WITH GRAPH PAPER

केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली

सैकण्डरी स्कूल परीक्षा (कक्षा दसवीं)

परीक्षार्थी प्रवेश–पत्र के अनुसार भरें

विषय **Subject :** MATHEMATICS

विषय कोड **Subject Code :** 041

परीक्षा का दिन एवं तिथि
Day & Date of the Examination : Thursday, 7-03-19

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	Set Number
30/1/1	● ② ③ ④

अतिरिक्त उत्तर–पुस्तिका (ओं) की संख्या
No . of supplementary answer -book(s) used —

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यदि दृष्टिहीन हैं तो उपयोग में लाए गये सोफ्टवेयर का नाम :
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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 24 letters, write first 24 letters.

कार्यालय उपयोग के लिए
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1. Make sure that the answer-book contains 48 pages and are properly serialed 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 any of your answers.
4. You must write the supplementary answer-book serial no. in the attendance sheet.
5. Write on each ruled line on both sides and do not waste pages by leaving a wider margin.
6. DO NOT tear out or fold the pages of the answer-book and do not leave any page blank unnecessarily. No supplementary anwer-book(s) should be asked for unless this answer-book / the previous supplementary answer-book is 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.
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10. Use only blue-black or royal-blue ink/gel/ball point pen. Using of any other writing instrument/ink/pencil etc will be on your own risk and responsibility.
11. For rough calculation etc., appropriate margin on the right-hand side of the page may be drawn. The rough calculations etc. should be crossed out afterwards.
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13. If during the course of examination, a candidate is found indulging in any of the following, he/she shall be deemed to have used unfair means at the examinations, and as such his/her result shall not be declared but shall be marked as UNFAIR MEANS (U.F.M.) :-
    (a) having in possession papers, books, notes or any other material or information relevant to the examination in the paper concerned;
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केंद्रीय 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	01	01	02	02	02	02	14

Q. No.	11	12	13	14	15	16	17	18	19	20	TOTAL
MARKS	02	02	03	03	03	03	03	03	03	03	28

Q. No.	21	22	23	24	25	26	27	28	29	30	TOTAL
MARKS	03	03	04	04	04	04	04	04	04	04	38

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

GRAND TOTAL	80
MARKS IN WORDS	Eighty only = 80

प्रमाणित किया जाता है कि मैंने इस उत्तर पुस्तिका का मूल्यांकन उचित प्रश्नपत्र के सैट और अंकन योजना के अनुसार किया है। यह भी प्रमाणित किया जाता है कि उत्तर पुस्तिका के अन्दर कोई भी प्रश्न बिना मूल्यांकन के नहीं छूटा है।

Ans1

A — O — B

(x,y) $(2,-3)$ $(1,4)$

$AO = OB$ (radius)

So, O is the mid point of AB

$2 = \frac{x+1}{2}$ (By mid point formula)

$4 = x+1$

$x = 3$

$-3 = \frac{y+4}{2}$ (By mid point formula)

$-6 = y+4$

$-10 = y$

So the coordinates of A is $(3,-10)$

Ans2 $3x^2 - 10x + k = 0$

It's roots are α and $\frac{1}{\alpha}$

~~$\alpha + \beta$~~ $\alpha \cdot \beta = \frac{c}{a}$

$\alpha \times \frac{1}{\alpha} = \frac{K}{3}$

$K = 3$

Ans3 $\tan 2A = \cot (A - 24^\circ)$

$\cot (90 - 2A) = \cot (A - 24)$ $\quad (\tan\theta = \cot(90-\theta))$

$90 - 2A = A - 24^\circ$

$-3A = -114$

$A = \frac{-114}{-3} = 38^\circ$

Value of A is 38°

Ans4 1st two digit no. divisible by 3 is 12

12, 15, 18 99

$a = 12 \qquad d = 3 \qquad a_n = 99$

$99 = a + (n-1)d$

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

$99 - 12 = 3n - 3$

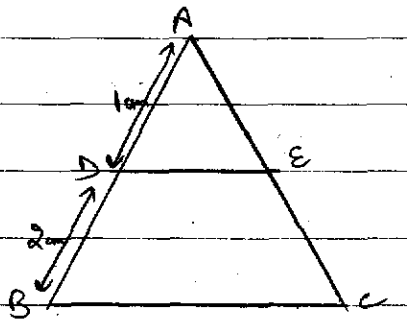
$87 = 3n - 3$

$3n = 90$

$n = 30$

So, there are 30 numbers of two digits divisible by 3

Ans5 $DE \parallel BC$



In ΔADE and ΔABC

$\angle D = \angle B$ [as $DE \parallel BC$]

$\angle E = \angle C$ [corresponding angles]

So, $\Delta ADE \sim \Delta ABC$ (AA criteria]

$\frac{\text{ar } \Delta ABC}{\text{ar } \Delta ADE} = \left(\frac{AB}{AD}\right)^2 = \left(\frac{AD + DB}{AD}\right)^2 = \left(\frac{1+2}{1}\right)^2$

$= \left(\frac{3}{1}\right)^2$

$= \frac{9}{1}$

So the ratio is $9:1$

Ans 6 $\sqrt{2}$ and $\sqrt{3}$

Rational number $-$ 1.5

Ans 7 HCF of 1260 and 7344

By Euclid's algorithm,

$7344 = 1260 \times 5 + 1044$

$1260 = 1044 \times 1 + 216$

$1044 = 216 \times 4 + 180$

$216 = 180 \times 1 + 36$

$180 = 36 \times 5 + 0$

HCF $= 36$

Ans 8 3, 15, 27, 39 .....

$a = 3$ $\quad d = 15 - 3 = 12 \quad n = 21$

$a_{21} = a + 20d$

$a_{21} = 3 + 20(12)$

$= 3 + 240$

$= 243$

1260
× 6
7560

1260
× 5
6300
1260
7344
6300
1044
1260
1044
216
216
× 4
864

216
× 5
1080
1044
864
180
1044
-864
180
-180
36

36
× 5
180

$120 + a_{21} = 120 + 243 = 363$

$363 = a + (n-1)d$

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

$363 - 3 = 12n - 12$

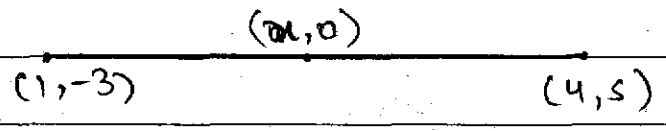
$360 + 12 = 12n$

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

$n = 31$

So, 31st term will be 120 more than 21st term.

Ans 9 As the point is on x-axis,



So, $y = 0$

Let, the ratio is $k : 1$

By section formula,

$y = \frac{m_1y_2 + m_2y_1}{m_1 + m_2}$

$0 = \frac{5k - 3}{k + 1}$

$5k - 3 = 0$

$5k = 3$

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

So the ratio is $3 : 5$

$x = \frac{3(4) + 5(1)}{3+5}$

$= \frac{12+5}{8} = \frac{17}{8}$

So the coordinates of point is $\left(\frac{17}{8}, 0\right)$

Ans10 Total outcomes :- (HHH), (TTT), (HTT), (THT), (TTH), (THH), (HTH), (HHT)

Total outcomes = 8

Possible outcomes = (HTT) (THT) (TTH) (THH) (HTH) (HHT)

= 6

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

Ans11 (i) Total outcomes = 6

Prime numbers = 2, 3, 5

Possible outcomes(E) = 3

$P(E) = \frac{3}{6} = \frac{1}{2}$

(ii) No. between 2 and 6 = 3, 4 5

Possible outcomes (E) = 3

$P(E) = \frac{3}{6} = \frac{1}{2}$

2

Ans 12 $cx + 3y + (3-c) = 0$

$12x + cy - c = 0$

For many solutions,

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

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

$\frac{c}{12} = \frac{3}{c}$

$$c^2 = 36$$

$$c = \pm 6$$

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

$$\frac{3}{c} = \frac{3-c}{-c}$$

$$\frac{-3c}{1} = \frac{3c-c^2}{+1}$$

$$-3c = 3c - c^2$$

$$c^2 = 3c + 3c = 6c, \quad c = 0, 6$$

So, the value of c is 6

Ans 13 Let, $\sqrt{2}$ is a rational number,

$$\sqrt{2} = \frac{a}{b}$$ ($b \neq 0$, and a and b are any +tive integer) (~~the~~ a and b are co-prime no.)

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

Squaring both sides,

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

Now 2 divides a^2. So 2 divides a also

Let, $a = 2c$

Squaring both sides,

$$a^2 = 4c^2$$

$$2b^2 = 4c^2 \qquad (a^2 = 2b^2)$$

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

Now, 2 divides b^2. So, 2 divides b also.

So, our supposition was wrong as 2 is a common factor of both a and b.

$\therefore$ $\sqrt{2}$ is an irrational number.

Ans 14 $x^2 - (k+6)x + 2(2k-1)$

It is given that,

$$\alpha + \beta = \frac{1}{2}\alpha \cdot \beta \qquad (i)$$

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

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

Putting values in eq. (i)

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

3

$$K + 6 = 2K - 1$$

$$K = 6 + 1 = 7$$

$$K = 7$$

Ans 15 Let, the fraction be $\frac{x}{y}$

According to ques.

$$\frac{x-2}{y} = \frac{1}{3}$$

$$3(x-2) = y$$

$$3x - y - 6 = 0 \quad \text{(i)}$$

Also,

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

$2x = y - 1$

$2x - y + 1 = 0$ (ii)

By elimination method,

$$\begin{array}{r} 3x - y = 6 \\ 2x - y = -1 \\ - \quad + \quad + \\ \hline x = 7 \end{array}$$

Substituting value of x in eq. (i)

$3(7) - y = 6$

$-y = 6 - 21 = -15$

$y = 15$

So, the fraction is $\frac{x}{y} = \frac{7}{15}$

Ans 16 $AC = CB$

~~AC~~ By distance formula

A (5, −2) — (0, y) C — B (−3, 2)

$\sqrt{(0-5)^2 + (y+2)^2} = \sqrt{(-3-0)^2 + (2-y)^2}$

Squaring both sides,

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

$$25 + \cancel{y^2} + \cancel{4} + 4y = 9 + \cancel{y^2} + \cancel{4} - 4y$$

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

$$8y = -16$$

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

$$y = -2$$

So the coordinates of point are ~~(-2,~~ $(0, -2)$

3

Ans 17 $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$

LHS,

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

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

$$= (\sin^2\theta + \cos^2\theta) + \operatorname{cosec}^2\theta + \sec^2\theta + 2 \times \sin\theta \times \frac{1}{\sin\theta} + 2\cos\theta \times \frac{1}{\cos\theta}$$

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

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

$= 1 + 1 + \cot^2\theta + 1 + \tan^2\theta + 4$ $\left[\begin{array}{l} \operatorname{cosec}^2\theta = 1 + \cot^2\theta \\ \sec^2\theta = 1 + \tan^2\theta \end{array}\right]$

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

$= RHS$

Hence Prove

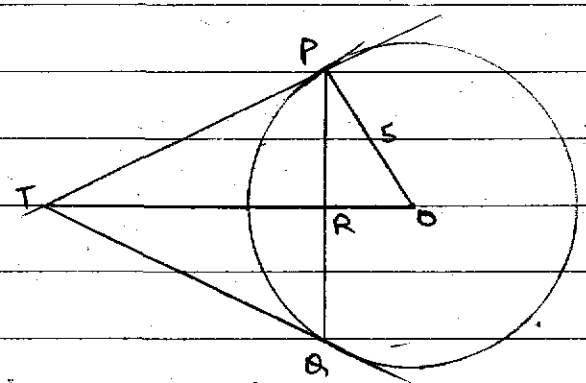
Ans18 $PQ = 8cm$

$OT \perp PQ$,

So, $PR = RQ$.

$PR + RQ = 8$

$PR = RQ = 4cm$



In ΔPRO

By Pythagoras theorem

$PO^2 = PR^2 + RO^2$

$(5)^2 = (4)^2 + RO^2$

$RO^2 = 25 - 16$

$= 9$

$RO = \sqrt{9} = 3cm$

Let, $TP = x$

$TR = y$

In ΔTPR, By pythagores theorem

$TP^2 = PR^2 + TR^2$

$x^2 = (4)^2 + y^2$

$x^2 = 16 + y^2$ (i)

In ΔTPO, $OP \perp TP$ (tangents are $\perp$ from the centre of circle)

By pythagores theorem

$TO^2 = TP^2 + PO^2$

$(y+3)^2 = x^2 + (5)^2$

$y^2 + 9 + 6y = x^2 + 25$

$\cancel{y^2} + 9 + 6y = 16 + \cancel{y^2} + 25$ (from (i))

$6y = 41 - 9$

$6y = 32$

$y = \frac{32}{6} = \frac{16}{3}$ cm

Substituting value of y in eq. (i)

$$x^2 = 16 + \left(\frac{16}{3}\right)^2$$

$$x^2 = 16\left(1 + \frac{16}{9}\right)$$

$$x^2 = 16\left(\frac{25}{9}\right)$$

3

$$x = \sqrt{\frac{4 \times 4 \times 5 \times 5}{3 \times 3}} = \frac{4 \times 5}{3}$$

$$= \frac{20}{3} \text{ cm}$$

So, the length of TP $= \frac{20}{3}$ cm

Ans20 area of rectangle ABCD,

$= lb$

$= 8 \times 6$ $(l = 8\text{cm}, \ b = 6\text{cm})$

$= 48 \text{ cm}^2$

AC = diameter of circle

In $\triangle ADC$,

By pythagoras theorem,

$AC^2 = AD^2 + DC^2$

$AC^2 = (6)^2 + (8)^2$

$AC^2 = 36 + 64$

$AC^2 = 100$

$AC = \sqrt{100} = 10\,cm$

$r = \frac{d}{2} = \frac{10}{2} = 5\,cm$

area of circle,

$= \pi r^2$

$= 3.14 \times (5)^2$

$= 3.14 \times 25$

$= 78.50\ cm^2$

Shaded area = area of circle − area of ABCD

3

$= 78.50 - 48$

$= 30.50 \ m^2$

$3.14 \times 25 = 78.50$

Ans21 Dimentions of Canal

$b = 6m$

$h = 1.5m$

Speed $= 10 km/h$

time $= 30$ min. $= \frac{30}{60}$ hr $= \frac{1}{2}$ hr.

length of canal $= \frac{1}{2} \times 10,000$ (10km = 10000m)

$= 5000 \ m$

height of standing water $= 8 \ cm = \frac{8}{100} \ m$

area irrigate $= lb$

ATQ,

lbh of field = lbh of canal

$lb \times \frac{8}{100} = 6 \times 1.5 \times 5000$

$$db = \frac{3\cancel{6} \times 1.5 \times 5000 \times \cancel{100}^{25}}{4\cancel{8}}$$

$$= 3 \times \frac{15}{1\cancel{0}} \times 500\cancel{0} \times 25$$

$$= 45 \times 25 \times 500$$

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

$$= \cancel{562.5 \text{ km}}$$

$3 \times \frac{15}{10}$

$$\begin{array}{r} 45 \\ \times 25 \\ \hline 225 \\ 90 + \\ \hline 1125 \\ \times 5 \\ \hline 5625 \end{array}$$

3

So, it will irrigate 562500 m^2 area in 30 minutes.

Ans 22

Class	fi
0 - 10	8
10 - 20	10
20 - 30	10
30 - 40	16
40 - 50	12
50 - 60	6
60 - 70	7

$l = 30$

$f_1 = 16$

$f_0 = 10$

$f_2 = 12$

$h = 10$

$$\text{Mode} = l + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right] \times h$$

$$= 30 + \left[\frac{16 - 10}{2(16) - 10 - 12}\right] \times 10$$

$$= 30 + \left[\frac{6}{32 - 22}\right] \times 10$$

$$= 30 + \left[\frac{6}{\cancel{10}}\right] \times \cancel{10}$$

$$= 30 + 6$$

$$= 36$$

3

So, the mode of the frequency distribution is 36.

Ans23 Let, the speed of boat = x km/h
the speed of stream = y km/h

During upstream = $\frac{30}{x-y}$

During downstream = $\frac{44}{x+y}$

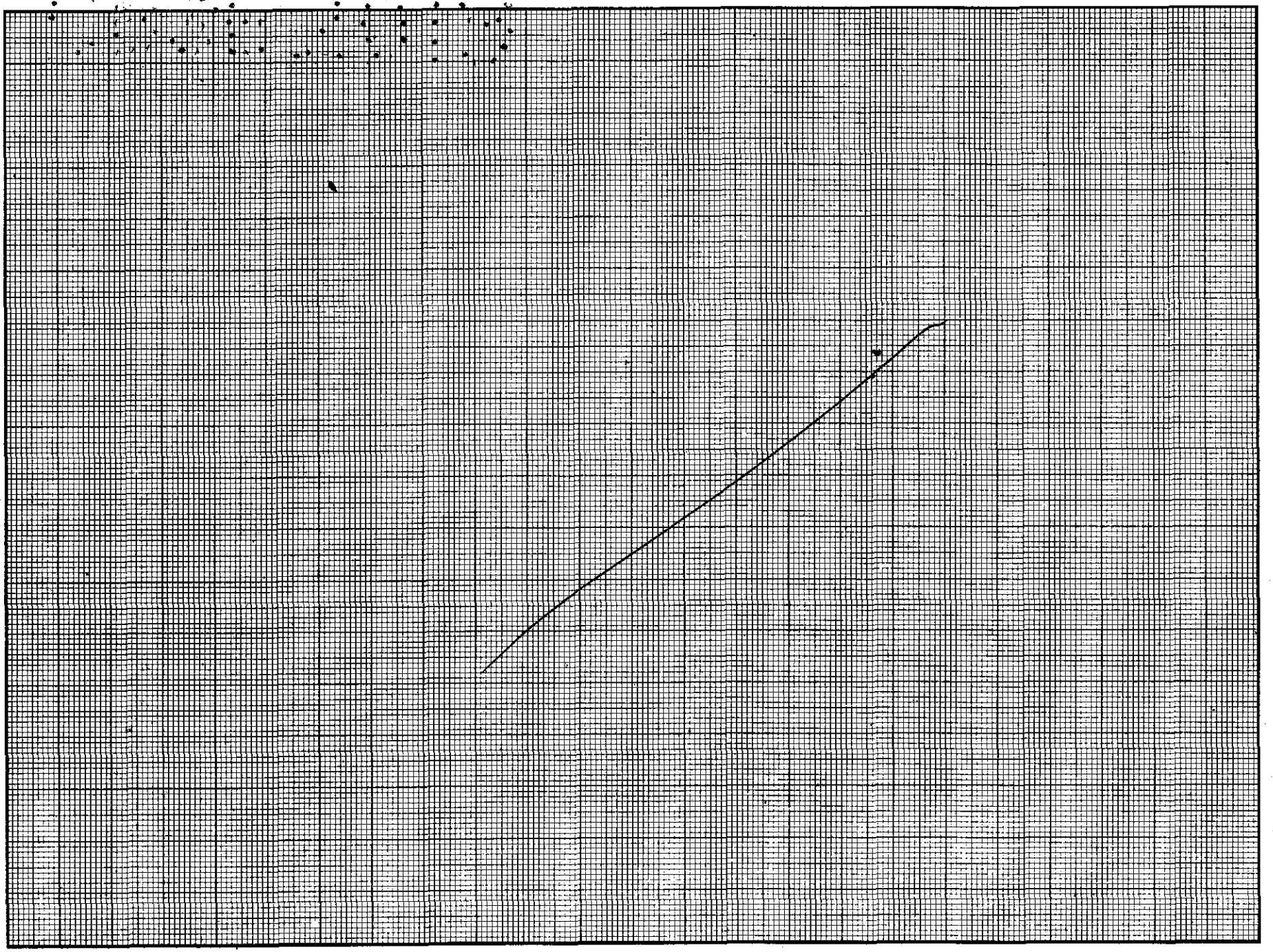
ATQ

$$\frac{30}{x-y} + \frac{44}{x+y} = 10 \quad \text{(i)}$$

During upstream = $\frac{40}{x-y}$

During downstream = $\frac{55}{x+y}$

Time = 13 hr



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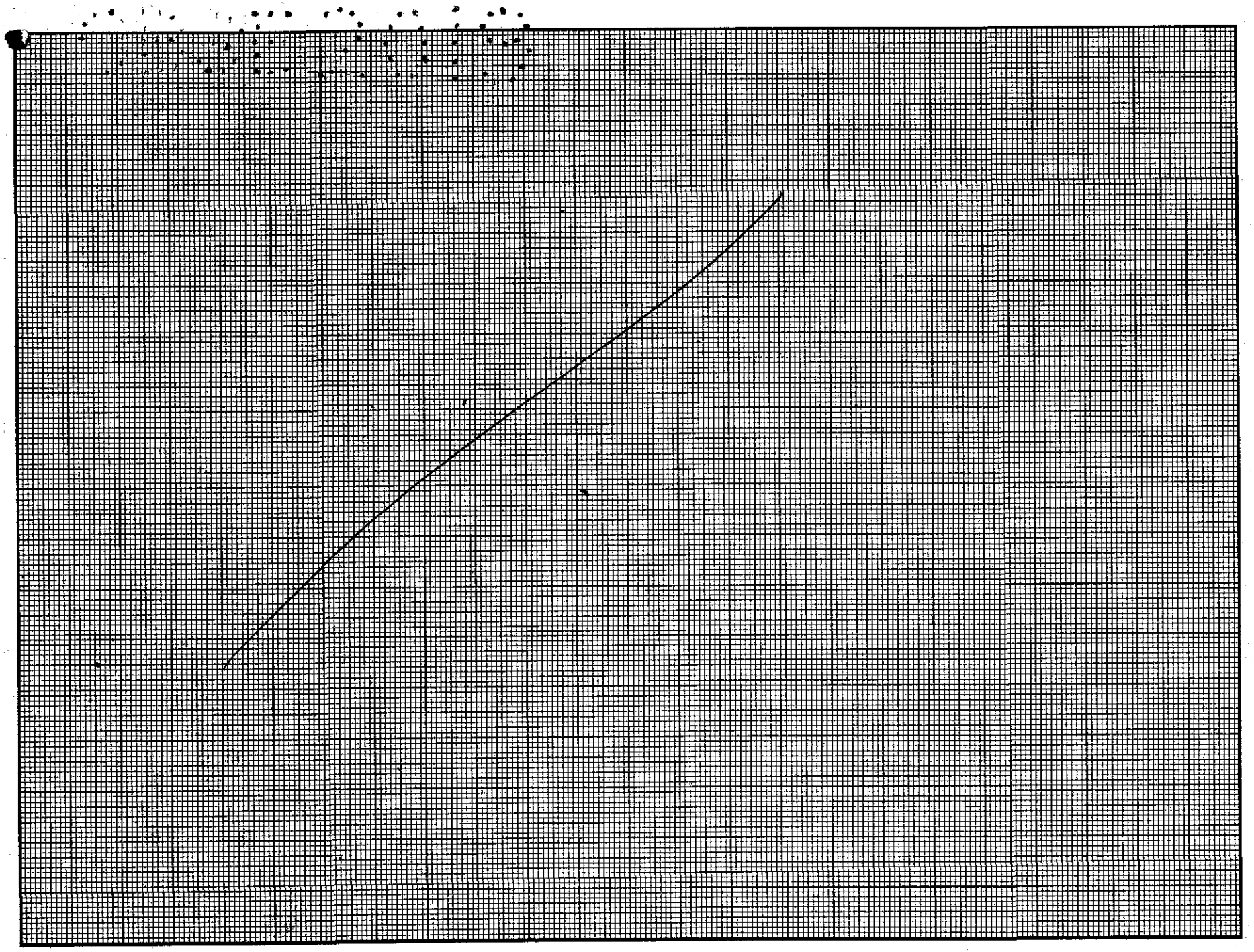


ATQ

$$\frac{40}{x-y} + \frac{55}{x+y} = 13 \qquad \text{(ii)}$$

By elimination method,

$$4\times\left(\frac{30}{x-y} + \frac{44}{x+y} = 10\right)$$

$$3\times\left(\frac{40}{x-y} + \frac{55}{x+y} = 13\right)$$

$$\frac{120}{x-y} + \frac{176}{x+y} = 40$$

$$\frac{120}{x-y} + \frac{165}{x+y} = 39$$

$$- \qquad - \qquad -$$

$$\frac{176}{x+y} - \frac{165}{x+y} = 1$$

$$\frac{11}{x+y} = 1$$

$$x+y = 11 \qquad \text{(iii)}$$

176
165
11

Putting value of $x+y$ in (i)

$$\frac{30}{x-y} + \frac{44}{11} = 10$$

$$\frac{30}{x-y} = 10 - 4$$

$$\frac{30}{x-y} = 6$$

$$x - y = 5 \qquad \text{(iv)}$$

Using elimination method,

4

$$x + y = 11$$
$$x - y = 5$$
$$2x = 16$$
$$x = 8 \text{ km/h}$$

$$8 + y = 11$$
$$y = 11 - 8$$
$$y = 3 \text{ km/h}$$

The Speed of boat is 8km/h and speed of stream is 3km/h

Ans24 $S_4 = 40$

$\frac{4}{2}(2a + (4-1)d) = 40$

$2(2a + 3d) = 40$

$2a + 3d = 20$ (i)

$S_{14} = 280$

$\frac{14}{2}(2a + (14-1)d) = 280$

$7(2a + 13d) = 280$

$2a + 13d = 40$ (ii)

Using elimination method,

$2a + 3d = 20$

$2a + 13d = 40$

$- \quad - \quad -$

$-10d = -20$

$d = \cancel{10}\ 2$

$$2a + 3(2) = 20$$
$$2a + 6 = 20$$
$$2a = 14$$
$$a = 7$$

$$S_n = \frac{n}{2}(2a + (n-1)d)$$
$$= \frac{n}{2}(2(7) + (n-1)(2))$$
$$= \frac{n}{\cancel{2}} \times \cancel{2}[7 + n - 1]$$
$$= n[n+6]$$

So, the S_n term is $n(n+6)$

4

Ans 25 $\frac{\sin A - \cos A + 1}{\sin A + \cos A - 1} = \frac{1}{\sec A - \tan A}$

LHS,

$$= \frac{\sin A - \cos A + 1}{\sin A + \cos A - 1}$$

Dividing the numerator and denominator by $\cos A$

$$= \frac{\frac{\sin A}{\cos A} - \frac{\cos A}{\cos A} + \frac{1}{\cos A}}{\frac{\sin A}{\cos A} + \frac{\cos A}{\cos A} - \frac{1}{\cos A}}$$

$$= \frac{\tan A - 1 + \sec A}{\tan A + 1 - \sec A}$$

$$= \frac{\tan A + \sec A - 1}{\tan A - \sec A + 1}$$

$$= \frac{\tan A + \sec A - 1}{-(\sec A - \tan A) + (\sec^2 A - \tan^2 A)}$$

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

$$= \frac{\tan A + \sec A - 1}{-(\sec A - \tan A) + (\sec A - \tan A)(\sec A + \tan A)}$$

$$= \frac{(\tan A + \sec A - 1)}{(\sec A - \tan A)[-1 + \sec A + \tan A)}$$

$$= \frac{1}{\sec A - \tan A}$$

$= RHS$

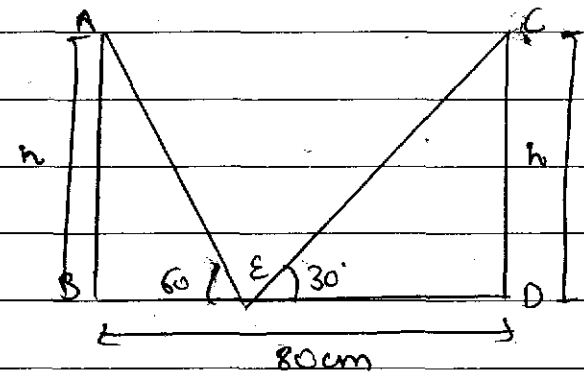
$(\sec^2 - \tan^2)$

$(\tan - \sec)C$

$(\sec - \tan)E1$

Ans 26 Let, $BE = x$, $AB = CD = h$

$ED = 80 - x$



In ΔABE

$\tan 60 = \sqrt{3}$

$\frac{AB}{BE} = \sqrt{3}$

$\frac{h}{x} = \sqrt{3}$

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

In ΔDCE,

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

$\frac{CD}{DE} = \frac{1}{\sqrt{3}}$

$\frac{h}{80-x} = \frac{1}{\sqrt{3}}$

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

$$x\sqrt{3} = \frac{80 - x}{\sqrt{3}} \quad \text{[By eq. (i)]}$$

$$(x\sqrt{3})(\sqrt{3}) = 80 - x$$

$$3x = 80 - x$$

$$4x = 80$$

$$x = 20 \text{ cm}$$

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

$$= 20\sqrt{3} = 20 \times 1.73$$

$$= 34.60 \text{ cm}$$

Distance between Pole AB and E

$$= x = 20 \text{ cm}$$

Distance between Pole CD and E

$$= 80 - x$$

$$= 80 - 20 = 60 \text{ cm}$$

4

height of Poles

$$= AB = CD = h$$

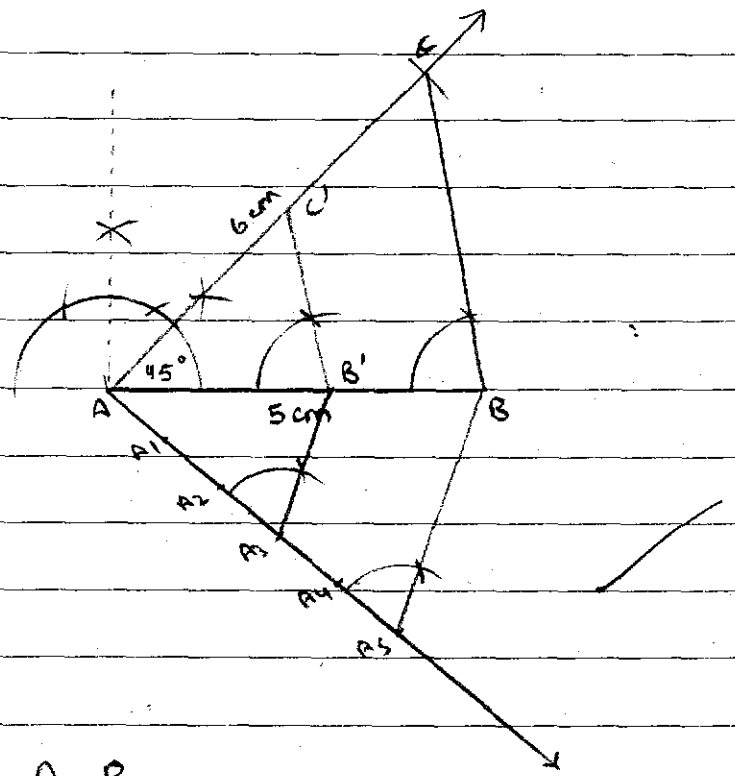
$$= 34.60 \text{ cm}$$

20
1.73
20
000
346×
3460

Ans 27 $AB = 5cm$

$AC = 6cm$

$\angle A = 45^\circ$



$A_3B' \parallel A_5B$

So, By BPT

$$\frac{AB'}{B'B} = \frac{3}{2}$$

$$1 + \frac{B'B}{AB'} = \frac{2}{3} + 1$$

$$\frac{AB}{AB'} = \frac{5}{3}$$

$$\frac{AB}{AB'} = \frac{AC}{AC'} = \frac{BC}{B'C'} = \frac{5}{3}$$

$$\frac{AB'}{AB} = \frac{AC'}{AC} = \frac{B'C'}{BC} = \frac{3}{5} \quad [\text{In } \triangle AB'C' \text{ and } \triangle ABC]$$

400
144
240
784

Ans 28

Volume $= 12308.8 \text{ cm}^3$

$r_1 = 20 \text{ cm}$

$r_2 = 12 \text{ cm}$

$$V = \frac{1}{3}\pi h \left[r_1^2 + r_2^2 + r_1 r_2\right]$$

$$12308.8 = \frac{1}{3} \times \frac{22}{7} \times h \left[(20)^2 + (12)^2 + (20)(12)\right]$$

$$\frac{12308.8 \times 3 \times 7}{22} = h\left[400 + 144 + 240\right]$$

$$\begin{array}{r} 17 \\ \times 17 \\ \hline 119 \\ 17\times \\ \hline 289 \end{array}$$

$$\begin{array}{r} 17 \\ \times 32 \\ \hline 34 \\ 51\times \\ \hline 544 \end{array}$$

784

~~12~~ $h = \cancel{\frac{12308.8 \times 3 \times 7}{22 \times 784\ 112}}$

$= \cancel{\frac{36926.4}{9464}}$

$= \frac{12308.8 \times 3}{784 \times 3.14}$

$= 15\,cm$

$l = \sqrt{h^2 + (r_1 - r_2)^2}$

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

$= \sqrt{289} = 17\,cm$

Metal used = CSA + base area

$= \pi l (r_1 + r_2) + \pi r_2^2$

$= \frac{22}{7}\left(17(20+12) + (12)^2\right)$

$= \frac{22}{7}\left(17 \times 32 + 144\right)$

$= \frac{22}{7} \times 688$

12308.8
10
22
12308.8
× 3
36926.4
36926.4

112
×22
224
224 ×
2464

~~184632~~
~~36926.4~~
~~24640~~
~~12320~~
46158
~~92316~~
~~6160~~
~~3080~~

23079
1540
17

~~1540~~
~~×5~~
~~7700~~
1540
× 2
3080

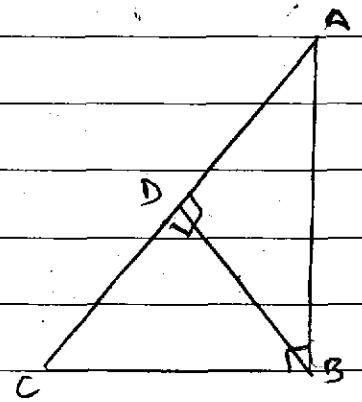
$\sqrt{289}$

4

$= 3.14 \times 688$

$= 2160.32 \text{ cm}^2$

Ans29 Statement - In a right angle triangle, the square of the hypotenuse is equal to the sum of squares of the other two sides.



Given - ΔABC, $\angle B = 90^\circ$

To prove - $AC^2 = AB^2 + BC^2$

Const. - Draw $BD \perp AC$

Proof - In ΔBDC & ΔABC

$\angle B = \angle D$ [each 90°]

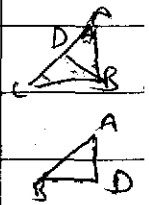
$\angle C = \angle C$ (common)

So $\Delta BDC \sim \Delta ABC$ (AA criteria)

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

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

$$BC^2 = AC \cdot CD \quad (i)$$



In $\triangle ABC$ & $\triangle ADB$

$\angle B = \angle D$ (each 90°)

$\angle A = \angle A$ (common)

So, $\triangle ABC \sim \triangle ADB$ (AA criteria)

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

$$\frac{AB}{AD} = \frac{AC}{AB}$$

$$AB^2 = AC \cdot AD \quad \text{(ii)}$$

On adding (i) & (ii)

$$AB^2 + BC^2 = AC \cdot AD + AC \cdot CD$$
$$= AC(AD + CD)$$
$$= AC \times AC$$
$$= AC^2$$

Hence proved.

$$AB^2 + BC^2 = AC^2$$

Ans 30

Class	f	cf
0 - 10	f_1	f_1
10 - 20	5	$5 + f_1$
20 - 30	9	$14 + f_1$
30 - 40	12	$26 + f_1$
40 - 50	f_2	$26 + f_1 + f_2$
50 - 60	3	$29 + f_1 + f_2$
60 - 70	2	$31 + f_1 + f_2$
Total	40	

$$31 + f_1 + f_2 = 40$$
$$f_1 + f_2 = 40 - 31$$
$$f_1 + f_2 = 9 \quad (1)$$

$l = 30$
$h = 10$
$\frac{n}{2} = 20$
$f = 12$
$cf = 14 + f_1$

$$\text{Median} = l + \left[\frac{\frac{n}{2} - cf}{f}\right] \times h$$

$$32.5 = 30 + \left[\frac{20 - 14 - f_i}{12}\right] \times 10$$

$$32.5 - 30 = \frac{6 - f_i}{12} \times 10$$

$$12 \times \frac{2.5}{10} = 6 - f_i$$

$$6 - f_i = 3$$

$$-f_i = 3 - 6$$

$$-f_i = \cancel{24} - 3$$

$$f_1 = 3$$

$$3 + f_2 = 9$$

$$f_2 = 6$$

Values of $f_1 = 3$

$f_2 = 6$

$$\frac{25}{\times 12}$$

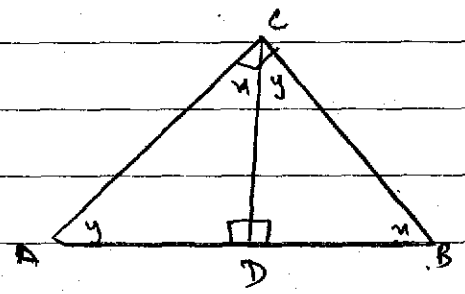
$$\frac{\cancel{12} \times \cancel{25}}{\cancel{10}}$$

30

$$\frac{3 \quad 1}{\cancel{12} \times \cancel{25}}$$

Ans 19 Given - $\angle ACB = 90^\circ$

$CD \perp AB$



To prove = $CD^2 = BD \times AD$

Proof = In $\triangle ADC$ & $\triangle CDB$

Let; $\angle ACD = x$

$\angle CAD = y$

$x + y + 90 = 180$ (in $\triangle ADC$)

$x + y = 90^\circ$ (i)

also, $x + \angle BCD = 90^\circ$

So, $\angle y = \angle BCD$

$\angle x = \angle CBD$

In $\triangle ADC$ & $\triangle CDB$

$\angle D = \angle D$ (each 90°)

$\angle DCA = \angle CBD$

3 So, $\triangle ADC \sim \triangle CDB$ (AA)

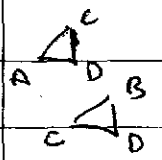
$\frac{CD}{BD} = \frac{AD}{CD} = \frac{CA}{CB}$

$CD^2 = AD \cdot BD$

$x + y = 90$

$x + 1 = 90$

$y = 1$



$\frac{CA}{CB} = \frac{CD}{BD}$

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

80/80 Eighty only

made 11875

Preuto Behl 11852

11868

11851

11861

CW 1059