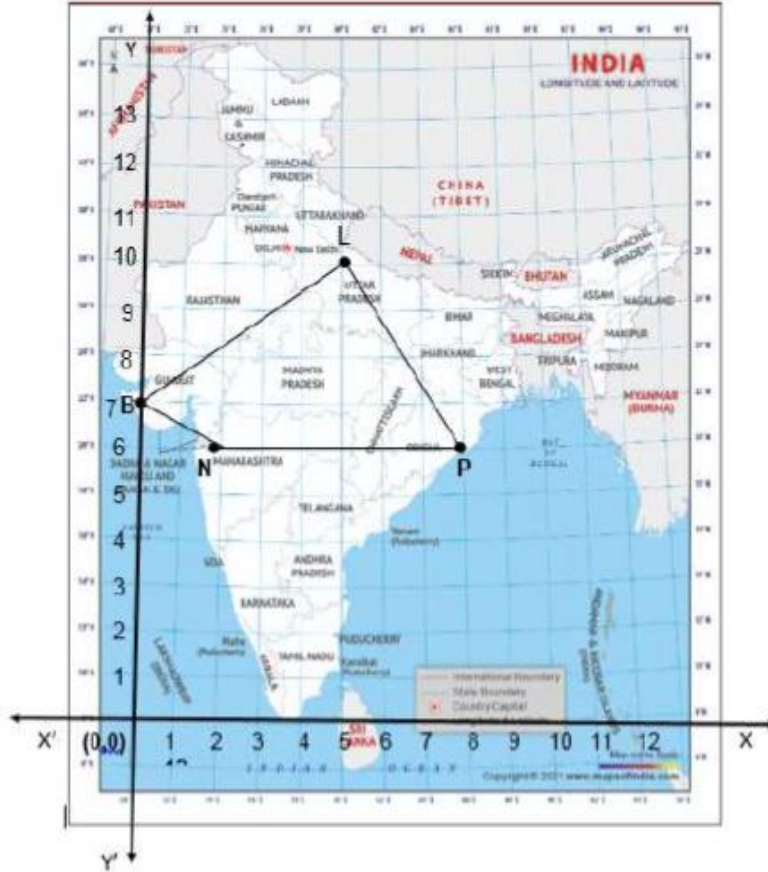
	<p>ΔABC में $OY \parallel AB$ (रचना से) $\therefore BY/CY = AO/OC$..... (1) (आधारभूत समानुपातिकता प्रमेय)</p> <p>.....</p> <p>ΔBCD में $OY \parallel CD$ (रचना से) $BY/CY = OB/OD$..... (2) (आधारभूत समानुपातिकता प्रमेय)</p> <p>.....</p> <p>समीकरण (1) और (2) से $OA/OC = OB/OD$</p> <p>.....</p> <p>$\Rightarrow OA/OB = OC/OD$ अतः सिद्ध हुआ ।</p>	<p>1</p> <p>1</p> <p>1</p> <p>1/2</p>
34.	 <p>.....</p>	1/2

	<p>बड़े बेलन की त्रिज्या = 12 सेमी, बड़े बेलन की ऊंचाई = 220 सेमी छोटे बेलन की त्रिज्या = 8 सेमी, छोटे बेलन की ऊंचाई = 60 सेमी</p> <p>.....</p> <p>बड़े बेलन का आयतन $=\pi r^2 h$ $=\pi \times 12^2 \times 220$ $=31680 \pi \text{ cm}^3$</p> <p>.....</p> <p>छोटे बेलन का आयतन $=\pi r^2 h$ $=\pi \times 8^2 \times 60$ $=3840 \pi \text{ cm}^3$</p> <p>.....</p> <p>ठोस लोहे के खंभे का आयतन = बड़े बेलन का आयतन + छोटे बेलन का आयतन $= 31680\pi + 3840\pi = 35520\pi \text{ cm}^3$</p> <p>.....</p> <p>खंभे का द्रव्यमान = घनत्व \times आयतन $= 8 \times 35520\pi = 8 \times 35520 \times 3.14$ $= 892262.4 \text{ gm} = 892.3 \text{ kg}$</p>	<p>1/2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
<p>अथवा 34.</p>	 <p>.....</p> <p>अर्धगोले की त्रिज्या, $r = d/2 = 5/2$ मिमी</p> <p>बेलन की त्रिज्या, $r = 5/2$ मिमी</p> <p>.....</p> <p>बेलन की लंबाई = कैप्सूल की लंबाई - $2 \times$ अर्धगोले की त्रिज्या $h = 14 \text{ mm} - 2 \times 5/2 \text{ mm} = 9 \text{ mm}$</p> <p>.....</p>	<p>1/2</p> <p>1/2</p> <p>1</p>

	<p>कैप्सूल का पृष्ठीय क्षेत्रफल = $2 \times$ अर्धगोलाकार भाग का वक्र पृष्ठीय क्षेत्रफल + बेलनाकार भाग का वक्र पृष्ठीय क्षेत्रफल</p> $= 2 \times 2\pi r^2 + 2\pi rh$ <p>.....</p> $= 2\pi r (2r + h)$ $= [2 \times 22/7 \times 5/2 \text{ mm} \times (2 \times 5/2 \text{ mm} + 9 \text{ mm})]$ <p>.....</p> $= 110/7 \text{ mm} \times 14 \text{ mm}$ $= 220 \text{ mm}^2$	<p>1</p> <p>1</p> <p>1</p>																																
35.	<table border="1" data-bbox="320 1025 1142 1563"> <thead> <tr> <th>SO₂ की सांद्रता (पीपीएम में)</th> <th>वर्ग चिन्ह (x_i)</th> <th>बारंबारता(f_i)</th> <th>f_ix_i</th> </tr> </thead> <tbody> <tr> <td>0.00-0.04</td> <td>0.02</td> <td>4</td> <td>0.08</td> </tr> <tr> <td>0.04-0.08</td> <td>0.06</td> <td>9</td> <td>0.54</td> </tr> <tr> <td>0.08-0.12</td> <td>0.10</td> <td>9</td> <td>0.90</td> </tr> <tr> <td>0.12-0.16</td> <td>0.14</td> <td>2</td> <td>0.28</td> </tr> <tr> <td>0.16-0.20</td> <td>0.18</td> <td>4</td> <td>0.72</td> </tr> <tr> <td>0.20-0.24</td> <td>0.22</td> <td>2</td> <td>0.44</td> </tr> <tr> <td></td> <td></td> <td>$\sum f_i = 30$</td> <td>$\sum f_i x_i = 2.96$</td> </tr> </tbody> </table> <p style="text-align: center;">[1] $\left[\frac{1}{2}\right]$ [1]</p> <p>.....</p> <p>माध्य सांद्रता $= \bar{x} = \frac{\sum f_i x_i}{\sum f_i}$</p> <p>.....</p>	SO ₂ की सांद्रता (पीपीएम में)	वर्ग चिन्ह (x _i)	बारंबारता(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			$\sum f_i = 30$	$\sum f_i x_i = 2.96$	<p>$2\frac{1}{2}$</p> <p>1</p>
SO ₂ की सांद्रता (पीपीएम में)	वर्ग चिन्ह (x _i)	बारंबारता(f _i)	f _i x _i																															
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	$\Rightarrow d = 6600/3 = 2200$ <p>(1) में d के मान का उपयोग करने पर, हमें प्राप्त होता है</p> $a = 16000 - 5(2200)$ $\Rightarrow a = 16000 - 11000$ $\Rightarrow a = 5000$ <p>.....</p> <p>माना nवें वर्ष में उत्पादन $a_n = 29200$, $a = 5000$, $d = 2200$</p> $a_n = a + (n-1)d$ $29200 = 5000 + (n - 1)2200$ $29200 - 5000 = 2200n - 2200$ $24200 + 2200 = 2200n$ $26400 = 2200n$ $n = 264/22$ $n = 12$ <p>\therefore 12वें वर्ष में उत्पादन 29200 था </p>	<p>1</p> <p>1</p>
	<p>OR (iii) $a_6 = 16000$, $a_9 = 22600$</p> $\Rightarrow a + 5d = 16000 \text{-----}(1)$ $a + 8d = 22600 \text{-----}(2)$ <p>(1) से (2) में $a = 1600 - 5d$ रखने पर</p> $16000 - 5d + 8d = 22600$ $\Rightarrow 3d = 22600 - 16000$ $\Rightarrow 3d = 6600$ $\Rightarrow d = 6600/3 = 2200$ <p>(1) में d के मान का उपयोग करने पर, हमें प्राप्त होता है</p> $a = 16000 - 5(2200)$ $\Rightarrow a = 16000 - 11000$ $\Rightarrow a = 5000$ <p>.....</p> $a_4 = a + 3d = 5000 + 3(2200) = 5000 + 6600 = 11600$ <p>.....</p> $a_7 = a + 6d = 5000 + 6 \times 2200 = 5000 + 13200 = 18200$ <p>.....</p> $a_7 - a_4 = 18200 - 11600 = 6600$	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>

37.



$$(i) LB = \sqrt{(0 - 5)^2 + (7 - 10)^2} = \sqrt{(5)^2 + (3)^2}$$

1/2

.....

$$= \sqrt{25 + 9} = \sqrt{34} \text{ km}$$

1/2

$$(ii) \text{ कोटा (K) के निर्देशांक} = \left(\frac{3 \times 0 + 2 \times 5}{3+2}, \frac{3 \times 7 + 2 \times 10}{3+2} \right)$$

$$= \left(\frac{0+10}{5}, \frac{21+20}{5} \right)$$

1/2

.....

$$= \left(2, \frac{41}{5} \right)$$

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

.....

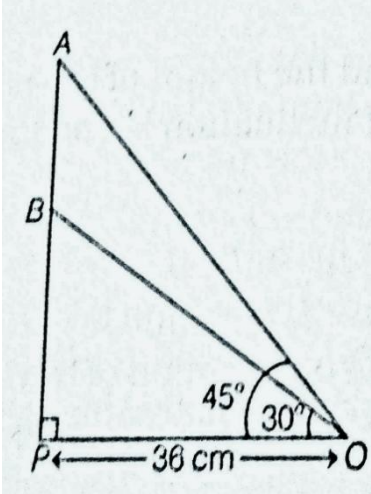
$$NP = \sqrt{(8 - 2)^2 + (6 - 6)^2} = \sqrt{(6)^2 + (0)^2} = 6$$

1/2

.....

$$PL = \sqrt{(8 - 5)^2 + (6 - 10)^2} = \sqrt{(3)^2 + (-4)^2} = \sqrt{9 + 16} = \sqrt{25} = 5$$

1/2

	<p>क्योंकि $LN = PL \neq NP$, इसलिए $\triangle LNP$ एक समद्विबाहु त्रिभुज है।</p>	1/2
	<p>OR (iii) मान लीजिए कि $A(0,y)$ y-अक्ष पर एक बिंदु है तब $AL = AP$</p> <p>.....</p> $\Rightarrow \sqrt{(5-0)^2 + (10-y)^2} = \sqrt{(8-0)^2 + (6-y)^2}$ $\Rightarrow (5-0)^2 + (10-y)^2 = (8-0)^2 + (6-y)^2$ <p>.....</p> $\Rightarrow 25 + 100 - 20y + y^2 = 64 + 36 - 12y + y^2$ $\Rightarrow 8y = 25$ $\Rightarrow y = \frac{25}{8}$ <p>.....</p> <p>इसलिए, y-अक्ष पर बिंदु के निर्देशांक $(0, \frac{25}{8})$ हैं।</p>	1/2 1/2 1/2
38.	 <p>(i) समकोण $\triangle OPB$ में,</p> $\cos 30^\circ = \frac{OP}{OB} = \frac{36}{OB}$ $\Rightarrow OB = \frac{36}{\cos 30^\circ}$ <p>.....</p> $= \frac{36}{\frac{\sqrt{3}}{2}} = \frac{72}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$	1/2

	$\Rightarrow OB=24\sqrt{3} \text{ cm}$	1/2
	(ii) समकोण $\triangle APO$ में, $\tan 45^\circ = \frac{AP}{OP} \Rightarrow 1 = \frac{AP}{OP}$	1/2
 $\Rightarrow AP=OP$ $\Rightarrow AP = 36\text{cm}$ \therefore टावर के आधार से खंड A की उंचाई = AP = 36cm	1/2
	(iii) समकोण $\triangle OPB$ में, $\tan 30^\circ = \frac{BP}{OP}$ $\Rightarrow \frac{72}{\sqrt{3}} = \frac{BP}{36}$ $\Rightarrow BP = \frac{36}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 12\sqrt{3} \text{ cm}$	1
 समकोण $\triangle APO$ में, $\tan 45^\circ = \frac{AP}{OP} \Rightarrow 1 = \frac{AP}{OP}$ $\Rightarrow AP=OP$ $\Rightarrow AP = 36\text{cm}$	1/2
 \therefore दूरी AB = AP - BP = $36 - 12\sqrt{3} = 12(3 - \sqrt{3}) \text{ cm}$	1/2
	OR (iii) समकोण $\triangle OPB$ में, $\tan 30^\circ = \frac{BP}{OP}$ $\Rightarrow BP = OP \tan 30^\circ = 36 \times \frac{1}{\sqrt{3}} = 12\sqrt{3} \text{ cm}$	1
 $\therefore \triangle OPB$ का क्षेत्रफल = $\frac{1}{2} \times OP \times BP = \frac{1}{2} \times 36 \times 12\sqrt{3} = 216\sqrt{3} \text{ cm}^2$	1