

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

य Subject : MATHE MATICS

य कोड Subject Code : 041

का दिन एवं तिथि  
& Date of the Examination : THURSDAY, 07 MARCH

र देने का माध्यम  
dium of answering the paper : ENGLISH

पत्र के ऊपर लिखे  
को दर्शाएँ :  
e code No. as written on  
top of the question paper :

| Code Number |
|-------------|
| 30/1/2      |

| Set Number |
|------------|
| ① ● ③ ④    |

रिक्त उत्तर-पुस्तिका (ओं) की संख्या  
. of supplementary answer -book(s) used

सर्क विकलांग व्यक्ति  
son with Benchmark Disabilities

हाँ / नहीं  
Yes / No

NO

लांगता का कोड  
य पत्र के अनुसार)  
e of Disabilities  
given on Admit Card)

लेखन - लिपिक उपलब्ध करवाया गया : हाँ / नहीं  
Whether writer provided : Yes / No

दृष्टिहीन हैं तो उपयोग में लाए गये  
टवेयर का नाम :  
usually challenged, name of software used :

जाने में एक अक्षर लिखें। नाम के प्रत्येक भाग के बीच एक खाना रिक्त छोड़ दें। यदि परीक्षार्थी का  
अक्षरों से अधिक है, तो केवल नाम के प्रथम 24 अक्षर ही लिखें।

letter be written in one box and one box be left blank between each part of the  
. In case Candidate's Name exceeds 24 letters, write first 24 letters.

लय उपयोग के लिए  
e for office use

**1268640**  
**041 / 12307**  


## Instructions to Candidates

1. Make sure that the answer-book contains 48 pages and are properly serial in number (including title pages) as soon as you receive it.
2. **DO NOT** make any special sign or mark in or outside the answer-book supplementary answer-book, graph-paper, map etc.
3. **DO NOT** write your roll no., name of your school or place of examination in a of your answers.
4. You must write the supplementary answer-book serial no. in the attendar sheet.
5. Write on each ruled line on both sides and do not waste pages by leaving wider margin.
6. **DO NOT** tear out or fold the pages of the answer-book and do not leave a page blank unnecessarily. No supplementary answer-book(s) should be ask for unless this answer-book / the previous supplementary answer-book finished.
7. Number your answers according to their numbers in the question paper.
8. Draw a line when a question (or a part thereof) is finished.
9. Securely tag your answer-book with supplementary answer-book( graph-paper, map etc. if used by you, but **DO NOT** write your Roll No. on tl supplementary answer-book, graph-paper, map etc. .
10. Use only blue-black or royal-blue ink/gel/ball point pen. Using of any other writi instrument/ink/pencil etc will be on your own risk and responsibility.
11. For rough calculation etc., appropriate margin on the right-hand side the page may be drawn. The rough calculations etc. should be crossed c afterwards.
12. **DO NOT** leave the examination hall without handing over the answer-book the Asstt. Supdt.
13. If during the course of examination, a candidate is found indulging in any of t following, he/she shall be deemed to have used unfair means at t examinations, and as such his/her result shall not be declared but shall marked as **UNFAIR MEANS (U.F.M.) :-**
  - (a) having in possession papers, books, notes or any other material i information relevant to the examination in the paper concerned;
  - (b) giving or recejving assistance directly or indirectly of any kind c attempting to do so;
  - (c) writing questions or answers on any material other than the answer boc given by the Centre Superintendent for writing answers;
  - (d) tearing of any page of the answer-book or supplementary answer-book et
  - (e) contacting or communicating or trying to do so with any person, other th the Examination Staff, during the examination time in the examination centr
  - (f) taking away the answer-book out of the examination hall/room;
  - (g) using or attempting to use any other undesirable method or mean in connection with the examination;
  - (h) smuggling out Question Paper or its part or smuggling out answer-boo supplementary answer-sheet or part thereof; and
  - (i) threatening any of the officials connected with the conduct of the examination or threatening of any of the candidates.



केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली  
Central Board of Secondary Education, Delhi  
SECONDARY SCHOOL EXAMINATION (CLASS X)

WITH GRAPH PAPER

सैकण्डरी स्कूल परीक्षा (कक्षा दसवीं)

|        |    |    |    |     |    |    |    |    |    |    |        |
|--------|----|----|----|-----|----|----|----|----|----|----|--------|
| Q. No. | 01 | 02 | 03 | 04  | 05 | 06 | 07 | 08 | 09 | 10 | TOTAL  |
| MARKS  | 1  | 1  | 1  | 1/2 | 1  | 1  | 2  | 2  | 2  | 2  | 13 1/2 |

|        |    |    |    |    |    |    |    |    |    |    |       |
|--------|----|----|----|----|----|----|----|----|----|----|-------|
| Q. No. | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | TOTAL |
| MARKS  | 2  | 2  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 28    |

|        |    |    |    |    |    |    |    |    |    |    |       |
|--------|----|----|----|----|----|----|----|----|----|----|-------|
| Q. No. | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | TOTAL |
| MARKS  | 3  | 3  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 38    |

|        |    |    |    |    |    |    |    |    |    |    |       |
|--------|----|----|----|----|----|----|----|----|----|----|-------|
| Q. No. | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | TOTAL |
| MARKS  |    |    |    |    |    |    |    |    |    |    |       |

|                |             |        |
|----------------|-------------|--------|
|                | GRAND TOTAL | 79 1/2 |
| MARKS IN WORDS | Eighty .    |        |

100 (80)

2019

## SECTION D

Answer No. (30)

Let  $BC = x$ , then  $\Rightarrow CD = 80 - x$

In  $\triangle ABC$

$$\tan 60^\circ = \frac{AB}{BC} = \frac{h}{x} = \sqrt{3}$$

$$h = x\sqrt{3} \quad - (i)$$

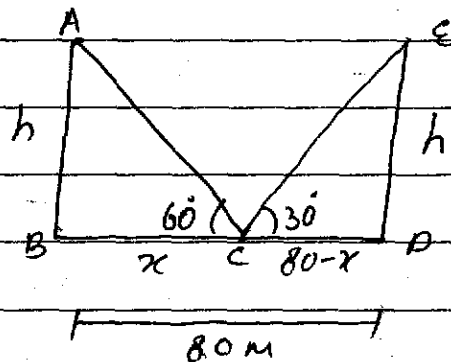
In  $\triangle DEC$

$$\tan 30^\circ = \frac{DE}{CD} = \frac{h}{80-x} = \frac{1}{\sqrt{3}}$$

$$h\sqrt{3} = 80 - x$$

$$3x = 80 - x \quad [\text{using (i)}]$$

$$x = \frac{80}{4} = 20 \text{ m}$$



then  $CD = 80 - 20 = 60 \text{ m}$

and height of tower =  $20\sqrt{3} \text{ m}$   
 distances of point from pole is  $\rightarrow 20 \text{ m}$  and  $60 \text{ m}$

Answer No - (29)

Let the time taken by ~~larger tap~~ smaller tap =  $x$  hour  
 then time taken by larger tap =  $x - 2$

ATQ

$$\Rightarrow \frac{1}{x} + \frac{1}{x-2} = \frac{1}{\frac{15}{8}}$$

$$\Rightarrow \frac{1}{x} + \frac{1}{x-2} = \frac{8}{15}$$

$$\frac{x-2+x}{x(x-2)} = \frac{8}{15}$$

$$\Rightarrow \frac{2x-2}{x(x-2)} = \frac{8}{15}$$

$$\Rightarrow 15(2x-2) = 8[x^2-2x]$$

$$\Rightarrow 30x - 30 = 8x^2 - 16x$$

$$\Rightarrow 8x^2 - 16x + 30 - 30x = 0$$

$$8x^2 - 42x + 30 = 0$$

$$4x^2 - 21x + 15 = 0$$

$$\Rightarrow 8x^2 - 42x + 30 = 0$$

$$4x^2 - 21x + 15 = 0$$

$$\Rightarrow 4x^2 - 23x + 15 = 0 \quad \checkmark$$

$$4x^2 - 20x - 3x + 15 = 0$$

$$4x(x-5) - 3(x-5) = 0$$

$$(x-5)(4x-3) = 0$$

$$x = 5 \text{ hour} \quad [\text{ignore} = \frac{3}{4}]$$

time taken by smaller tap = ~~5 hours~~

and that larger tap = 3 hours

$$\begin{array}{r} 2 \overline{) 120} \\ 3 \overline{) 60} \\ 2 \overline{) 20} \\ 5 \overline{) 10} \\ 2 \end{array}$$

$$2 \times 3 \times 2 \times 5 \times 2$$

$$\begin{array}{r} 15 \\ 12 \\ 3 \end{array}$$

$$2 \times 2 \times 5 \times 3$$

$$\frac{3}{4} - 2$$

30772  
123088

$$\begin{array}{r} 30772 \\ \times 3 \\ \hline 1235033 \end{array}$$

$$\begin{array}{r} 400 \\ 144 \\ 240 \\ \hline 784 \end{array} \quad \begin{array}{r} 125 \\ 30772 \\ \hline 163088 \end{array} \quad \begin{array}{r} 2 \\ 2 \end{array}$$

$$\begin{array}{r} 26 \\ 28.5 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 314 \\ \times 2 \\ \hline 628 \end{array}$$

$$\begin{array}{r} 314 \\ \times 338 \\ \hline 942 \\ 9420 \\ 125600 \\ \hline 105882 \end{array}$$



$$h = 15, l = \sqrt{(15)^2 + (20-12)^2} = \sqrt{225 + 64} = \sqrt{289}$$

$$l = 17 \text{ cm}$$

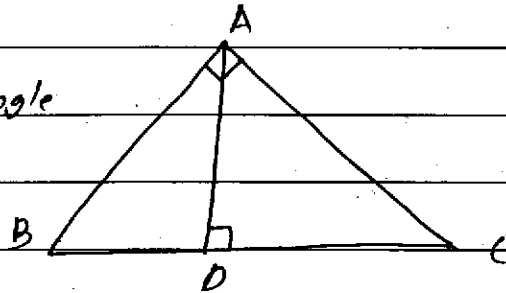
$$\begin{aligned} \text{Area of metal sheet used} &= \pi(r_1 + r_2)l + \pi r_2^2 \\ &= 3.14(20+12) \times 17 + \pi(12)^2 \\ &= 3.14 \times 32 \times 17 + (3.14 \times 144) \\ &= 3.14(32 \times 17 + 144) \\ &= 2160.32 \text{ cm}^2 \end{aligned}$$

Ans(27)

Given  $\rightarrow$  ABC is right angle triangle at A.

To Proof:-  $AB^2 + AC^2 = BC^2$

Construct:-  $AD \perp BC$



$$\triangle BAD \sim \triangle ACD$$

AB

$$\triangle BDA \sim \triangle BAC$$

$$\frac{BD}{AB} = \frac{AB}{BC}$$

$$\Rightarrow AB^2 = BD \cdot BC \quad \text{--- (i)}$$

[In a right angle triangle if a perpendicular is drawn from vertex of right angle to hypotenuse then triangle divided are similar to each other and whole triangle]

$$\begin{array}{r} 153867895 \\ 2077210997 \end{array}$$

$$61544$$

$$123088 \times 3 \times 166$$

$$\begin{array}{r} 275 \\ 164 \\ \hline 289 \end{array} \quad \begin{array}{r} 157 \\ 294 \\ \hline 145 \\ 96 \end{array}$$

$$\begin{array}{r} 215 \\ 75 \\ \hline 157 \\ 225 \end{array}$$

$$\begin{array}{r} 157 \\ 43 \\ \hline 1099 \end{array}$$

$$\begin{array}{r} 12 \\ 119 \\ 174 \\ \hline 1099 \end{array} \quad \begin{array}{r} 22524 \\ 1568 \\ 22 \\ 2841 \\ 1568 \\ \hline 23528 \end{array}$$

$$\triangle CDA \sim \triangle CAB$$

$$\frac{CD}{AC} = \frac{AC}{BC}$$

$$\frac{CD}{AC} = \frac{AC}{BC} \Rightarrow AC^2 = BC \cdot CD \quad (i')$$

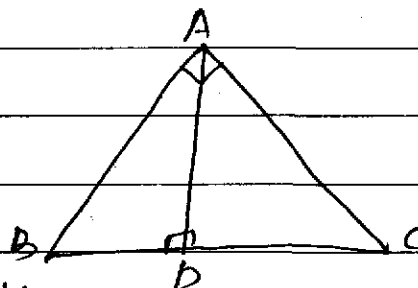
Adding eq (i) & (i')

$$AB^2 + AC^2 = BC \cdot CD + BD \cdot BC$$

$$= BC (CD + BD)$$

$$AB^2 + AC^2 = BC^2 \quad (BC = BD + CD)$$

Hence proved



Answer No. 26

| Marks | No. of Students | Less than    | CF |
|-------|-----------------|--------------|----|
| 0-5   | 2               | Less than 5  | 2  |
| 5-10  | 5               | Less than 10 | 7  |
| 10-15 | 6               | Less than 15 | 13 |
| 15-20 | 8               | Less than 20 | 21 |
| 20-25 | 10              | Less than 25 | 31 |
| 25-30 | 25              | Less than 30 | 56 |
| 30-35 | 20              | Less than 35 | 76 |
| 35-40 | 10              | Less than 40 | 86 |
| 40-45 | 4               | Less than 45 | 90 |
| 45-50 | 2               | Less than 50 | 92 |

1  
76  
18  
94

38  
5  
15  
40

10  
31  
19

$$\frac{N}{2} = \frac{100}{2} = 50$$

Median class = 25-30

$$\text{Median} = l + \frac{\left(\frac{N}{2} - (F)\right) \times h}{f}$$

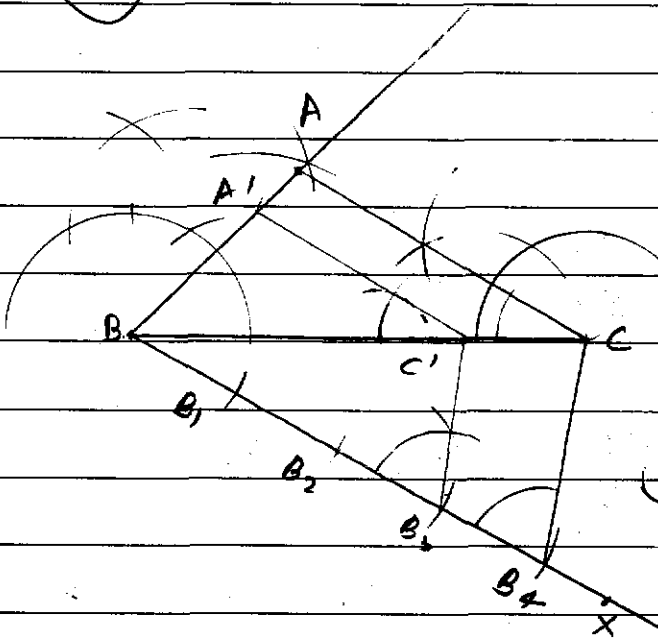
$$\text{Median} = 25 + \frac{(50 - 31)}{25}$$

$$\text{Median} = 25 + \frac{(50 - 31)}{25}$$

$$= 25 + \frac{19}{5}$$

$$= 28.8$$

Answer (25)



Steps of construction

- construct a triangle ABC with  $\angle B = 45^\circ$ ;  $\angle A = 105^\circ$ ,  $BC = 6\text{cm}$
- Draw a ray BX making an acute angle with BC
- Locate 4 point  $B_1, B_2, B_3, B_4$  such that  $BB_1 = B_1B_2 = B_2B_3 = B_3B_4$
- Join  $B_4$  to C
- through  $B_3$  draw a line parallel to  $B_4C$
- through  $C'$  draw a line parallel to AC
- then  $A'B'C'$  is required triangle

Answer No. (24)

4.  $a = 3$ ,  $l = 83$ ,  $S_n = 903$ ,  $n = ?$ ,  $d = ?$

$$l = a + (n-1)d$$

$$83 = 3 + (n-1)d$$

$$83 = 3 + (21-1)d \quad [n=21]$$

$$83 = 3 + 20d$$

$$80 = 20d$$

$$d = 4$$

$$\text{No of term} = 21$$

$$\text{Common difference} = 4$$

$$S_n = \frac{n}{2}(a+l)$$

$$903 = \frac{n}{2}(3+83)$$

$$= \frac{43 \times 86 \times n}{2}$$

$$n = \frac{903 \times 2}{43 \times 86}$$

$$n = 21 \text{ (Ans)}$$

86

21

$$\begin{array}{r} 43 \overline{) 903} \\ \underline{86} \phantom{0} \\ 43 \phantom{0} \end{array}$$

150

$$\begin{array}{r} 165 \\ \underline{45} \\ 180 \end{array}$$

Answer No 23

Ans (23)

$$\frac{\tan^2 A + \operatorname{cosec}^2 A}{\tan^2 A - 1} = \frac{1}{1 - 2\cos^2 A}$$

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

$$= \frac{2 \frac{\sin^2 A}{\cos^2 A}}{2 \frac{\sin^2 A - \cos^2 A}{\cos^2 A}} + \frac{\frac{1}{\sin^2 A}}{\frac{\sin^2 A - \cos^2 A}{\sin^2 A \cos^2 A}} \quad 2 \operatorname{cosec}^2 A = \frac{1}{\sin^2 A}$$

$$= \frac{\sin^2 A}{\sin^2 A - \cos^2 A} + \frac{\cos^2 A}{\sin^2 A - \cos^2 A}$$

$$= \frac{\sin^2 A + \cos^2 A}{\sin^2 A - \cos^2 A}$$

$$\text{LHS} = \frac{1}{1 - \cos^2 A - \cos^2 A} = \frac{1}{1 - 2\cos^2 A}$$

LHS = RHS Hence proved

## SECTION C

Answer NO (22)

(3)

$$(\sin \theta + \operatorname{cosec} \theta)^2 + (\cos \theta + \sec \theta)^2 = 7 + \tan^2 \theta + \cot^2 \theta$$

$$\text{LHS} = \sin^2 \theta + \operatorname{cosec}^2 \theta + 2 \sin \theta \operatorname{cosec} \theta + \cos^2 \theta + \sec^2 \theta + 2 \cos \theta \sec \theta$$

$$(\sin^2 \theta + \cos^2 \theta) + (\operatorname{cosec}^2 \theta + \sec^2 \theta) + \frac{2 \sin \theta}{\sin \theta} + \frac{2 \cos \theta}{\sec \cos \theta} \left[ \frac{\sin \theta}{\operatorname{cosec} \theta} \right]$$

$$= 1 + 2 + 2 + \operatorname{cosec}^2 \theta + \sec^2 \theta$$

$$= 5 + 1 + \cot^2 \theta + 1 + \tan^2 \theta$$

$$= 7 + \cot^2 \theta + \tan^2 \theta$$

$$[\sin^2 \theta + \cos^2 \theta = 1]$$

$$[\operatorname{cosec}^2 \theta = 1 + \cot^2 \theta]$$

$$\sec^2 \theta = 1 + \tan^2 \theta]$$

$$\text{LHS} = \text{RHS}$$

Answer No. 21

3

Let the present age of father =  $x$   
and sum of ages of two children =  $y$

ATQ

$$x = 3y$$

After 5 years

$$(x+5) = 2(y+5)$$

$$x+5 = 2y+10$$

$$x - 2y + 5 - 10 = 0$$

$$3y - 2y - 5 = 0$$

$$y = 5$$

$$(x+5) = 2(y+10)$$

$$x+5 = 2y+20$$

$$x - 2y + 5 - 20 = 0$$

$$x - 2y - 15 = 0$$

$$3y - 2y = 15$$

$$y = 15$$

So Present age of father =  ~~$3 \times 5$~~

$$3 \times 15 = 45 \text{ years}$$



Answer no. 20

3

Let the point on y-axis =  $(0, y)$

and A

B  $(0, y)$

A  $(5, -2)$

C  $(-3, 2)$

$$(AB)^2 = (BC)^2$$

$$(0-5)^2 + (y-(-2))^2 = (0-(-3))^2 + (y-2)^2$$

$$25 + y^2 + 4 + 4y = 9 + y^2 + 4 - 4y$$

$$4y + 29 - 9 - 4 + 4y = 0$$

$$8y + 16 = 0$$

$$8y = -16$$

$$y = -2$$

so the point  $(0, -2)$

$$\begin{array}{r} 29 \\ 13 \\ \hline 16 \end{array}$$

Answer No 19

$$x^2 - (k+6)x + 2(2k-1)$$

Given  $\rightarrow \alpha + \beta = \frac{1}{2} \alpha \beta$  [If  $\alpha$  and  $\beta$  are zeroes]

$$\alpha + \beta = \frac{-b}{a} \Rightarrow \alpha + \beta = -\frac{-(k+6)}{1} = k+6$$

$$\alpha \beta = \frac{c}{a} \Rightarrow \alpha \beta = \frac{2(2k-1)}{1} =$$

Now A.T.Q

$$\alpha + \beta = \frac{1}{2} \alpha \beta$$

then

$$k+6 = \frac{2(2k-1)}{2} \Rightarrow k+6 = 2k-1$$

$$2k - k = 6 + 1$$

$$k = 7$$

Answer No - 18

Let assume  $\sqrt{2}$  is ~~irrational~~ rational then there exist  $a$  &  $b$  positive integer

$$\sqrt{2} = \frac{a}{b} \quad [a \& b, \text{co-prime}]$$

$$(b\sqrt{2})^2 = (a)^2 \quad (\text{squaring both side})$$

$$2b^2 = a^2$$

$$b^2 = \frac{a^2}{2} \Rightarrow a/2$$

$a$  has also divide by 2 [ If  $p$  divides  $a^2$  then  $p$  also divide  $a$  ]

Now let  $a = 2c$  for some integer  $c$

$$b\sqrt{2} = 2c$$

$$(b\sqrt{2})^2 = (2c)^2$$

$$2b^2 = 4c^2$$

$$\frac{b^2}{2} = c^2 \Rightarrow b/2$$

$$c^2 = \frac{b^2}{2}$$

so  $b$  also divide by 2.

but the fact that  $a$  and  $b$  has no other factor than 1  
so our assumption is wrong.

hence  $\sqrt{2}$  is irrational Number.

Q3

Answer No 17

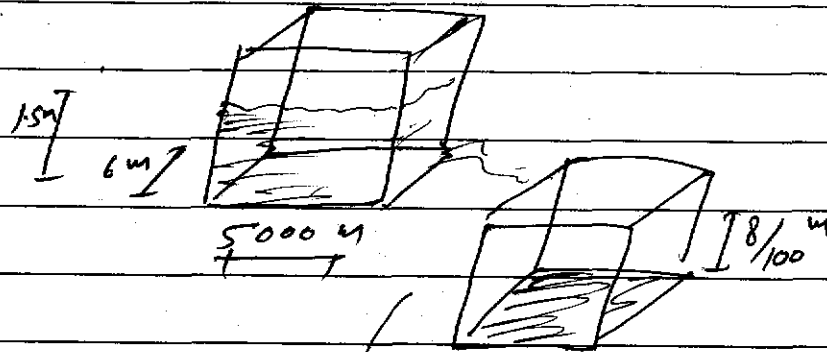
length of canal =

$$\Rightarrow S = \frac{d}{t}$$

$$\Rightarrow 10 \times 1000 = \frac{d}{\frac{1}{2}}$$

$$= \frac{10000 \times 2}{1} = d$$

length of canal = 5000 m



Let the area area to be irrigated =  $x \text{ m}^2$

water in

Volume of canal = Volume of water that flow in field

~~1.5 x 6 x 5000~~

$$1.5 \times 6 \times 5000 = \frac{x^2 \times 8}{100}$$

$$x = \frac{15 \times 100 \times 3 \times 1250}{10 \times 8}$$

$$= 15 \times 3 \times 1250 \times 10$$

$$= 562500 \text{ m}^2$$

$$\begin{array}{r} 125 \\ \times 4 \\ \hline 500 \\ \times 2 \\ \hline 562500 \end{array}$$

Answer No 16

3

Let  $BN = x$

then  $BN = BL$  (tangents of circle)

$$CL = 8 - x$$

and  $ML = CL = 8 - x$

$$AM = AC - MC$$

$$= 12 - (8 - x)$$

$$= 12 - 8 + x$$

$$AM = x + 4$$

$$AN = AB - BN$$

$$= 10 - x$$

and  $AN = AM$  (tangents)

$$x + 4 = 10 - x$$

$$2x = 10 - 4$$

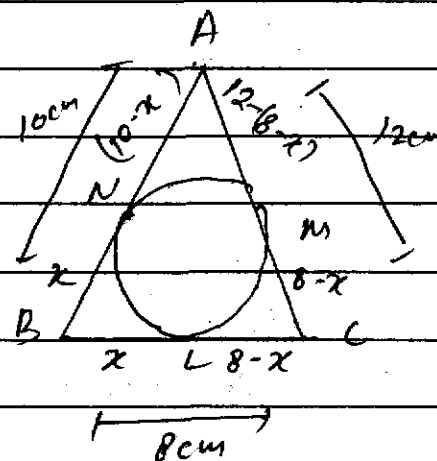
$$x = \frac{6}{2}$$

so  $BL = 3 \text{ cm}$

$$x = 3 \text{ cm}$$

$$CM = 8 - x = 5 \text{ cm}$$

$$AN = 10 - 3 = 7 \text{ cm}$$



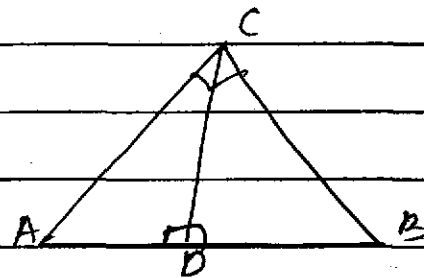
Answer No 15

3

By theorem

(If a perpendicular draw from vertex of right angle in a right angle triangle then

triangles divided are similar to each other and the whole triangle)



So,  $\triangle ACD \sim \triangle ABC$

$\triangle ACD \sim \triangle CDB$

$$\frac{CD}{BD} = \frac{AD}{CD}$$

[corresponding part of similar triangles]

$$CD^2 = BD \cdot AD$$

Answer NO-14

3

area of sector

$$= \frac{\theta}{360} \times \pi r^2$$

$$= \frac{120}{360} \times \pi \times 22 \times 21$$

$$= 22 \times 21 = 462 \text{ cm}^2$$

Area of triangle =  $r^2 \cos \frac{\theta}{2} \sin \frac{\theta}{2}$

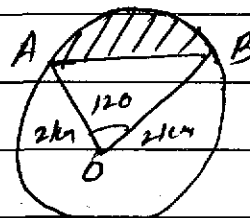
$$= 21 \times 21 \times \cos 60^\circ \sin 60^\circ$$

$$= 21 \times 21 \times \frac{\sqrt{3}}{2} \times \frac{1}{2}$$

$$= \frac{441 \sqrt{3}}{4}$$

area of segment =  $462 - \frac{441 \sqrt{3}}{4}$

$$= \frac{1848 - 441 \sqrt{3}}{4} \text{ cm}^2$$



$$\begin{array}{r} 19023.25 \\ 4 \overline{) 762.93} \\ \underline{4} \phantom{00} \\ 36 \phantom{00} \\ \underline{36} \phantom{00} \\ 24 \phantom{00} \\ \underline{28} \phantom{00} \\ 13 \phantom{00} \\ \underline{12} \phantom{00} \\ 1 \end{array}$$

$$\begin{array}{r} 22 \\ \times 21 \\ \hline 22 \\ 44 \phantom{0} \\ \hline 462 \end{array}$$

$$\begin{array}{r} 441 \\ \times 1.73 \\ \hline 1323 \\ 3087 \phantom{0} \\ \hline 762.93 \end{array}$$

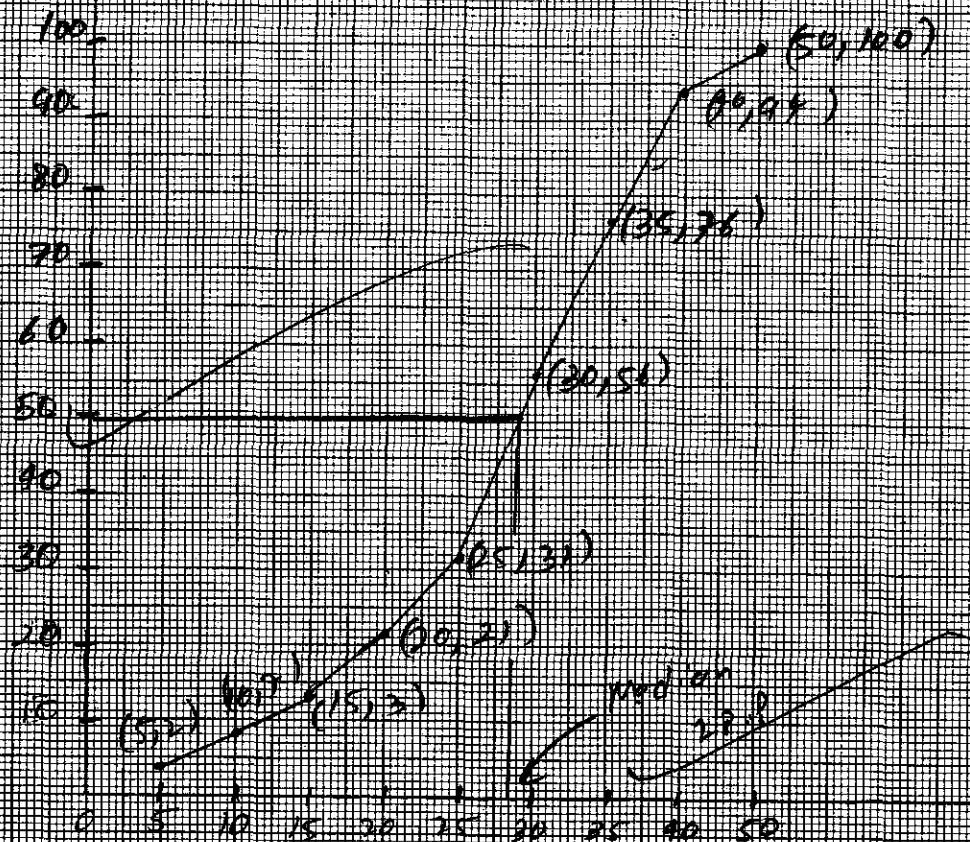
$$\begin{array}{r} 462 \\ \times 4 \\ \hline 1848 \end{array}$$

$$\begin{array}{r} 762.93 \\ \hline \end{array}$$

$$\begin{array}{r} 3462.00 \\ 190.75 \\ \hline 272 \end{array}$$

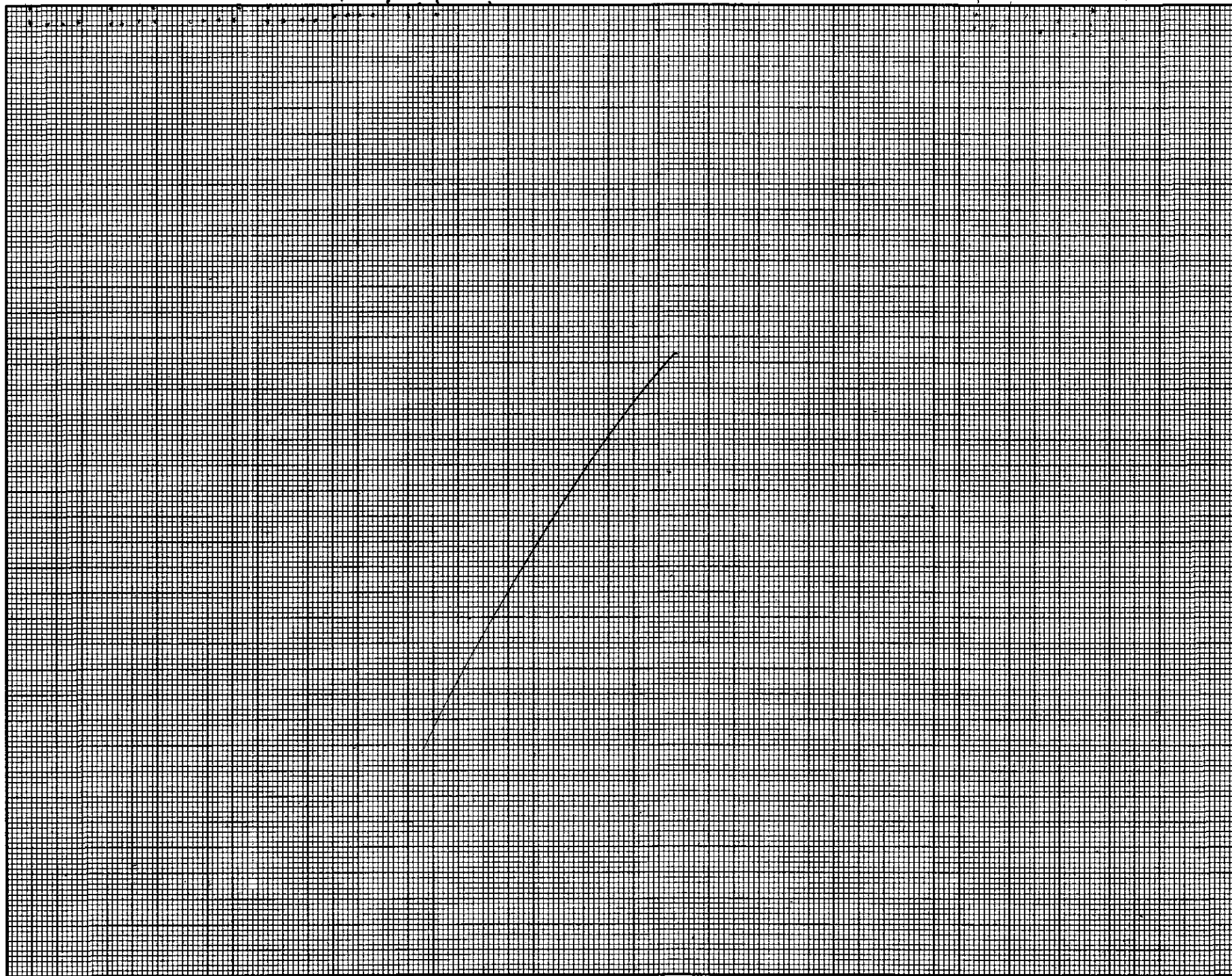


Answer No ~~27~~ 26



404

10431200



1000

1000000000

Answer NO - 13

(3)

| C-I    | f <sub>i</sub> | <del>mid</del> $x_i$ | $u_i = \frac{x_i - A}{h}$ | $f_i u_i$ |
|--------|----------------|----------------------|---------------------------|-----------|
| 0-20   | 12             | 10                   | -2                        | -24       |
| 20-40  | 15             | 30                   | -1                        | -15       |
| 40-60  | 32             | 50                   | 0                         | 0         |
| 60-80  | K              | 70                   | 1                         | K         |
| 80-100 | 13             | 90                   | 2                         | 26        |

$$\sum f_i u_i = 72 + K$$

$$\sum f_i u_i^2 = K - 13$$

Let  $A = 50$

$$\text{No. } \bar{X} = \frac{A + \sum f_i u_i \times h}{\sum f_i}$$

$$50 \quad 53 = \frac{50 + K - 13 \times 20}{72 + K}$$

$$3 = \frac{K - 13 \times 20}{72 + K}$$

$$216 + 3K = 20K - 60$$

$$216 + 60 = 20K - 3K$$

$$\frac{1290}{17} = 75.88$$

$$\frac{216}{17} = 12.70$$

$$\frac{22}{32} = 0.6875$$

$$\frac{216}{22} = 9.81$$

$$\frac{22}{32} = 0.6875$$

$$\frac{22}{32} = 0.6875$$

$$3 = \frac{(k-13)20}{72+k}$$

$$216 + 3k = 20k - 260$$

$$216 + 260 = 17k$$

$$476 = 17k$$

$$k = \frac{476}{17} = 28$$

Answer No = 12

$$\begin{array}{r} 260 \\ 216 \\ \hline 476 \end{array}$$

$$\begin{array}{r} 17 \\ 156 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 476 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \overline{) 476} = 28 \\ 34 \\ \hline 136 \end{array}$$

Let any odd positive integer  $a$   
and  $b = 4$ , then by euclid's division  
lemma

$$a = 4q + r \quad \text{where } 0 \leq r < 4$$

$$r = 0, 1, 2, 3$$

$$a = 4q$$

$$\text{or } a = 4q + 1$$

or  $4q+2$  or  $4q+3$

but  $a = 4q+1$  or  $4q+3$  (  $\because a \neq 4q$  or  $a \neq 4q+2$   
became  $a$  is odd integer

Answer NO-11

2 AP - 3, 15, 27, 39

$$d = 15 - 3 = 12$$

Let the term  $a_n$

$$a_n = 120 + a_{21}$$

$$a_n = 120 + a + (21-1)d$$

$$= 120 + 3 + (20 \times 12)$$

$$= 123 + 240$$

$$a_n = 363$$

$$a_n = 363$$

$$363 = 3 + (n-1)12$$

$$360 = 12n - 12$$

$$372 = 12n$$

$$n = \frac{372}{12}$$

$$n = 31$$

the term's ~~37~~  $31^{th}$   
term

$$\begin{array}{r} 240 \\ 123 \\ \hline 363 \end{array}$$

Answer NO-10

Sample: [ HHH, HHT, HTH, HTT, THT, TTH, TTH, TTT

favourable outcomes  $\Rightarrow$  HHT, HTH, HTT, THT, TTH, TTH

$$P(\text{losing the game}) = \frac{\text{no of favourable outcome}}{\text{total no of outcome}}$$

$$P(\text{losing game}) = \frac{6}{8} = \frac{3}{4}$$

Answer 9

$$A(1, -3) \xrightarrow{k \quad 1} (x, 0) \quad B(4, 5)$$

Let the ratio  $k:1$

by section formula

$$\Rightarrow \frac{1 \times 1 + k \times 4}{k+1} = 0 \Rightarrow 4k+1=0$$

$$k = \frac{-1}{4} = -\frac{1}{4}$$



ratio is = 1:4

$$A(1, -3) \xrightarrow[1:4]{(2, 0)} B(4, 5)$$

⇒

Answer - 9

$$A(1, -3) \xrightarrow[k]{(x, 0)} B(4, 5)$$

Let ratio  $k:1$

by section formula

$$y = \frac{1 \times (-3) + k \times 5}{k+1} = 0$$

$$-3 + 5k = 0$$

$$k = \frac{3}{5}$$

ratio 3:5

$$A(1, -3) \xrightarrow[3:5]{(x, 0)} B(4, 5)$$

$$x = \frac{5 \times 1 + 3 \times 4}{8} = \frac{5+12}{8}$$

$$x = \frac{17}{8}$$

coordinate

$$is (x, 0)$$

$$= \left( \frac{17}{8}, 0 \right)$$

Answer NO - 8

sample  $\rightarrow 1, 2, 3, 4, 5, 6$

favourable outcome = 2, 3, 5

$$(i) P(\text{prime no}) = \frac{\text{no of outcome}}{\text{total no of outcome}} = \frac{3}{6} = \frac{1}{2}$$

$$(ii) P(\text{lies between 2 and 6}) = \frac{3}{6} = \frac{1}{2}$$

Answer no 7

$$2x + 3y - 7 = 0$$

$$(K+1)x + (2K-1)y - (4K+1) = 0$$

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

$$a_1 = 2, b_1 = 3, c_1 = -7, a_2 = K+1, b_2 = 2K-1, c_2 = -(4K+1)$$

$$\frac{2}{k+1} = \frac{3}{2k-1} = \frac{+7}{+(4k+1)}$$

$$\Rightarrow \frac{2}{k+1} = \frac{7}{4k+1}$$

$$\frac{3}{2k-1} = \frac{7}{4k+1}$$

$$\Rightarrow 2(4k+1) = 7(k+1)$$

$$12k+3 = 14k-2$$

$$\Rightarrow 8k+2 = 7k+7$$

$$\Rightarrow k=5$$

$$\Rightarrow 8k-7k = 7-2$$

$$\Rightarrow k=5$$

Answer No - 6

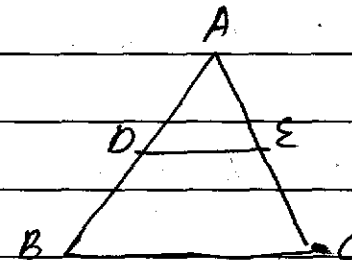
(1)

$$\frac{AD}{BD} = \frac{1}{2}$$

$$\frac{AD}{BD} = \frac{BD}{AD} = 2$$

$$\frac{BD+1}{AD} = 2+1$$

$$\Rightarrow \frac{AB}{AD} = 3 \text{ cm}$$



$$\triangle ADE \sim \triangle ABC$$

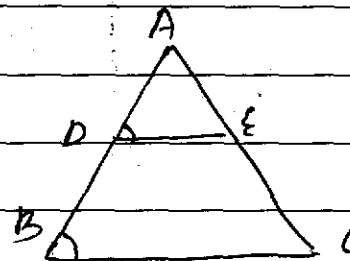
$$\angle A = \angle A$$

$$\angle D = \angle B \text{ (corresponding angle)}$$

$$\triangle ADE \sim \triangle ABC$$

$$\frac{\text{ar}(\triangle ADE)}{\text{ar}(\triangle ABC)} = \left(\frac{AD}{AB}\right)^2 = \left(\frac{1}{3}\right)^2 = \frac{1}{9} \Rightarrow 1:9$$

$$\text{or } \frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle ADE)} = \frac{9}{1} \Rightarrow 9:1$$



Answer no 5

$$3x^2 - 10x + K = 0$$

Atq H & B are zeros

$$\alpha = \frac{1}{B}, \text{ also } \alpha B = \frac{K}{3}$$

$$\alpha B = 1$$

$$\frac{K}{3} = 1 \Rightarrow K = 3$$

Answer no 4

$$\sin^2 23^\circ + \sin^2 57^\circ$$

$$\sin^2 23^\circ + \cos^2 (90 - 57)$$

$$\sin^2 23^\circ + \cos^2 23^\circ$$

$$= 1$$

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\sin^2 \theta = \cos^2 (90 - \theta)$$

Answer No 3

$$AP \rightarrow 12, 15, \dots, 99$$

4

$$99 = 12 + (n-1)3$$

$$87 = 3n - 3$$

$$3n = 90$$

$$n = 30$$

$$\begin{array}{r} 99 \\ 12 \\ \hline 87 \end{array}$$

Answer no 2

See for rational no between  $\sqrt{2}$  and  $\sqrt{3}$

$$\sqrt{2} = 1.414, \sqrt{3} = 1.732$$

so rational no 1.5

Answer no 1

radi

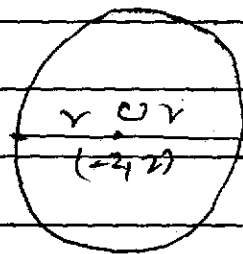
Diameter of circle

divided by centre in

ratio  $\Rightarrow 1:1$

so by section formula

A  
(-7, 0)



B (3, 4)

[A (-7, 0)]

$$\Rightarrow \frac{3+x}{2} = -2$$

$$\frac{4+y}{2} = 2$$

Answer

$$3+x = -4$$

$$4+y = 4$$

$$x = -7$$

$$y = 0$$

80/80

Rough

$$\frac{1}{3} \times \frac{22}{7} \times 21 \times 21 - 21 \times 21 \frac{\sqrt{3}}{4} \quad 441$$

$$441 \left( \frac{22}{21} - \frac{\sqrt{3}}{4} \right)$$

$$441$$

$$1.732$$

$$441$$

$$462.00$$

$$190.98$$

$$371.02$$

$$0.433$$

$$32$$

$$688$$

$$140.98$$

$$763.93$$

$$76$$

$$21 \sqrt{22} \quad 1.4$$

$$32$$

$$32$$

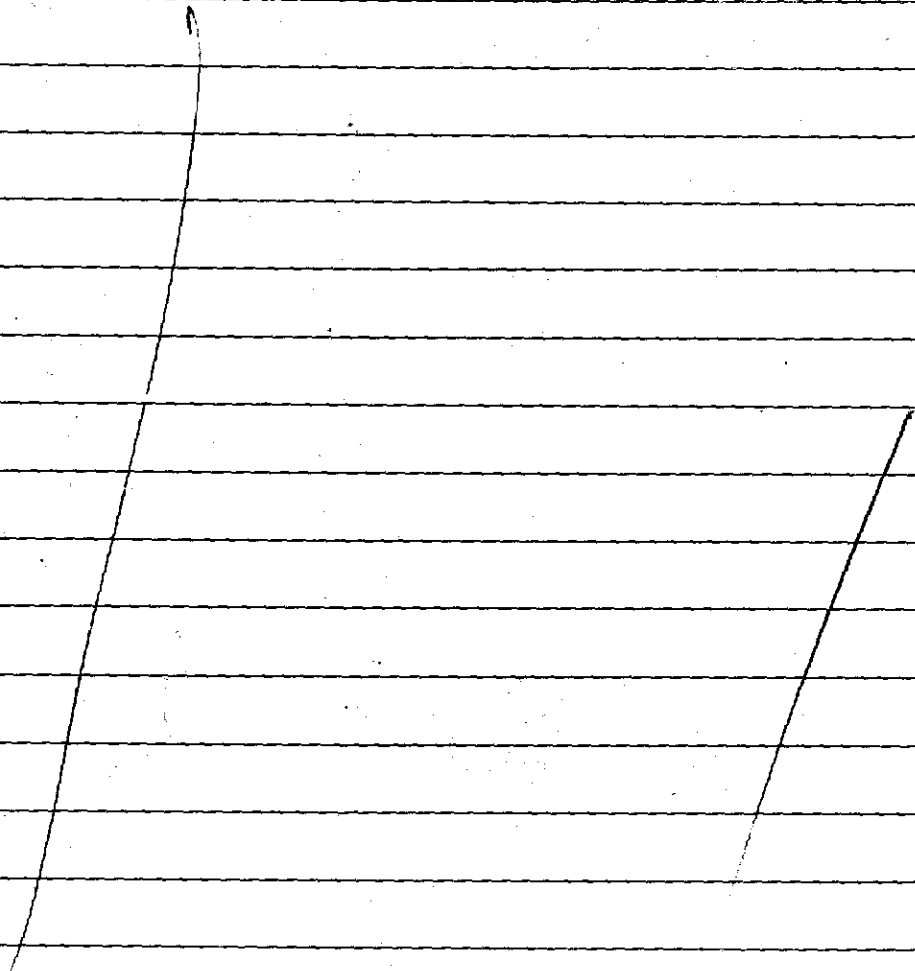
$$544$$

$$688$$

$$2064 \times 2$$

$$21$$

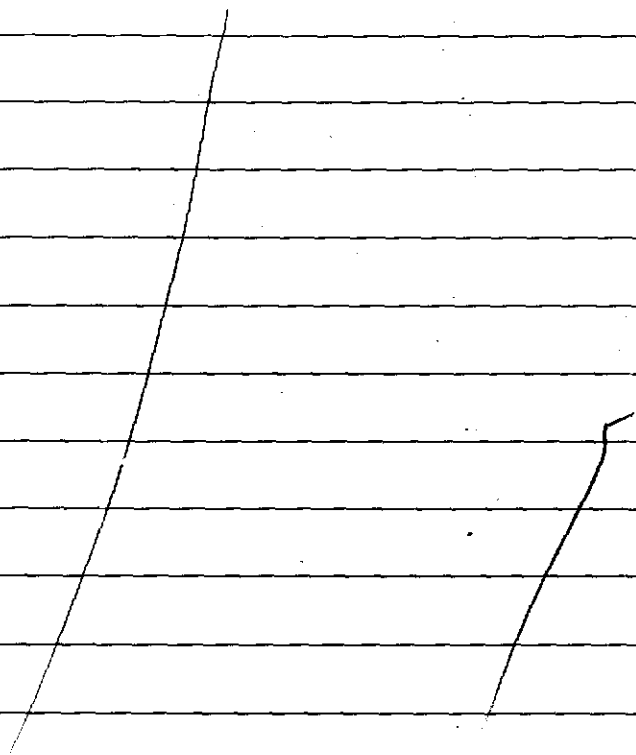
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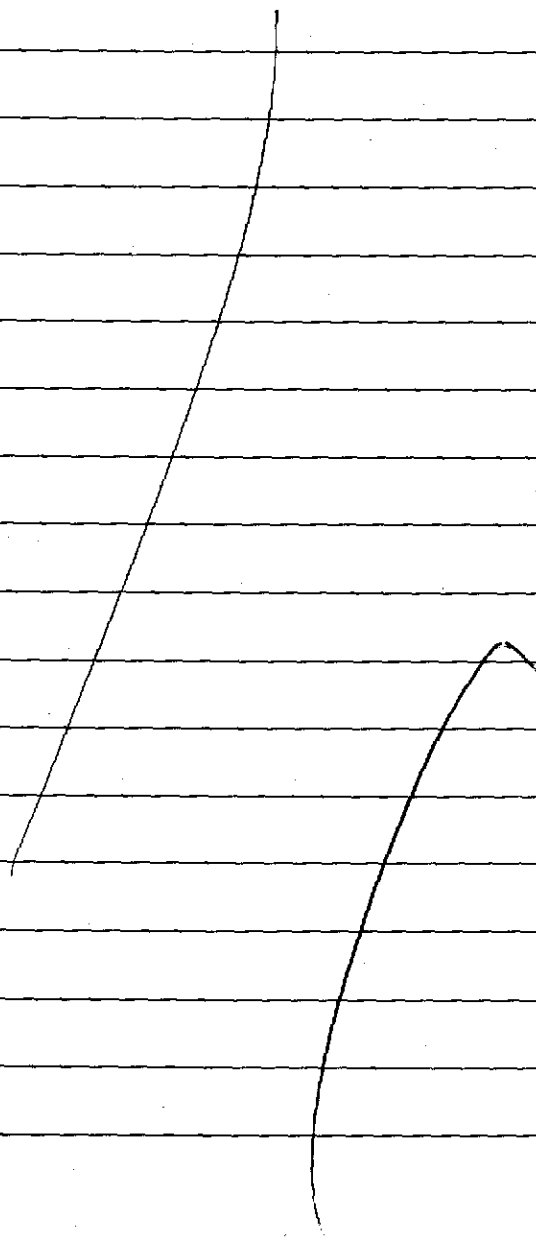
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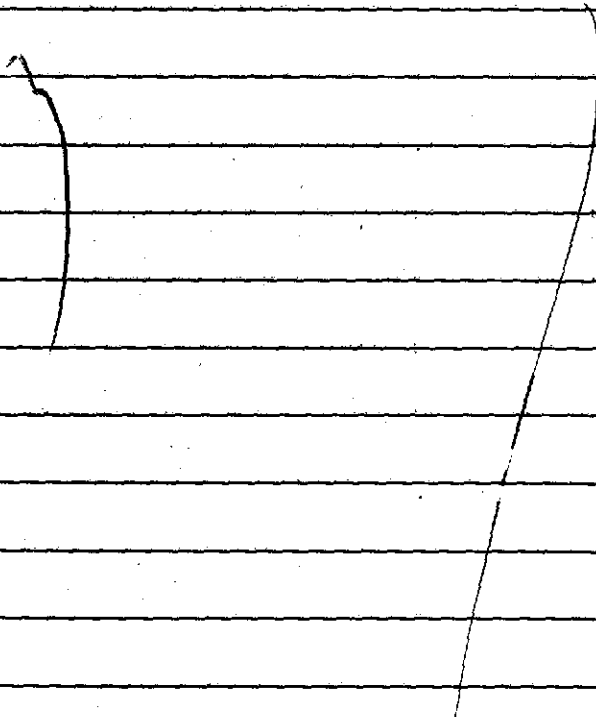
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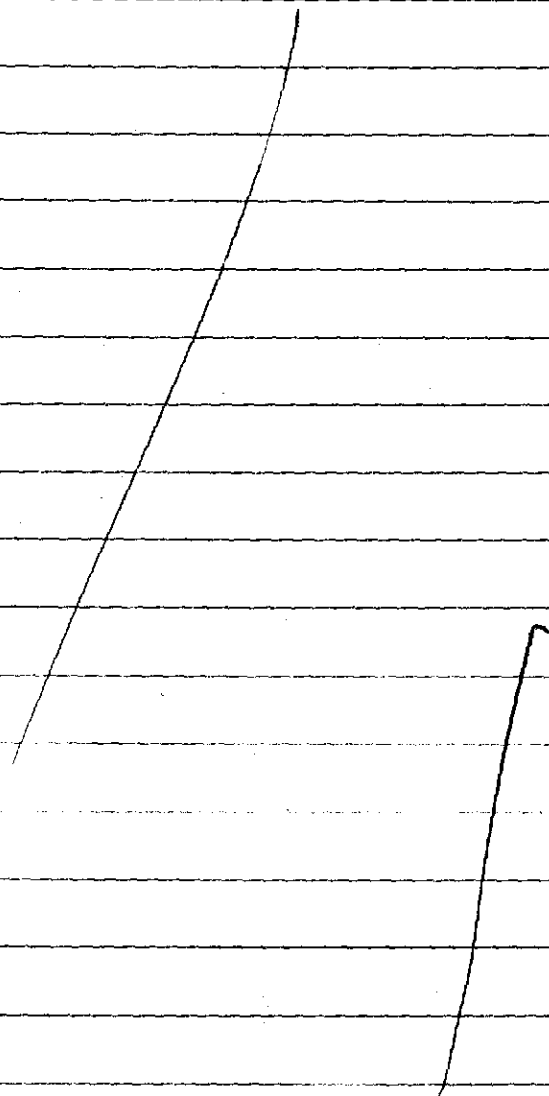
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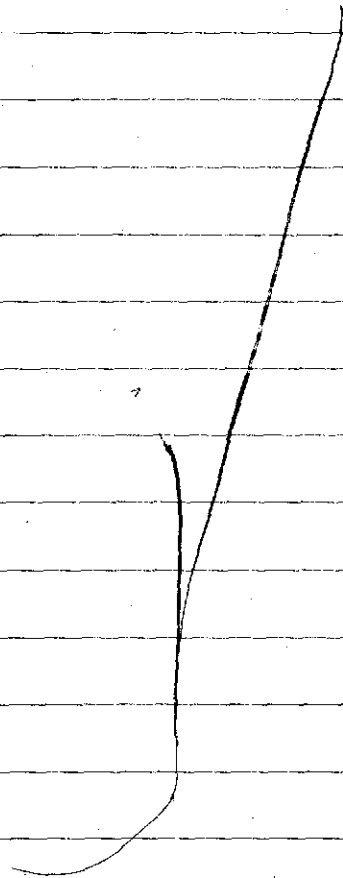
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