

WITH GRAPH PAPER

केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली
सैकण्डरी स्कूल परीक्षा (कक्षा दसवीं)
परीक्षार्थी प्रवेश-पत्र के अनुसार भरें

STANDARD

विषय Subject : **Mathematics**

विषय कोड Subject Code : **041**

परीक्षा का दिन एवं तिथि

Day & Date of the Examination : **Monday, 10/3/2025**

उत्तर देने का माध्यम

Medium of answering the paper : **English**

प्रश्न पत्र के ऊपर लिखे

कोड को दर्शाएं :

Write code No. as written on
the top of the question paper :

Code Number

30/6/2

Set Number

① ● ③ ④

अतिरिक्त उत्तर-पुस्तिका (ओं) की संख्या

No. of supplementary answer-book(s) used

0

बेंचमार्क विकलांग व्यक्ति : **हाँ / नहीं**

Person with Benchmark Disabilities : **Yes / No**

NO

विकलांगता का कोड (प्रवेश पत्र के अनुसार)

Code of Disability (As per the admit card)

NIL

क्या लेखन - लिपिक उपलब्ध कराया गया : **हाँ / नहीं**

Whether writer provided :

Yes / No

NO

यदि दृष्टिहीन हैं तो उपयोग में लाए गये

सॉफ्टवेयर का नाम :

If Visually challenged, name of software used :

NIL

*एक खाने में एक अक्षर लिखें। नाम के प्रत्येक भाग के बीच एक खाना रिक्त छोड़ दें। यदि परीक्षार्थी का नाम 22 अक्षरों से अधिक है, तो केवल नाम के प्रथम 22 अक्षर ही लिखें।

Each letter be written in one box and one box be left blank between each part of the name. In case Candidate's Name exceeds 22 letters, write first 22 letters.

कार्यालय उपयोग के लिए
Space for office use

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041 / 00943

Instructions to Candidates

1. On receiving the answer book
 - (i) ensure that answer book contains 40 pages.
 - (ii) check that all pages are serially numbered (including title page)
 - (iii) fill in and blacken all the required details fields correctly
 - (iv) use only blue-black or royal blue ink-gel ballpoint pen.
2. Write on each ruled line on both sides of the answer book.
3. Number your answers according to their numbers in the question paper.
4. Draw a line when a question (or a part thereof) is finished.
5. Do the rough work in the margin on right hand side of the page which should be crossed out afterwards.
6. Securely tag your answer book with supplementary answer book, graphs, maps etc.
7. **DO NOT**
 - (i) waste pages by leaving wide margin.
 - (ii) make any special sign or mark in or outside the answer book, supplementary answer book, graphs and etc.
 - (iii) write your roll number, name of your school or place of examination in any of your answers.
 - (iv) fold the pages of the answer book.
 - (v) ask for supplementary answer book if a candidate's answer book previous supplementary answer book is finished.
 - (vi) leave the examination hall without handing over the answer book to the Assistant Superintendent.
 - (vii) Candidates are directed to write the Question numbers only and only in the margin and not in the centre of the answer book or any other space in the answer book. This will not be evaluated.
 - (viii) Candidates are directed not to write or mark any answers or do any other rough work or any other work on the question paper other than writing their Roll number at the demarcated space.
8. Indulging in any of the following activities shall be treated as use of unfair means practice, result shall not be declared but marked as **UNFAIR MEANS (UFM)**.
 - (a) Having in possession any item or article which has been prohibited in examination centre or may be used for unfair practices including any stationery item, communication device, watches, eatable items, ornaments or any other material or information relevant or not relevant to the examination in the paper concerned.
 - (b) Paying / Placing someone else to write examination (impersonation) on candidate's behalf or preparing material for copying.
 - (c) Breaching examination rules or any direction issued by CBSE from time to time, in connection with the conduct of EXAMINATIONS.
 - (d) Assisting other candidate to engage in malpractices, giving or receiving assistance directly or indirectly of any kind or attempting to do so.
 - (e) Writing questions or answers on any material other than the answer book given by the Centre Superintendent for writing answers.
 - (f) Tearing of any page of the answer book or supplementary answer book etc.
 - (g) Contacting or communicating or trying to do so with any person, other than the Examination Staff, during the examination time in the examination Centre.
 - (h) Communicating with another candidate or the Assistant Superintendent directly or indirectly.
 - (i) Taking away the answer book out of the examination hall/room/centre.
 - (j) Smuggling out Question Paper or its part or smuggling out answer books/supplementary answer sheet or part thereof.
 - (k) Threatening any of the officials connected with the conduct of the examinations or threatening any of the candidates.
 - (l) Using or attempting to use any other undesirable method or means in connection with the examination.
 - (m) Forceful entry/exit in room/Examination Centre Hall.
 - (n) Use or attempted use of any electronic device after entering the examination centre.
 - (o) Uploading / sharing any examination related material, correct or wrong, on social media.
 - (p) Affixing/uploading of fabricated photograph on the admit card.
 - (q) Erasing or obliterating any information printed on the ANSWER BOOK (S).
 - (r) Providing wrong information on the answer sheets.
 - (s) Having in possession question papers of previous years.
 - (t) If a candidate approaches any Authority(ies) person(s) related to the conduct of exams soliciting unauthorized privileges in these examinations.
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केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली
CENTRAL BOARD OF SECONDARY EDUCATION, DELHI

WITH GRAPH PAPER

SECONDARY SCHOOL EXAMINATION (CLASS X)

सैकण्डरी स्कूल परीक्षा (कक्षा दसवीं)

Q.No.	01 ✓	02 ✓	03 ✓	04 ✓	05 ✓	06 ✓	07 ✓	08 ✓	09 ✓	10 ✓	TOTAL	
Marks	01	01	01	01	zero	01	01	01	01	01	09 ✓	
Q.No.	11 ✓	12 ✓	13 ✓	14 ✓	15 ✓	16 ✓	17 ✓	18 ✓	19 ✓	20 ✓	TOTAL	
Marks	01	01	01	01	01	01	01	01	01	01	10 ✓	
Q.No.	21 ✓	22 ✓	23 ✓	24 ✓	25 ✓	26 ✓	27 ✓	28 ✓	29 ✓	30 ✓	TOTAL	
Marks	02	1½	02	1½	02	03	03	03	03	03	24 ✓	
Q.No.	31 ✓	32 ✓	33 ✓	34 ✓	35 ✓	36 ✓	37 ✓	38 ✓	39 ✓	40 ✓	TOTAL	
Marks	2½	05	01	2½	4½	04	2½	3½	—	—	25½ ✓	
TOTAL MARKS IN WORDS		Sixty-Nine Only.									GRAND TOTAL	68½ = 69

मैं प्रमाणित करता/करती हूँ कि मैंने इस उत्तर पत्रिका का मल्लोक्त पृष्ठ एवं के मर्क के साथ ध्यान से काम किया है। मैं प्रमाणित करता/करती हूँ कि मैंने इस उत्तर पत्रिका का मल्लोक्त पृष्ठ एवं के मर्क के साथ ध्यान से काम किया है। मैं प्रमाणित करता/करती हूँ कि मैंने इस उत्तर पत्रिका का मल्लोक्त पृष्ठ एवं के मर्क के साथ ध्यान से काम किया है।

Space for writing
Question Number



SECRET

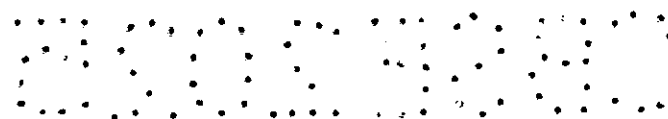


Section-A

- 01 1) (A) No solution ✓
- 01 2) (D) $4/\sqrt{15}$ ✓
- 01 3) (D) irrational number ✓
- 01 4) (C) 0 ✓
- 01 5) ~~(A) $2n-2$ & $2n+2$~~ (C) $(n-1)^2 = 1-2n$ ✓
- 01 6) (A) 2 ✓
- 01 7) (C) ~~b~~ b ✓
- 01 8) (C) 3cm ✓
- 01 9) (C) 150 ✓
- 01 10) (C) $3/4$ ✓
- 01 11) (D) 6cm ✓
- 01 12) (C) $n < 4$ ✓
- 01 13) (B) 8 ✓
- 01 14) (B) 45 ✓
- 01 15) (A) 30 ✓
- 01 16) (C) 2:1 ✓
- 01 17) (B) 13 and 12 ✓
- 01 18) (C) 52 is the mode of the data ✓
- 01 19) (D) Assertion (A) is false, but Reason (R) is true ✓
- 01 20) (D) Assertion (A) is false, but Reason (R) is true ✓

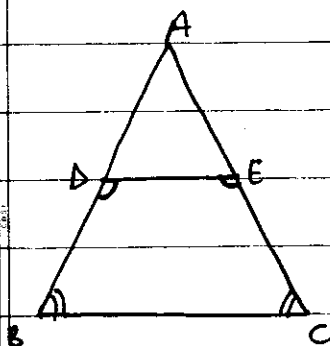


Section-B



21)

(02)



Given $\rightarrow \frac{AD}{BD} = \frac{AE}{EC}$ and $\angle BDE = \angle CED$

To Prove $\rightarrow \triangle ABC$ is isosceles triangle

$$\frac{AD}{BD} = \frac{AE}{EC} \text{ (Given)}$$

$\therefore DE \parallel BC$ (Converse of Basic Proportionality Theorem)

$$\begin{aligned} \angle DBC &= 180 - \angle BDE \\ \angle BCE &= 180 - \angle CED \end{aligned} \quad \left. \begin{array}{l} \\ \end{array} \right\} \text{(Co-interior angles are supplementary)}$$

$$\angle DBC = \angle BCE \text{ (Since } \angle BDE = \angle CED) \rightarrow AB = AC \text{ (Isosceles } \triangle \text{ property)}$$

$\therefore \triangle ABC$ is an isosceles triangle (Angles of equal sides with third side are equal)



22) (i) No. of cards in total = 96 $\frac{1}{2}$

Perfect Square numbers $\rightarrow 9, 16, 25, 36, 49, 64, 81$

No. of favourable outcomes $\rightarrow 7$

$$\text{Probability} = \frac{\text{No. of favourable outcomes}}{\text{Total no. of outcomes}} = \frac{7}{96} \frac{1}{2}$$

(ii) No. of favourable outcomes \rightarrow All except 5 $\rightarrow 96 - 5 = 91$

$$\text{Probability} = \frac{91}{96}$$

23) (a) $101x + 102y = 304 \text{ --- ①}$

② $102x + 101y = 305 \text{ --- ②}$

Adding ① and ②

$$x(101 + 102) + y(101 + 102) = 304 + 305$$

$$(x + y)(203) = 609$$

$$x + y = \frac{609}{203} = 3 \text{ --- ③} \frac{1}{2}$$

Subtracting ① from ②

$$102x - 101x + 101y - 102y = 305 - 304 = 1$$

$$x - y = 1 \text{ --- ④} \frac{1}{2}$$

$$\text{Adding ③ and ④} \rightarrow x - y + x + y = 4 \rightarrow 2x = 4 \rightarrow \boxed{x = 2 \text{ and } y = 1}$$



24) (b) To prove $\rightarrow \tan^2 A + 1 = \sec^2 A$

LHS

$$\tan^2 A + 1 = \frac{\sin^2 A}{\cos^2 A} + 1 \quad \left[\tan A = \frac{\sin A}{\cos A} \right]$$

$$= \frac{\sin^2 A + \cos^2 A}{\cos^2 A} = \frac{1}{\cos^2 A} \quad \left[\text{Identity} \rightarrow \sin^2 A + \cos^2 A = 1 \right]$$

$$\frac{1}{\cos^2 A} = \sec^2 A \quad \left[\sec A = \frac{1}{\cos A} \right]$$

\therefore ~~LHS \neq RHS~~ LHS = RHS

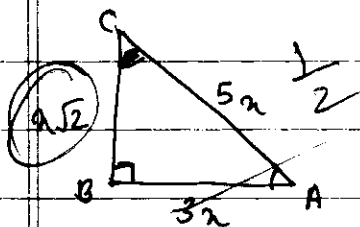
Hence proved.

Given $\rightarrow \sec A = \frac{5}{3}$

Find $\rightarrow \tan A$

$$\Rightarrow \cos A = \frac{1}{\sec A} = \frac{3}{5}$$

let n



$$BC = \sqrt{5n^2 - 3n^2} \quad (\text{Pythagoras Theorem})$$

$$= \sqrt{2n^2} = n\sqrt{2} \text{ units}$$

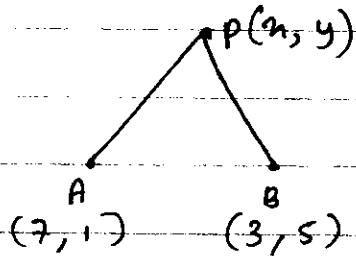
$$\tan A = \frac{\text{altitude}}{\text{base}} = \frac{n\sqrt{2}}{3n} = \frac{\sqrt{2}}{3}$$

$$\tan A = \frac{\sqrt{2}}{3}$$

25)

To prove \rightarrow Abscissa (x coordinate) = 2 + ordinate (y coordinate)

Q2



Given $\rightarrow AP = BP$

$$AP = \sqrt{(7-x)^2 + (1-y)^2}$$

$$BP = \sqrt{(3-x)^2 + (5-y)^2}$$

$$AP = BP = \sqrt{(7-x)^2 + (1-y)^2} = \sqrt{(3-x)^2 + (5-y)^2}$$

$$\Rightarrow (7-x)^2 + (1-y)^2 = (3-x)^2 + (5-y)^2$$

$$49 - 14x + 1 - 2y = 9 - 6x + 25 - 10y$$

$$8x - 8y = 49 + 1 - 9 - 25$$

$$x - y = \frac{16}{8} = 2$$

$$\boxed{x = y + 2}$$



26)(b)

Given $\rightarrow \sin \theta + \cos \theta = n$

To prove $\rightarrow \sin^4 \theta + \cos^4 \theta = \frac{2 - (n^2 - 1)^2}{2}$

03

$\sin \theta + \cos \theta = n$ (Given)

$\sin^4 \theta + \cos^4 \theta = (\sin^2 \theta + \cos^2 \theta)^2 - 2 \sin^2 \theta \cos^2 \theta$

[Identity used $\rightarrow (a+b)^2 = a^2 + b^2 + 2ab$]

$\sin^4 \theta + \cos^4 \theta = 1^2 - 2 \sin^2 \theta \cos^2 \theta$ [Identity used $\rightarrow \sin^2 \theta + \cos^2 \theta = 1$] — ①

$(\sin \theta + \cos \theta)^2 = n^2$

$\sin^2 \theta + \cos^2 \theta + 2 \sin \theta \cos \theta = n^2$

$\sin \theta \cos \theta = \frac{n^2 - 1}{2}$ — ②

Substituting ② in ①,

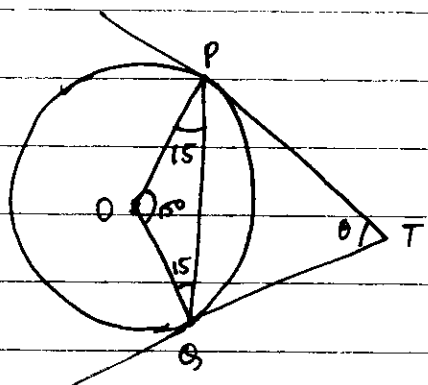
$\sin^4 \theta + \cos^4 \theta = 1 - \frac{2(n^2 - 1)^2}{2} = 1 - \frac{(n^2 - 1)^2}{2}$

$\sin^4 \theta + \cos^4 \theta = \frac{2 - (n^2 - 1)^2}{2}$

Hence Proved.

27)

03



Find $\rightarrow \sin 2\theta$

$OP = OQ$ (Radii of circle)

$\angle OPQ = \angle OQP$ (Applying Isosceles Δ property as in ΔPOQ , $OQ = OP$)

$\therefore \angle OPQ = \angle OQP = 15$ (Given) $\frac{1}{2}$

$\angle POQ = 180 - 2 \times 15 = 150$ (Angle sum property of Δ)

$\&$ $TP = TQ$ (Tangents from external point are equal)

$\therefore \angle TPQ = \angle TQP$ (Isosceles Δ property)

Since tangents are perpendicular to radii,

$$\angle TPO = \angle TQO = 90$$

$$\angle TPQ + \angle OPQ = 90$$

$$\angle TPQ = 90 - \angle OPQ = 90 - 15 = 75$$

$$\therefore \angle TPQ = 15 = \angle TQP$$

Now, $TPOQ$ is a quadrilateral. Hence sum of all angles = 360

$$\angle POQ + \angle OPT + \angle TQO + \angle PTQ = 360$$

$$150 + 90 + 90 + \theta = 360$$

$$\theta = 30$$

$$\sin 2\theta = \sin 60 = \frac{\sqrt{3}}{2}$$

$\frac{1}{2}$



28) (a) To prove $\rightarrow \sqrt{5}$ is irrational

(03) let us assume that $\sqrt{5}$ is rational.

then $\sqrt{5} = \frac{p}{q}$ [Where p and q are integers and co-primes]
and $q \neq 0$

$$\Rightarrow 5 = \frac{p^2}{q^2} \Rightarrow 5q^2 = p^2 \quad \text{--- ①}$$

\Rightarrow Since q^2 divides $5q^2$, it must also divide p^2 .
then, $5c = p$ (for some integer c).

$$25c^2 = p^2$$

$$25c^2 = 5q^2 \quad (\text{from ①})$$

$$5c^2 = q^2$$

\Rightarrow Since 5 divides q^2 , it must also divide q .

This shows that both p and q are divisible by 5 .

However, we had assumed that p and q are co-primes, so this is not possible.

\therefore our assumption that $\sqrt{5}$ can be written in the form of a rational no. is wrong.

$\therefore \sqrt{5}$ is irrational



29) $q(n) = 8n^2 - 2n - 3 = 0$

$n = \frac{2 \pm \sqrt{4 - 4 \times 8 \times -3}}{2 \times 8}$ (Quadratic Formula)

$n = \frac{2 \pm \sqrt{100}}{16} = \frac{2 \pm 10}{16}$

$n = \frac{12}{16}, \frac{-8}{16}$ or $n = \frac{3}{4}, \frac{-1}{2}$

zeros of $q(n) \rightarrow \frac{3}{4}$ and $\frac{-1}{2}$

let $p(n) \rightarrow$ a polynomial whose zeroes are 2 less than zeroes of $q(n)$

Hence $\alpha = \frac{3}{4} - 2 = \frac{-5}{4}$

$\alpha + \beta = \frac{-b}{a} = \frac{-15}{4}$

$\beta = \frac{-1}{2} - 2 = \frac{-5}{2} = \frac{-10}{4}$

$\alpha\beta = \frac{c}{a} = \frac{50}{16}$

$p(n) = [an^2 - (\alpha + \beta)n + \alpha\beta] k$

$p(n) = \left[4n^2 + 15n + \frac{50}{4} \right] k$



30)

03

$$x - 2y + 4 = 0$$

$$2x - y - 4 = 0$$

$$\frac{a_1}{a_2} = \frac{1}{2} \quad \& \quad \frac{b_1}{b_2} = 2 \quad \& \quad \frac{c_1}{c_2} = -1$$

Since $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$, the equations are consistent $\frac{1}{2}$

$$x - 2y = -4$$

x	2	4	8
y	3	4	6

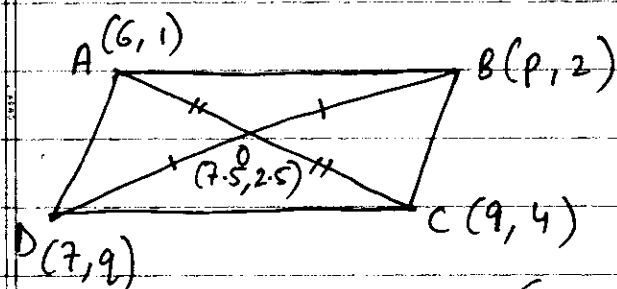
$$2x - y = 4$$

x	2	4	8
y	0	4	12

(NOTE -
Graph on page 19)

31)

2 1/2



$AO = CO$
 $BO = DO$ } Diagonals of a
parallelogram bisect
each other

Coordinates of O = $\left(\frac{15}{2}, \frac{5}{2} \right)$

Section formula $\rightarrow (x, y) = \left(\frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}, \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2} \right)$

$$\frac{15}{2} = \frac{7 + p}{2} \Rightarrow 14 + 2p = 30$$

$$p = 8$$

$$\frac{5}{2} = \frac{q + 2}{2} \Rightarrow 2q + 4 = 10$$

$$q = 3$$



To check if ABCD is a rectangle,

$$AB = \sqrt{(6-8)^2 + (1-2)^2} = \sqrt{5}$$

$$BC = \sqrt{(7-9)^2 + (3-4)^2} = \sqrt{5}$$

$$AD = \sqrt{(7-6)^2 + (3-1)^2} = \sqrt{5}$$

$$BC = \sqrt{(9-8)^2 + (7-2)^2} = \sqrt{5}$$

$$\frac{1}{2}$$

Since opposite sides are equal ABCD is a rectangle.



Section-D

$f_i \rightarrow$ frequency

$cf \rightarrow$ cumulative frequency

32)

05

No. of Members	f_i	cf
0 - 2	10	10
2 - 4	p	$10+p$
4 - 6	60	$70+p$
6 - 8	q	$70+p+q$
8 - 10	5	$75+p+q$

Median Class

$$75 + p + q = 120$$

$$p + q = 45 \quad \text{--- (1)}$$

$$\sum f_i = 120$$

$$\text{Median} = \left(\frac{\frac{n}{2} - cf}{f} \right) h + l$$

$$5 = \frac{60 - 10 - p}{60} \times 2 + 4$$

$$1 = \frac{100 - 2p}{60} \Rightarrow p = 100 - 2p$$

$$3p = 100 \Rightarrow p = \frac{100}{3}$$

$$100 - 2p = 60 \Rightarrow 2p = 40 \Rightarrow p = 20$$

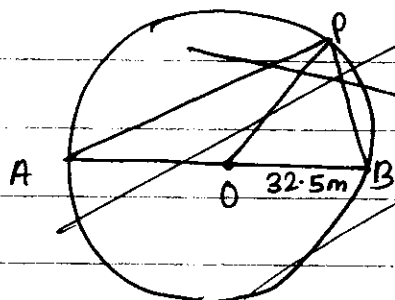
from (1), $p + q = 45$

$$q = 45 - p = 45 - 20 = 25$$

$$q = 25$$

Space for writing
Question Number

33)

let $BP = n$ mthen $AP = (n + 35)$ mradius = $\frac{\text{diameter}}{2} = \frac{65}{2} = 32.5$

33) (b) $x^2 - 2(p+1)x + p^2 = 0$

for real roots, discriminant > 0

$$\therefore 4 - 2^2(p+1)^2 - 4p^2 > 0$$

$$4(p+1)^2 > 4p^2 \quad 4(p+1)^2 - 4p^2 > 0$$

$$(p+1)^2 - p^2 > 0$$

$$1 + 2p > 0$$

if $p = 0$ then $1 + 2p = 1$ which is > 0

\therefore smallest value of p for which the equation has real roots $= 0$

$$x^2 - 2(0+1)x + 0^2 = 0$$

$$x^2 - 2x = 0$$

$$x^2 = 2x \Rightarrow x = 2$$



$$\text{height of cylinder} = 105.6 - 2 \times 2.8 = 100 \text{ mm}$$

$$\text{radius} = 2.1 \text{ mm}$$

34)

$$\text{TSA of pencil} = \text{CSA of cylinder} + 2 \times \text{CSA of cone}$$

$$= 2\pi r h + 2\pi r l$$

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

$$l = \frac{\sqrt{h^2 + r^2}}{2} = 2 \times \frac{22}{7} \times \frac{21^3}{10} \times \frac{0.07}{10} \quad Q = ?$$

$$l = \frac{\sqrt{2.8^2 + 2.1^2}}{2}$$

$$l = 0.7 \text{ mm}$$

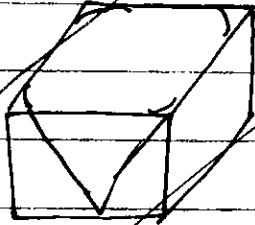
$$= \frac{132924}{100} = 1329.24 \text{ mm}^2$$

$$\begin{array}{r} 1007 \\ \times 8 \\ \hline 8056 \\ 10070 \\ + 2014 \\ \hline 12084 \end{array}$$

$$\begin{array}{r} 120840 \\ + 12084 \\ \hline 132924 \end{array}$$



35) height of ^{the} largest possible cone = 14 cm
radius of cone = 7 cm



$$l = \sqrt{h^2 + r^2} = 7\sqrt{5} \text{ cm}$$

Volume of remaining solid =

Volume of cube - Volume of cone

$$= 14^3 - \frac{\pi r^2 h}{3} = 14^3 - \frac{22}{7} \times 7 \times 7 \times \frac{14}{3}$$

$$= 14(14^2 - \frac{154}{3}) = 14 \times \frac{1078}{3}$$

$$= 196 - \frac{1078}{3} = 196 - 359.33$$

$$= 196 - \frac{2156}{3} = 196 - 718.66$$

$$\begin{array}{r} 196 \\ + 49 \\ \hline 245 \end{array}$$

$$5 \times 49$$

$$\begin{array}{r} 280 \\ + 286 \\ \hline 566 \end{array}$$

$$\begin{array}{r} 214 \\ \times 7 \\ \hline 1498 \end{array}$$

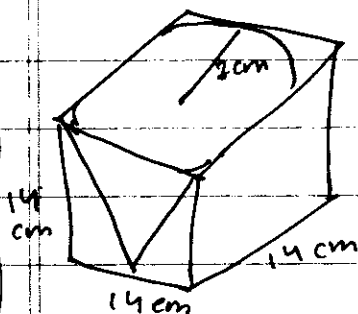
$$\begin{array}{r} 198 \\ \times 2 \\ \hline 396 \end{array}$$

$$\begin{array}{r} 980 \\ + 98 \\ \hline 1078 \end{array}$$

$$\begin{array}{r} 1960 \\ + 196 \\ \hline 2156 \end{array}$$



35)



largest possible height of cone = 14 cm

radius = 7 cm

$$l = \sqrt{14^2 + 7^2} = 7\sqrt{5} \text{ cm}$$

Volume remaining solid =

Volume of cube - Volume of cone =

$$14^3 - \frac{22 \times 7 \times 7 \times 14}{3}$$

$$= 14^3 - \frac{22}{7} \times 7 \times 7 \times \frac{14}{3} = 448 \times \frac{1}{2}$$

$$= 2744 - \frac{2156}{3}$$

$$= \frac{8232 - 2156}{3} = \frac{6076}{3} \text{ cm}^3$$

SA of solid = SA of cube

$$6l^2 - \pi r^2 + \pi r l$$

$$= 6 \times 14 \times 14 + \pi r (l - r)$$

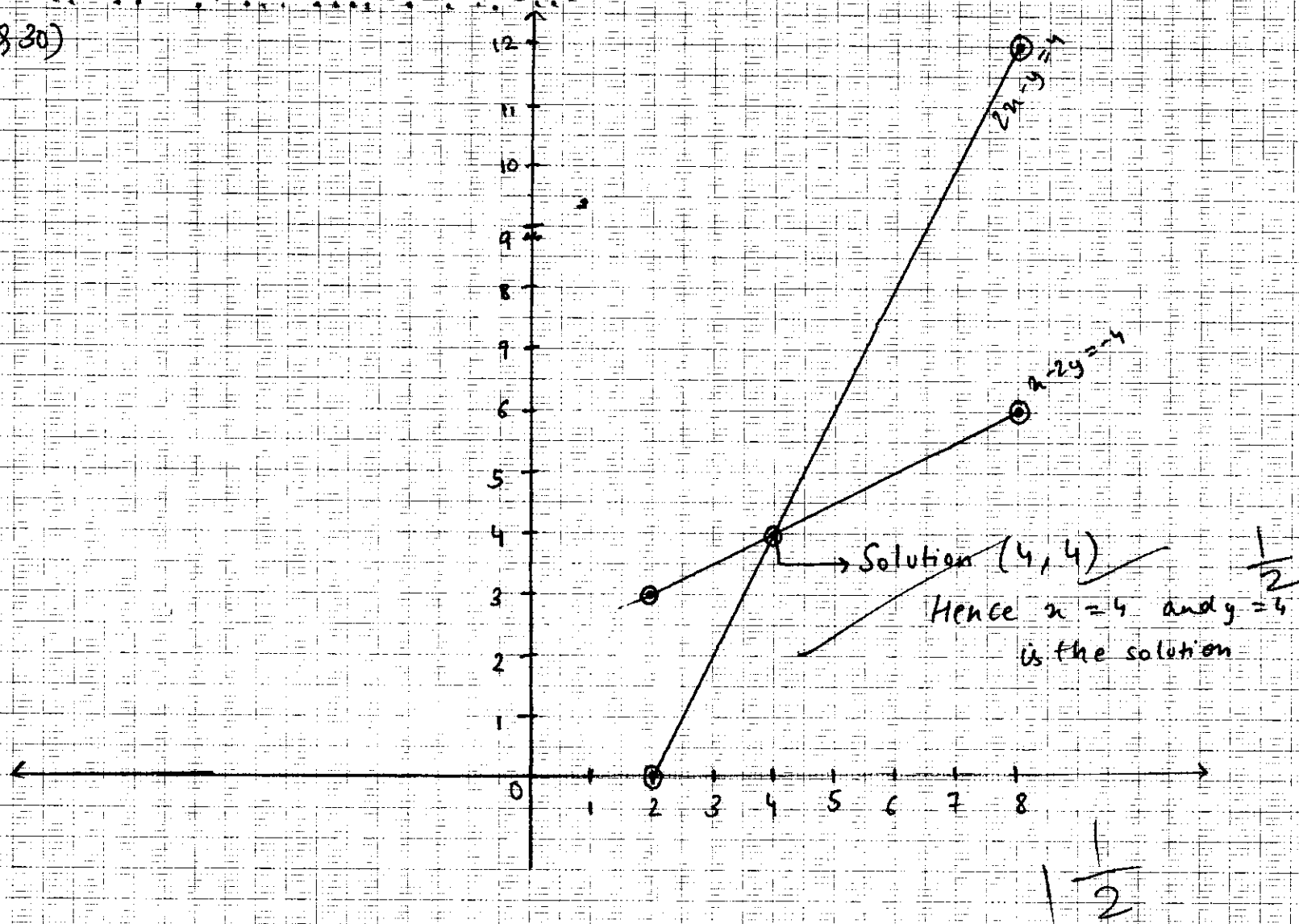
$$= 6 \times 14 \times 14 + \frac{22}{7} \times 7 \times 7 (\sqrt{5} - 1)$$

$$= 1176 + 154 \times 1.2 = 1176 + 184.8$$

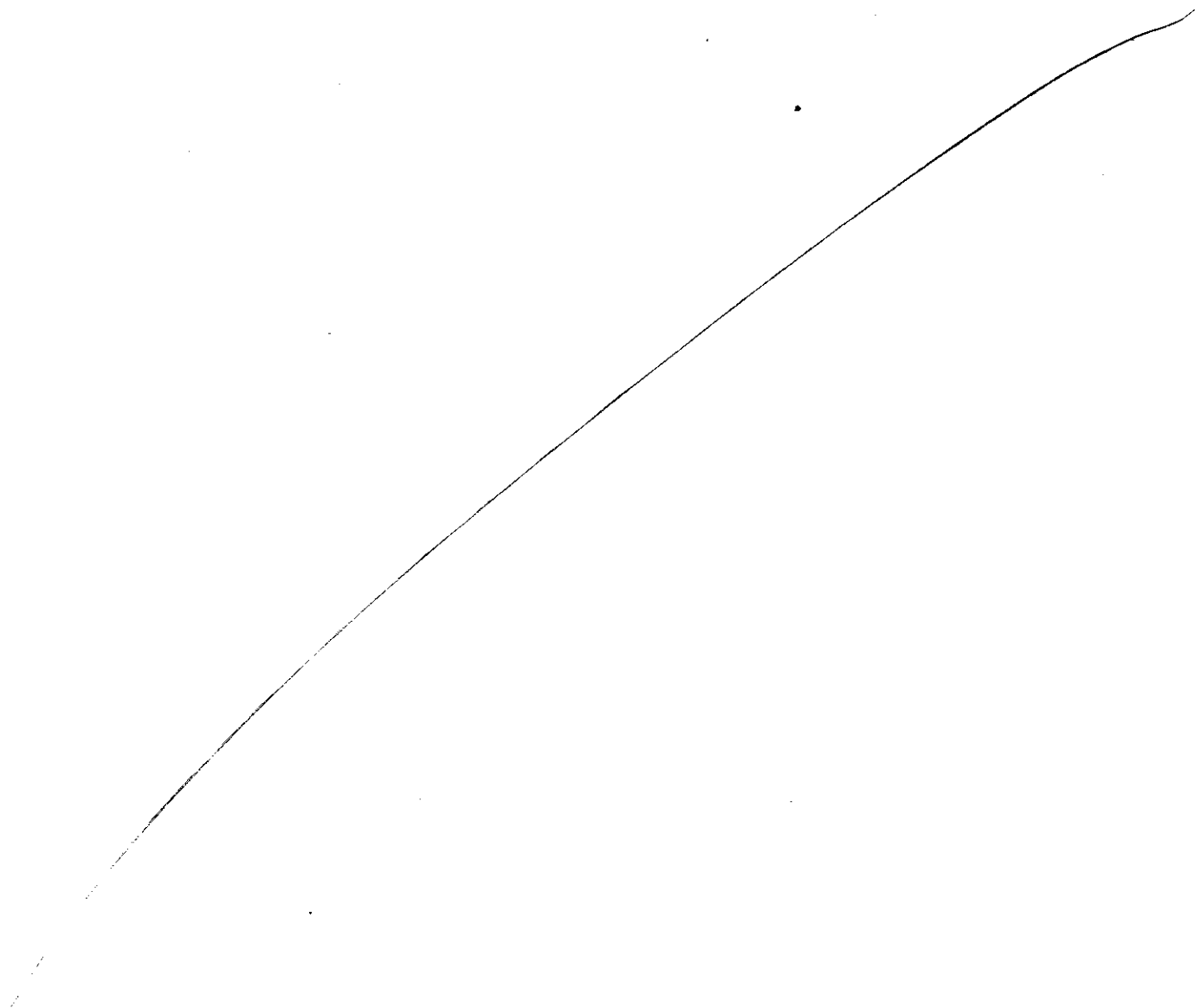
$$= 1360.8 \text{ cm}^2$$

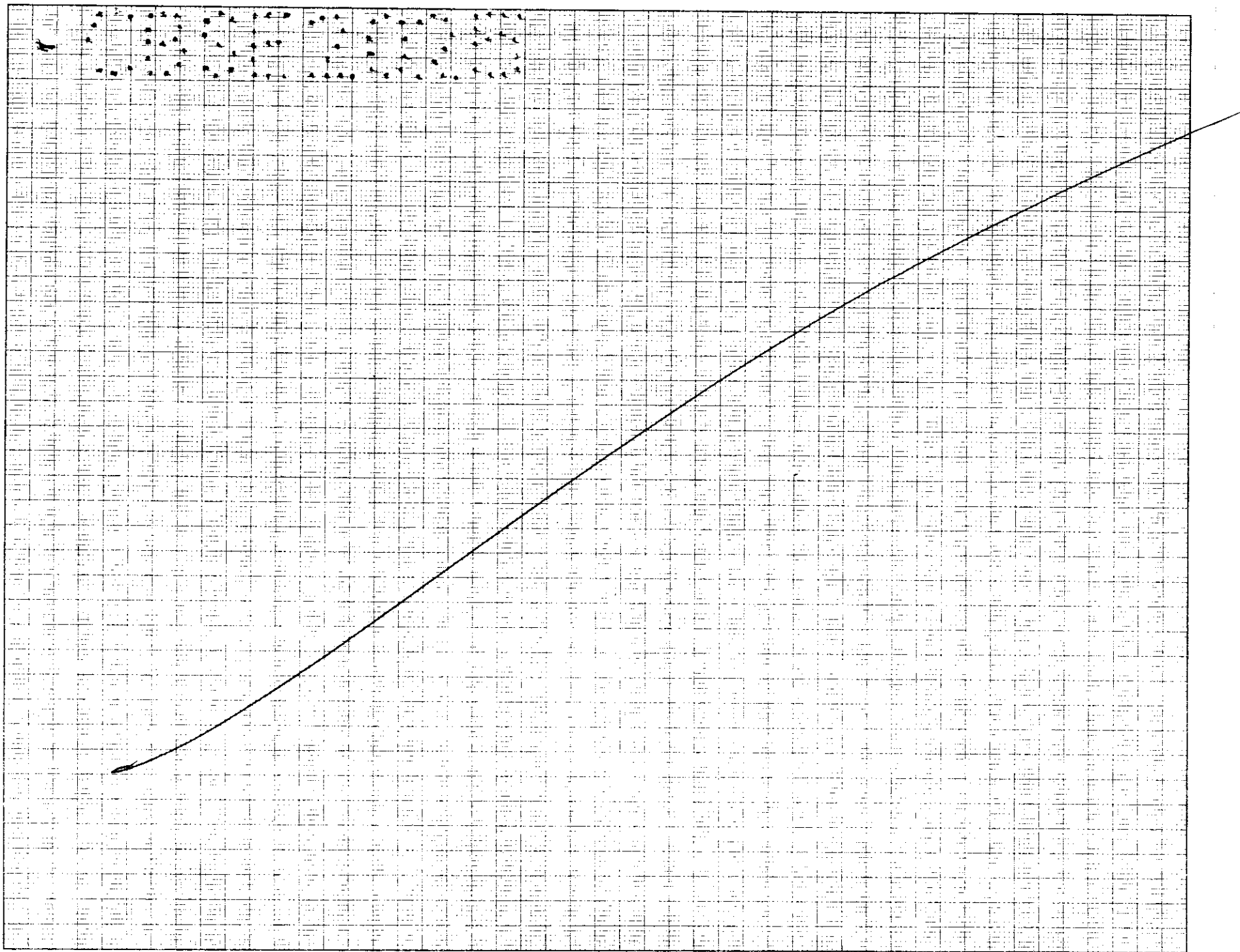
$$\begin{array}{r} 146 \\ \times 9 \\ \hline 784 \\ 1460 \\ + 784 \\ \hline 2744 \\ 22744 \\ \times 3 \\ \hline 8232 \\ - 2156 \\ \hline 6076 \\ 5996 \\ \times 6 \\ \hline 1176 \\ 1540 \\ + 308 \\ \hline 1848 \end{array}$$

(Q.30)

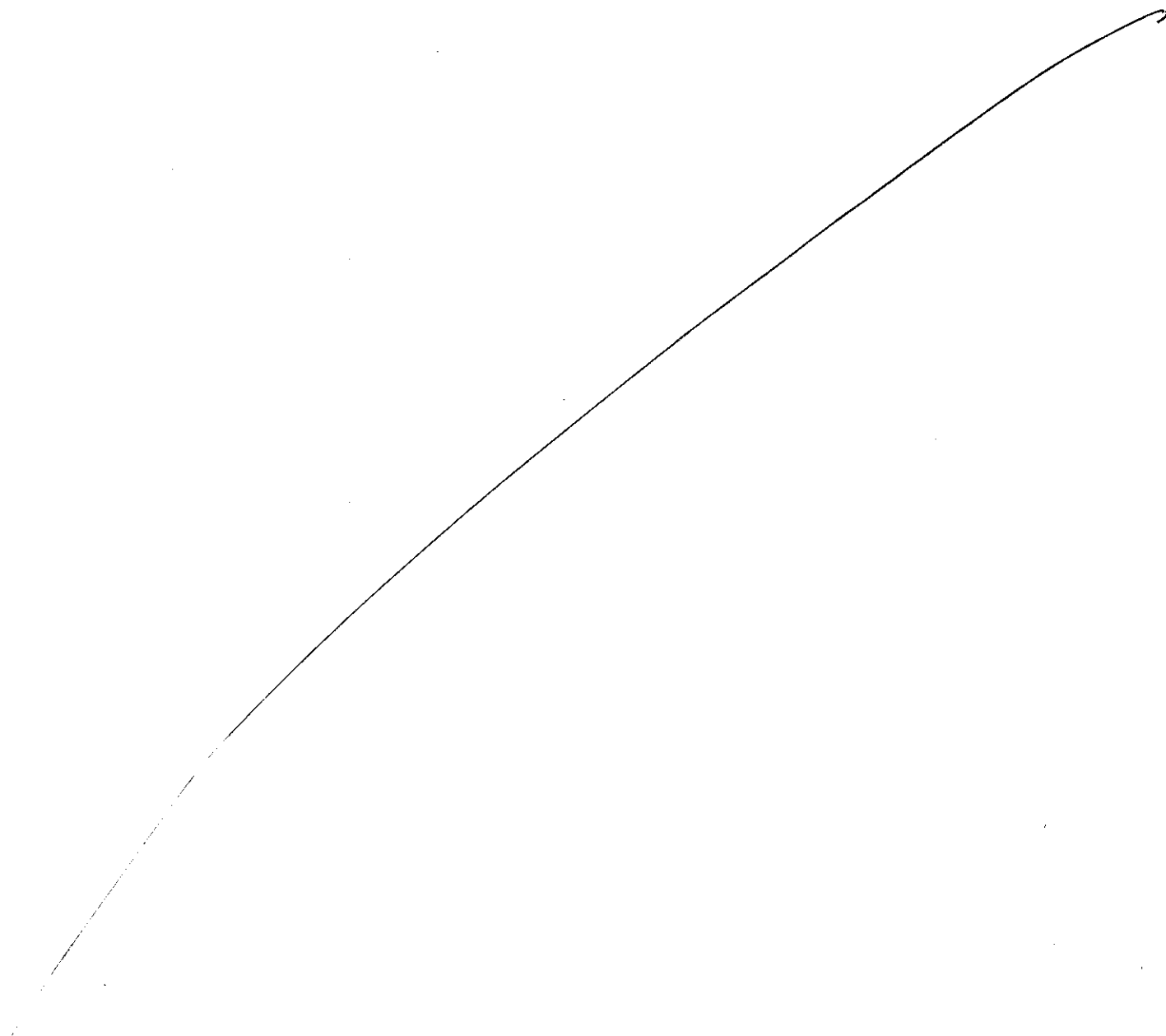


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Section-E

36)(i) AP $\rightarrow 400, 400 + 7.6, 400 + 7.6 + 7.6$

$a = 400$

$d = 7.6$

6th lane length $= a_6 = a + 5d = 400 + 5 \times 7.6$
 $= 400 + 380 = 438 \text{ m}$

(ii) 8th lane $= 400 + 7 \times 7.6 = 400 + 53.2 = 453.2 \text{ m}$

4th lane $= 400 + 3 \times 7.6 = 400 + 22.8 = 422.8 \text{ m}$

8th lane is 30.4 m longer than 4th lane

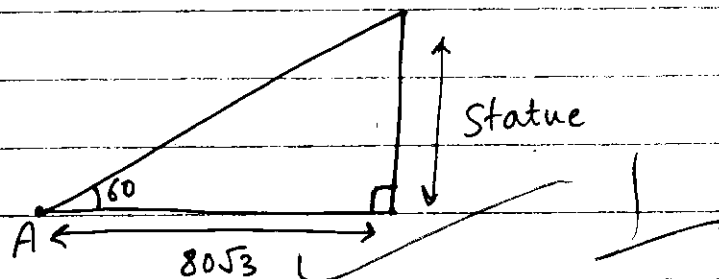
(iii)(a) Total distance covered by student $= S_6$

$S_n = \frac{n}{2} (2a + (n-1)d) \Rightarrow S_6 = \frac{6}{2} (800 + 5 \times 7.6)$

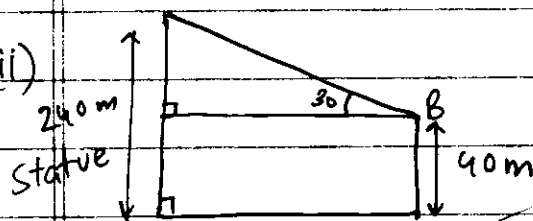
$S_6 = 3(800 + 38) = 3 \times 838 = 2514 \text{ m}$



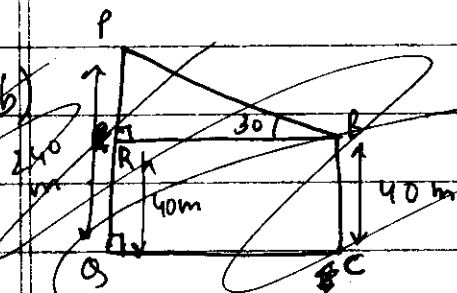
37)(i)

 $2\frac{1}{2}$


(ii)

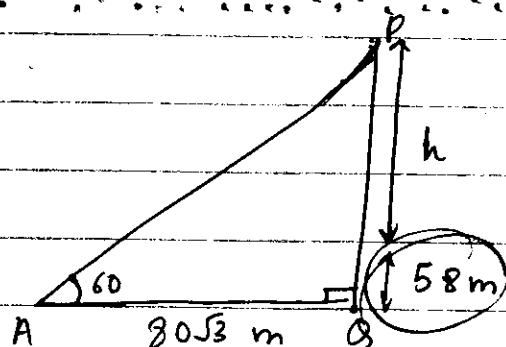


(iii) (b)

Find \rightarrow ~~BC~~ and $\tan \alpha$
 $RQ = BE = 40m$ (Since $RQCB$ is a rectangle)

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37)(ii)



Find \rightarrow h and $h+58$

$$\tan 60 = \frac{58+h}{80\sqrt{3}} = \frac{\sqrt{3}}{1}$$

$$58+h = 80\sqrt{3}$$

$$h = 80\sqrt{3} - 58 \text{ m}$$

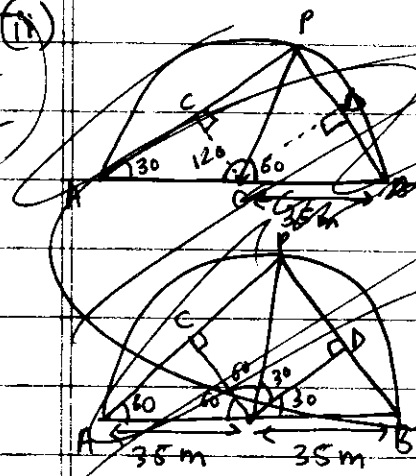
$$\frac{1}{2}$$

height including base $\rightarrow 80\sqrt{3} \text{ m}$

height excluding base $\rightarrow (80\sqrt{3} - 58) \text{ m}$

38)(i) $\angle POA = 180 - 2 \times 30 = 120$ (Angle Sum Prop.)

31/2



$$\text{Length of } AP = 2AC = 2\sqrt{35^2 - 35^2}$$

$$\text{Length of } AP = 2AC = 2\sqrt{35^2 - 35^2}$$

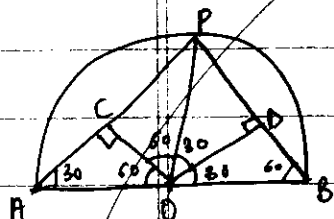


38)(ii) length of ~~fence~~^{wire} needed = $\frac{\text{circumference}}{2} + AP + BP + AB$

$$AP = 2AC = 70$$

$$\text{or } \frac{OC}{AC} = \tan 30$$

$$\frac{35}{AC} = \frac{1}{\sqrt{3}} \Rightarrow AC = 35\sqrt{3} \text{ m}$$



$$AP = 70\sqrt{3} \text{ m}$$

$$BP = 2BD$$

$$BD = \frac{OD}{BO} = \tan 60 = \sqrt{3}$$

$$BD = \frac{OD}{3} = \frac{35}{\sqrt{3}} \text{ m}$$

$$BP = \frac{70}{\sqrt{3}} \text{ m}$$

$$\text{length of fence} = \frac{70}{\sqrt{3}} + 70\sqrt{3} + 70 + 2 \times \frac{22}{7} \times \frac{35^2}{2}$$

$$= 70 \left(\frac{1}{\sqrt{3}} + \sqrt{3} + 1 \right) + 110$$

$$= \frac{70(4+\sqrt{3})}{\sqrt{3}} + 110 \text{ m}$$

38)(ii) (a) Area of region I = $\frac{\theta}{360} \times \pi r^2 - r^2 \times \sin\left(\frac{\theta}{2}\right) \times \cos\left(\frac{\theta}{2}\right)$

$$= \frac{80}{360} \times \frac{22}{7} \times 35^2 - 35 \times 35 \times \frac{\sqrt{3}}{4}$$

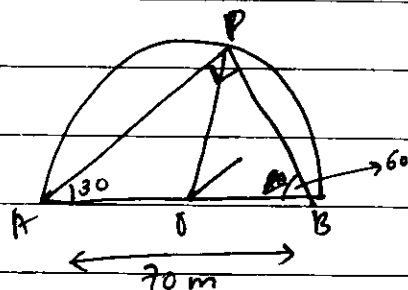
$$= \frac{1925}{3} - \frac{1225\sqrt{3}}{4}$$

$$= \frac{7700 - 3675\sqrt{3}}{12} \text{ m}^2$$

$$\begin{array}{r} 1750 \\ + 175 \\ \hline 1925 \end{array}$$

$$\begin{array}{r} 1050 \\ + 175 \\ \hline 1225 \end{array}$$

38)(ii)



$$\frac{AP}{AB} = \cos 30 = \frac{\sqrt{3}}{2}$$

$$AP = AB \times \frac{\sqrt{3}}{2} = 35\sqrt{3} \text{ m}$$

$$\frac{BP}{AB} = \sin 30 = \frac{1}{2}$$

$$BP = \frac{AB}{2} = 35 \text{ m}$$

Wire length needed = $\frac{2\pi r}{2} + AP + BP + AB$

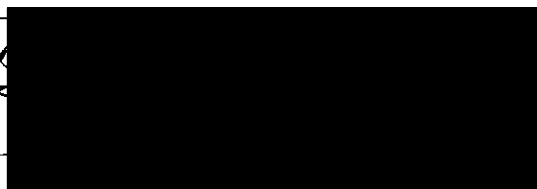
$$\frac{1}{2} = 110 + 35\sqrt{3} + 35 + 70 = (215 + 35\sqrt{3}) \text{ m}$$



$$\frac{68\frac{1}{2}}{80}$$

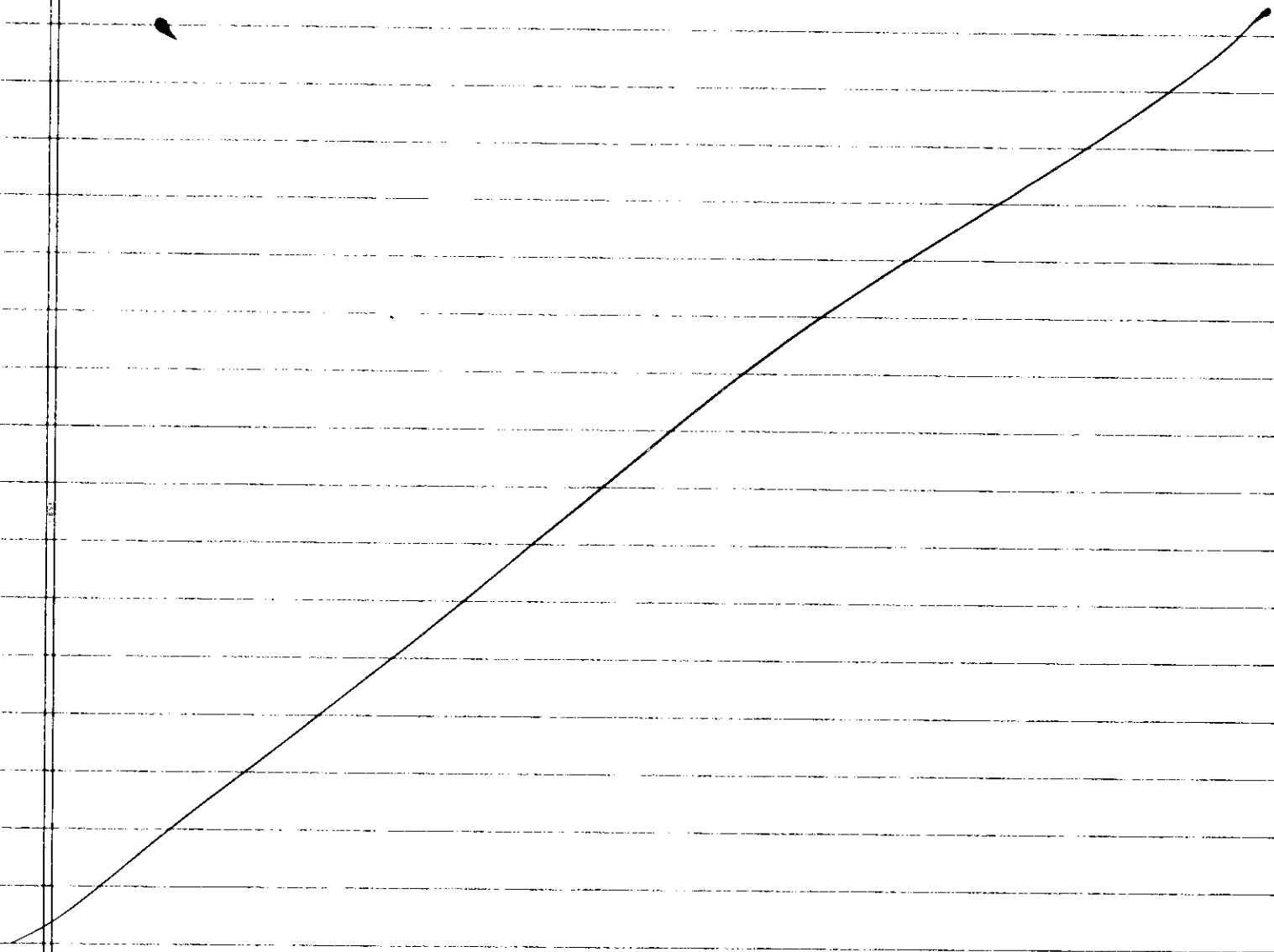
$$= \frac{69}{80}$$

Sixty-Nine Only



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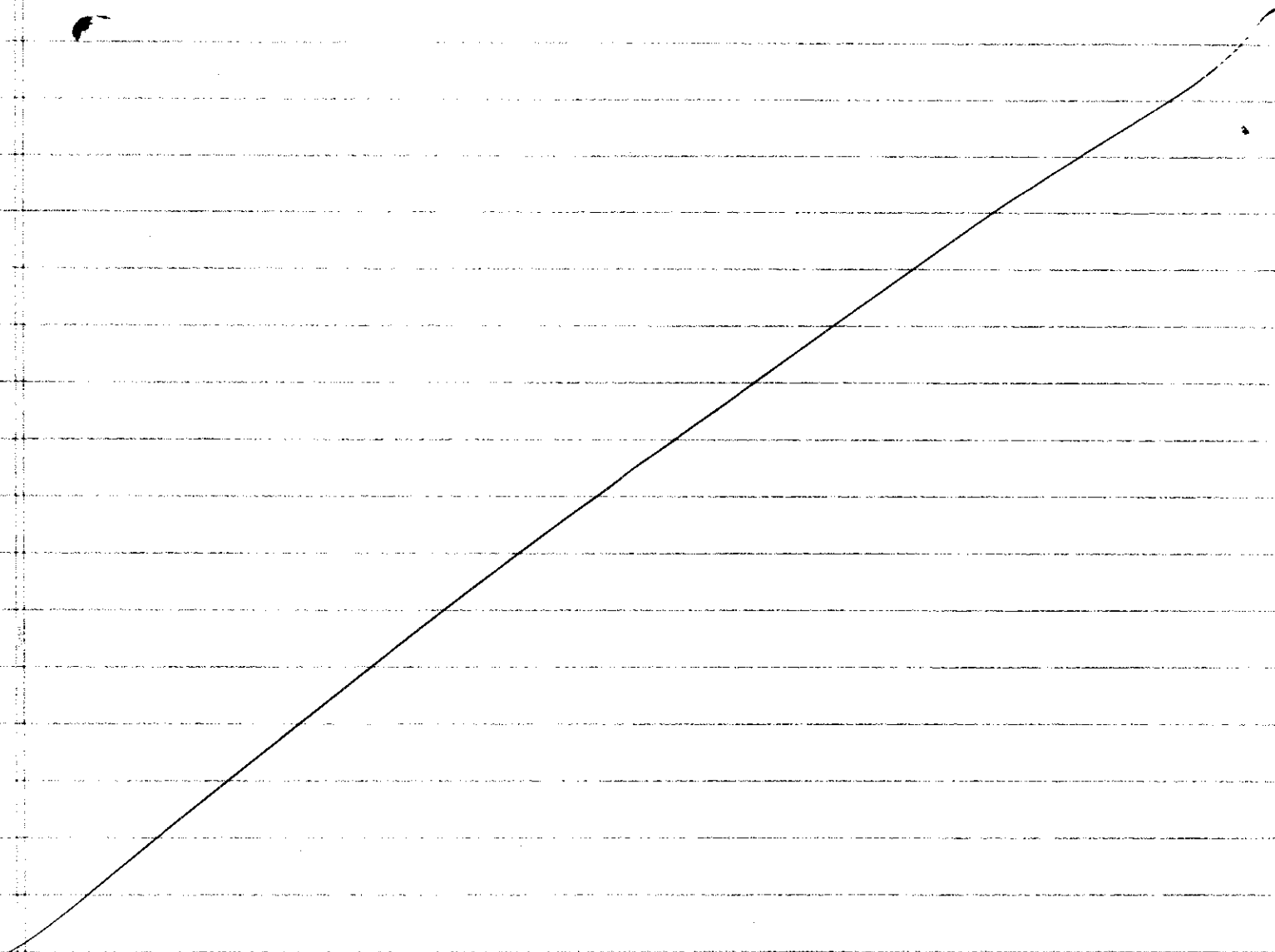
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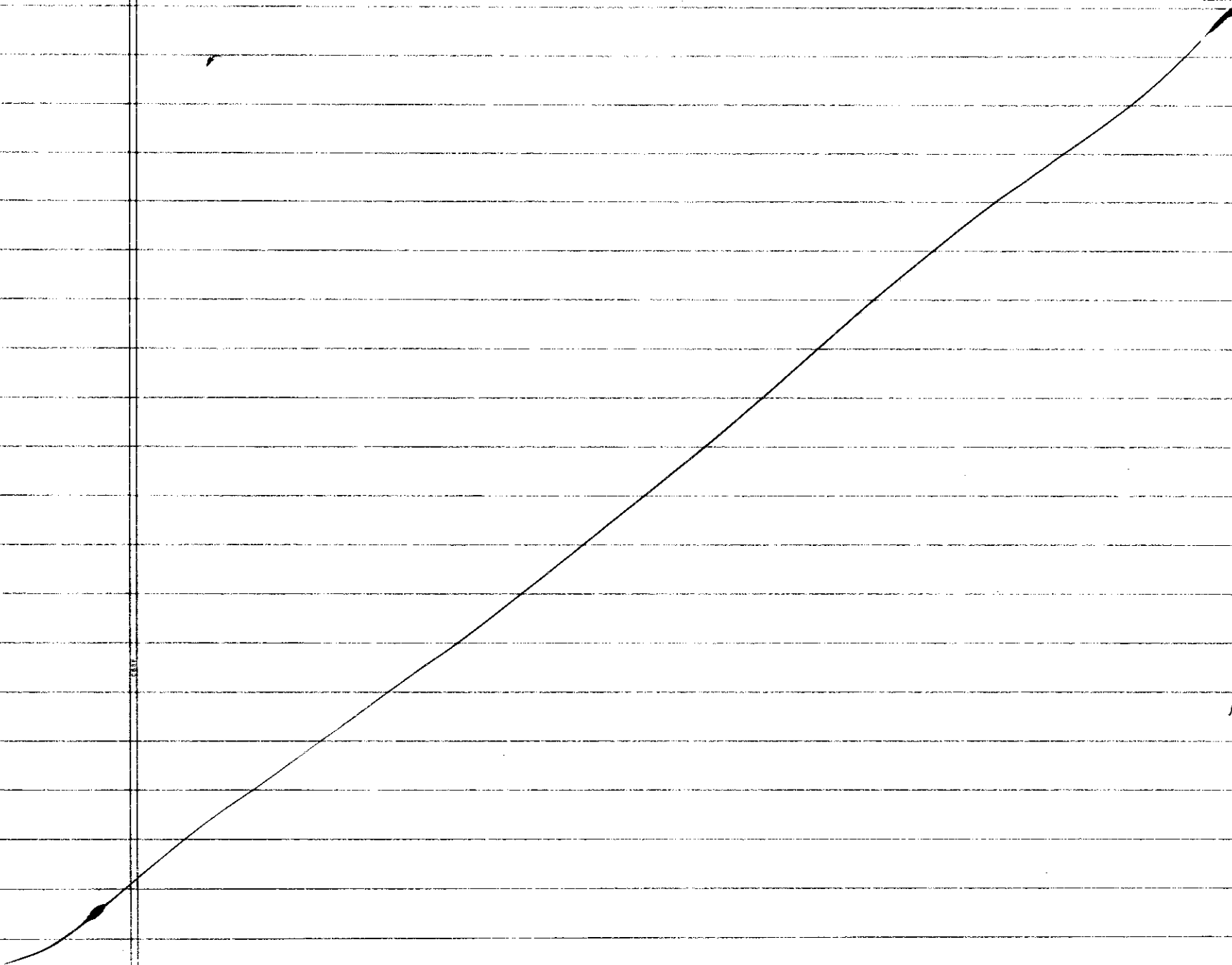
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31





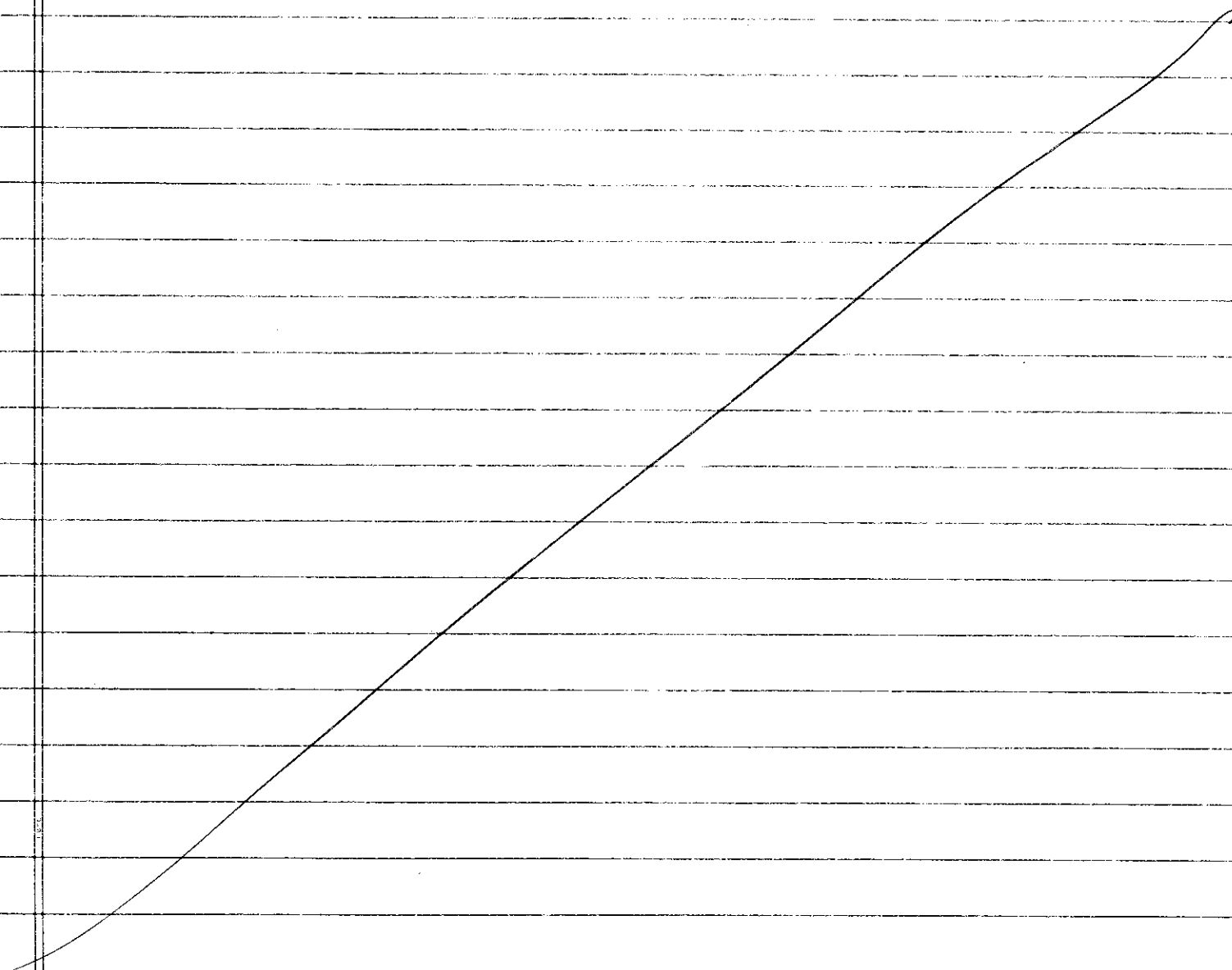
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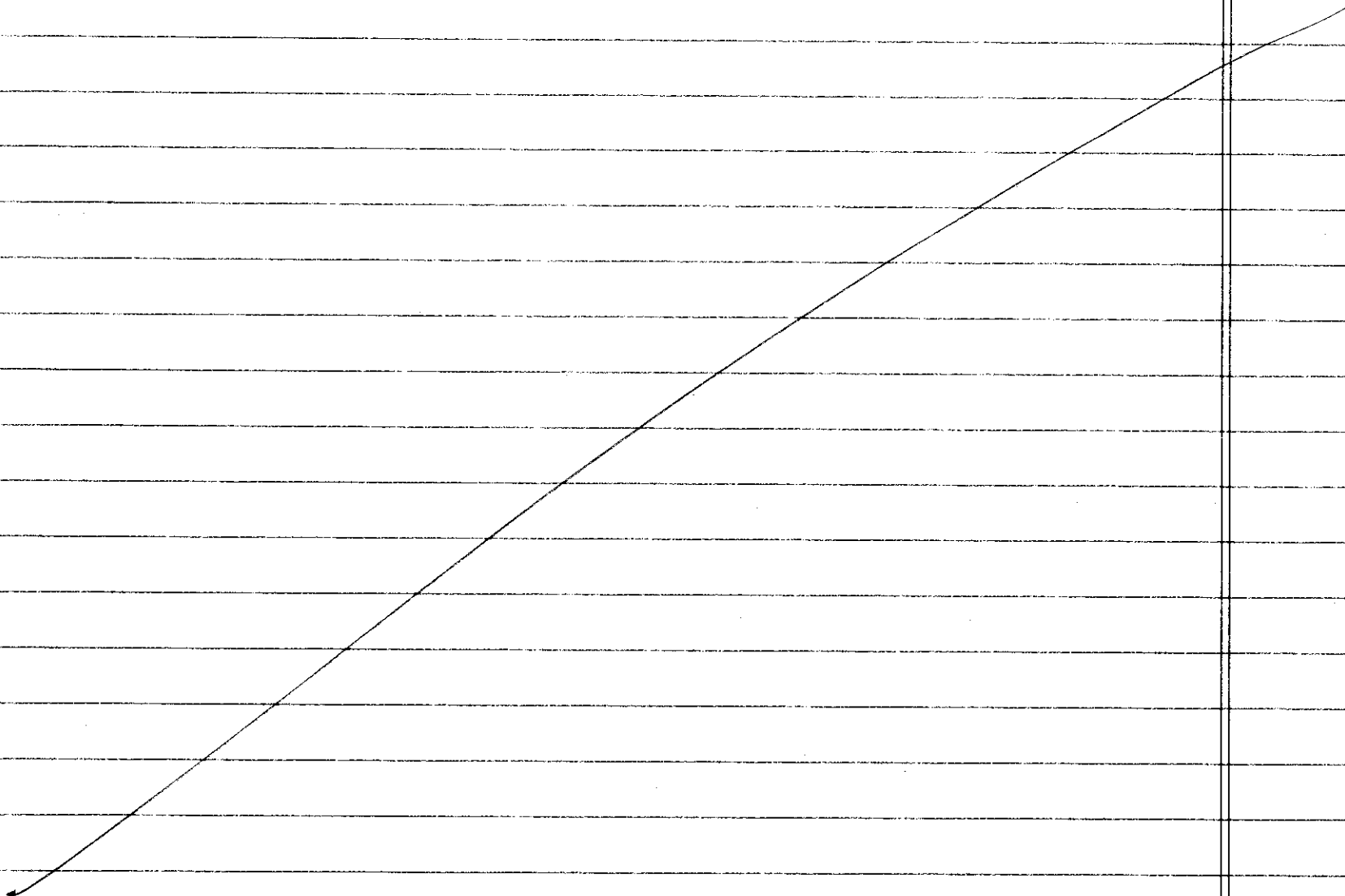
QUESTION

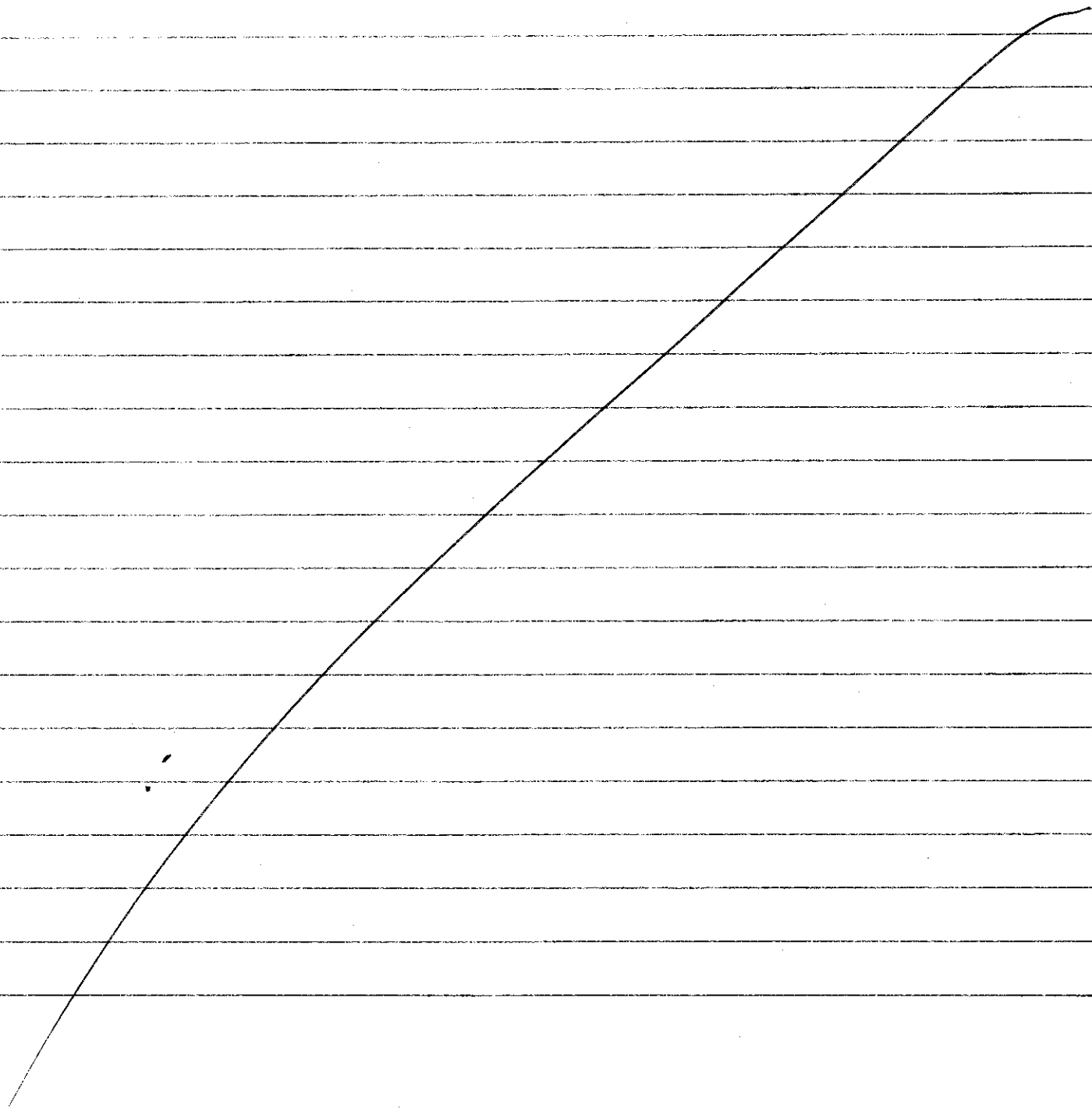
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Question Number





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Question Number





$$x = \cos 30 - \sin 30$$

$$= \frac{\sqrt{3}}{2} - \frac{1}{2} = \frac{\sqrt{3}-1}{2}$$

$$y = \tan 60 - \cot 60$$

$$= \sqrt{3} - \frac{1}{\sqrt{3}}$$

$$= \frac{2}{\sqrt{3}}$$

$$x = \frac{3-\sqrt{3}}{2\sqrt{3}} \quad y = \frac{4}{2\sqrt{3}}$$

$$\text{Mean} + \text{Median} = 25 \text{ --- (1)}$$

$$\text{Mode} = 10$$

$$3 \text{ Median} = 2 \text{ Mean} + \text{Mode}$$

$$3 \text{ Median} - 2 \text{ mean} = 10 \text{ --- (2)}$$

$$3 \text{ median} - 2 \text{ mean} + 2 \text{ mean} + 2 \text{ median} = 10 + 50$$

$$5 \text{ median} = 60$$

$$\text{Median} = 12$$

$$\text{Mean} = 13$$

Rough work

$$\sqrt{(a-0)^2 + (b-0)^2} = \sqrt{a^2 + b^2}$$

$$\frac{2}{1.5} = \frac{AB}{0.75}$$

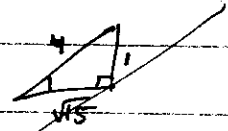
$$\frac{2}{3.5} = \frac{4}{n} \Rightarrow n = \frac{4 \times 3.5}{2} = 7$$

$$4 + 10.25$$

$$\frac{1}{2} \neq \frac{5}{-1}$$

$$4, -3, 0, -7$$

$$AQ = \frac{2}{12} \times 100 \times \frac{100}{2581} = 4$$

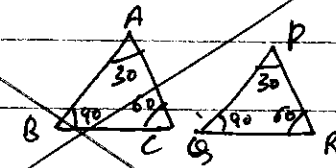


$$n^2 - 2n = -2n$$

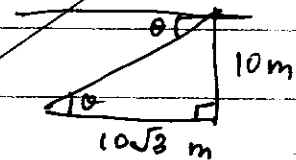
$$n^2 = 0$$

$$\frac{2a}{b} \times \frac{1}{a} = 1$$

$$2 = b$$



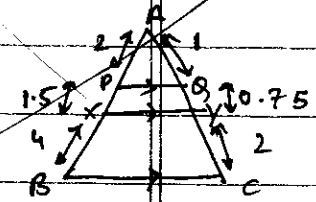
TT
(TH)
(HT)
(HH)



$$\tan \theta = \frac{1}{\sqrt{3}} \Rightarrow \theta = 30$$

$$\frac{2V}{3} \times \frac{3}{V} = 2:1$$

(1, 2, 3, 4, 5, 6)



$$AQ = \frac{2 \times 10}{18} \times \frac{100}{2581} = 1$$

$$CY = \frac{4}{3.5} \times 1.75 = \frac{4 \times 10}{2581} \times \frac{100}{175} = 2$$



2025

2025

