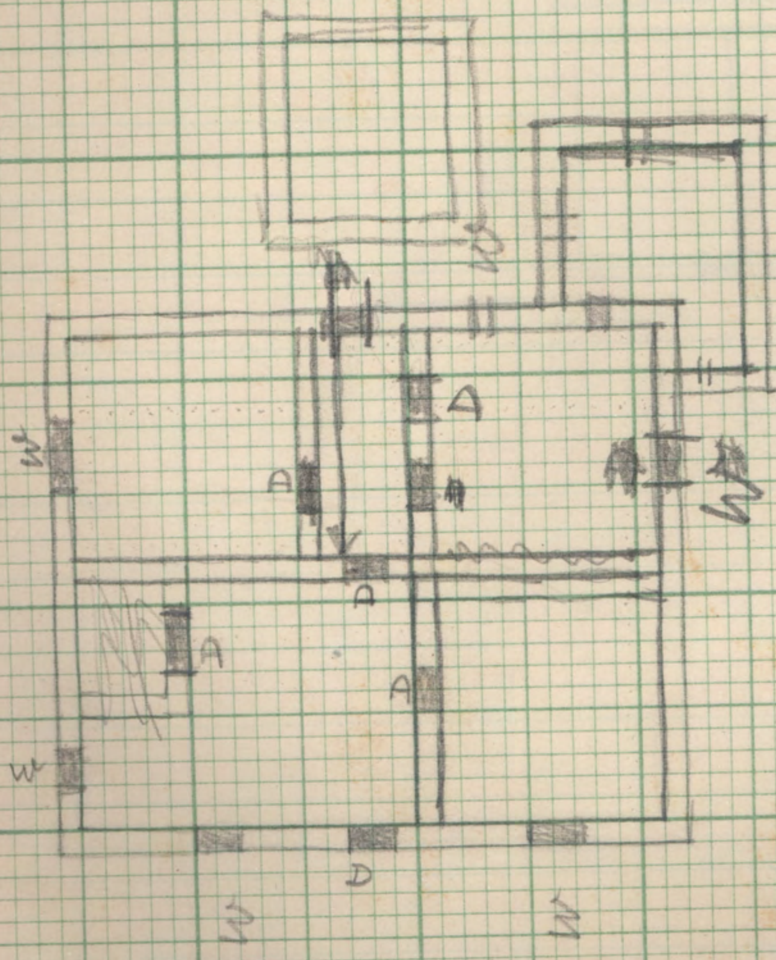
Synods Temperature

90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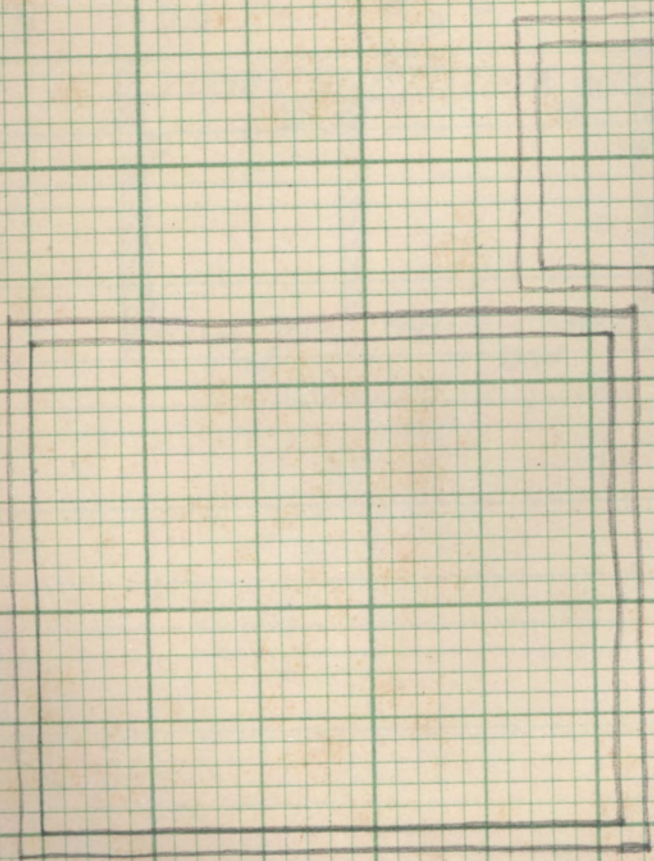
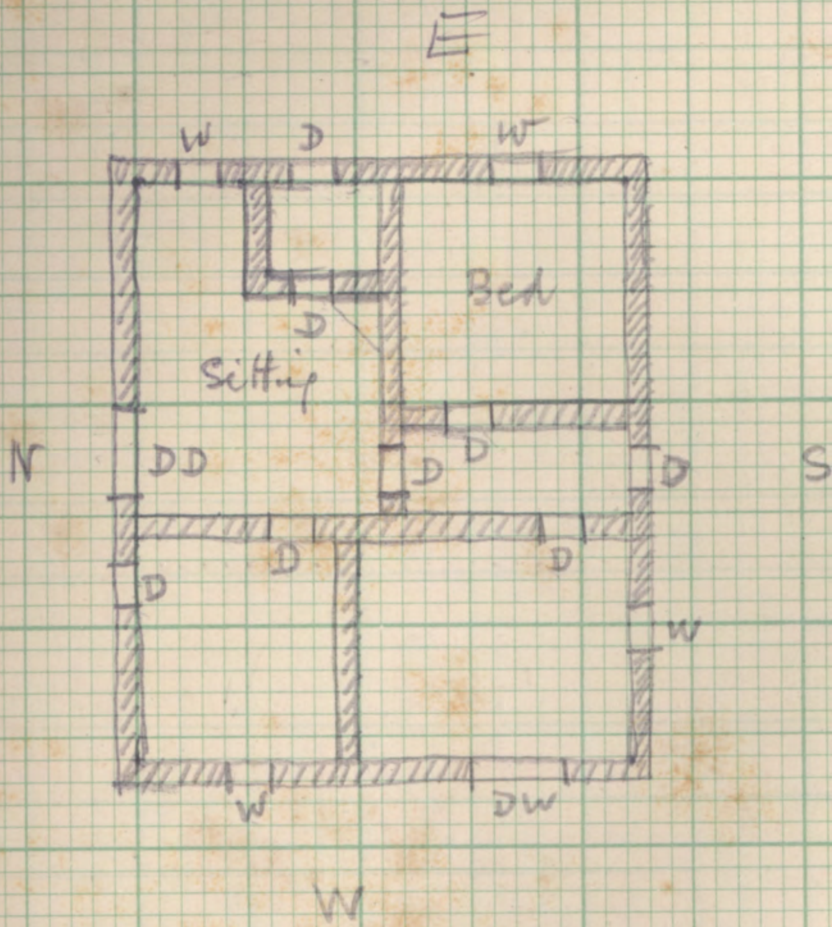


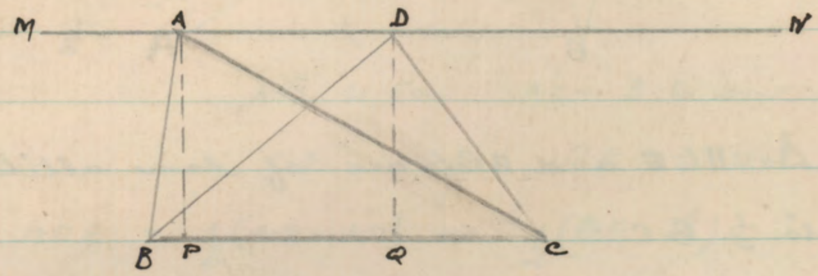


8 doors
5 windows

[20]

29-5-25 Proposition 7 Theorem

Triangles on the same base and ~~on~~ between the same parallels are equal in area.



Given : 2 Δs ABC and BCD on the same base BC and between the same //s MN, BC.

To Prove: Δ ABC = Δ BCD in area.

Cons : From A draw AP perp to BC, and from D draw DQ perp to BC.

Proof : AP, DQ are both perp to BC

∴ they are //.

and the fig APDQ is a parm.

∴ AP = DQ

Now the area of the Δ ABC is $\frac{1}{2}$(BC, AP)

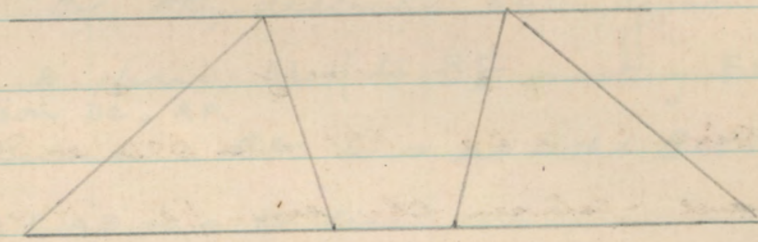
" " Δ BDC " $\frac{1}{2}$(BC, DQ)

but AP = DQ

∴ the Δs are equal in area.

Q.E.D.

Note : The converse of this is also true, namely: if triangles are equal in area and are on the same base and on the same side of it, they lie between the same ||s. For if their areas are equal and their basis the same, they must be of the same altitude.



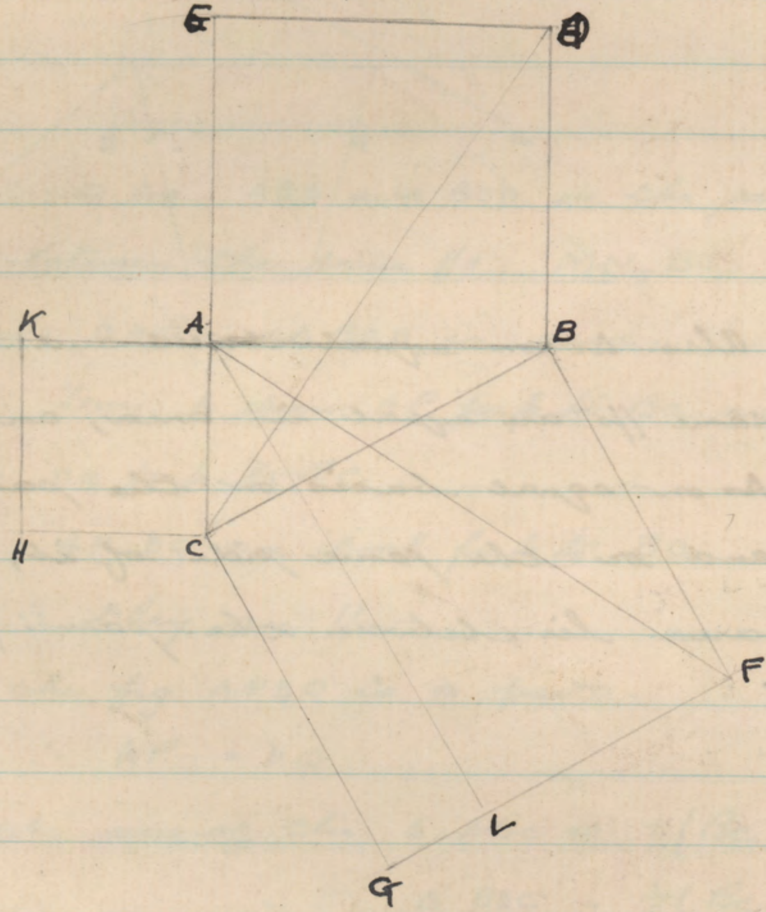
Also Δs on equal bases and between the same ||s are equal in area, and, Conversely Δs on equal basis on the same st line and on the same side of it, if equal in area lie between the same ||s.

[22]

after June Test. 16th 6-25

Proposition 8. Theorem.

The square on the hypotenuse of a rt angled triangle is equal to the sum of the squares of the other two sides



Given a $\triangle$ ABC having $\angle$ BAC a rt $\angle$

To prove that the square on BC is equal to the sum of the squares on AB and AC.

Cons. On AB describe the square ABDE,

on BC describe the square CBFG,

on AC describe the square ACHK.

From A draw AL || to BF meeting FG in L.

join DC, AF.

Proof: Because $\angle$ BAC is a rt $\angle$ + $\angle$ BAE is a rt $\angle$ (cons)

$\therefore$ CAE is a st line.

Now $\triangle$ BCD and the square AD are on the same base BD and between the same ||s CE, BD

$\therefore \triangle$ BCD is $\frac{1}{2}$ square AD

again $\triangle$ ABF and the rect. BL are on the same base BF and between the same ||s AL, BF.

$\therefore$ $\triangle$ ABF is $\frac{1}{2}$ the rect BL.

In $\triangle$s BCD, ABF we have BD = BA (sides of a square)

BC = BF (sides of a square) + included $\angle$ ~~BDC~~ DBC = included $\angle$ ABF each being a rt $\angle$ + $\angle$ ABC. $\therefore$ $\triangle$s are equal in all respects

$\therefore$ their doubles, the square AD + rect BL are equal

Similarly by joining BH + AG we can show that the square AH = rect CL.

and the rects BL, CL make up the square BG

$\therefore$ the square on BC = sum of squares on AB, AC.

Q.E.D.

2nd Session

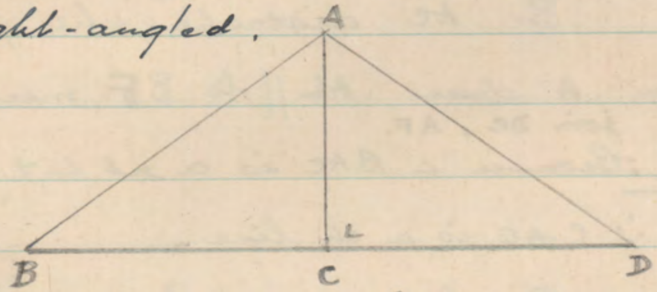
[24]

17-7-25

Proposition 9. "Theorem"

(Converse of Prop 8)

If the square on one side of a triangle is equal to the sum of the squares on the other two sides, the triangle is right-angled.



Given: a Δ ABC in which the square on AB is equal to the sum of the squares on AC and BC.

To prove ∠ ACB is a rt ∠

Cons:- At C make ∠ ACD a rt ∠ and make CD equal to CB. Join AD

Proof: Because ∠ ACD is a rt ∠

∴ the square on AD = the sq on AC + the sq on CD

= " " " AC + " " CB (cons)

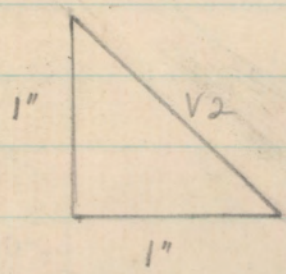
= " " " AB (Hypothesis)

∴ AD = AB

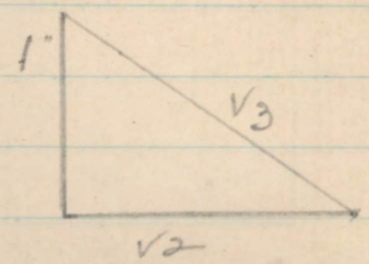
Then in Δs ABC, ADC, we have AD = AB, AC Common and CD = CB (cons) ∴ Δ's are equal in all respects

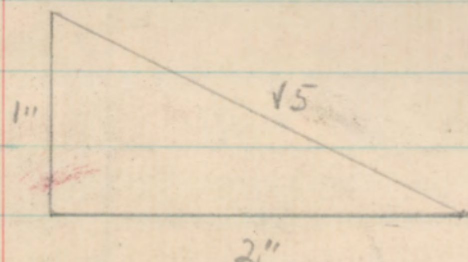
But ∠ ACD is a rt ∠ (cons) ∴ ∠ ACB is a rt ∠. Q.E.D.

$\sqrt{2} = 1.4''$



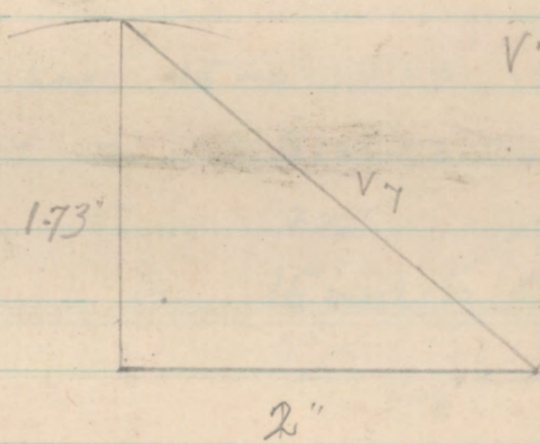
$\sqrt{3} = 1.73$





$\sqrt{5} = 2.21''$

$\sqrt{7} = 2.12$

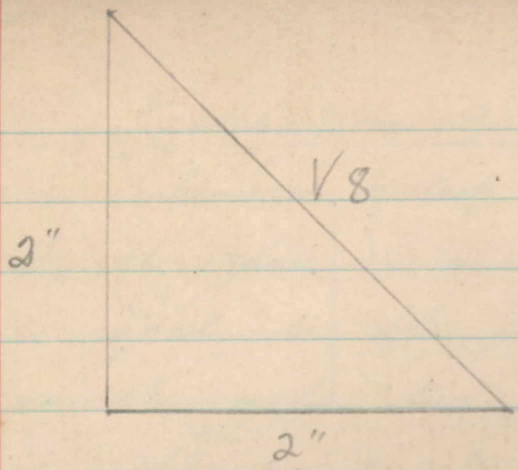


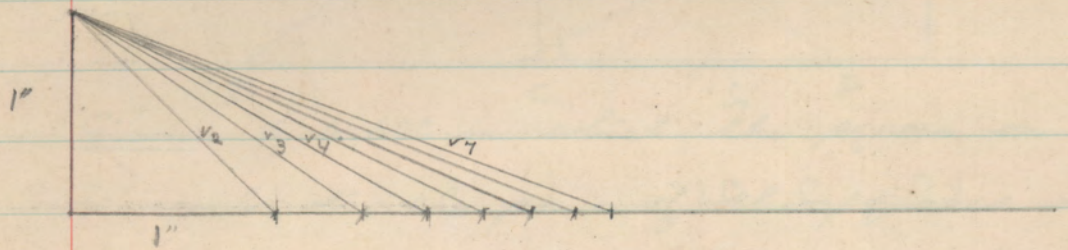
$\sqrt{2} = 1.4$

$\sqrt{3} = 1.73$

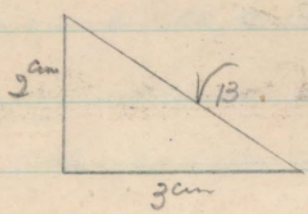
$\sqrt{5} = 2.21$

$\sqrt{7} = 2.12$

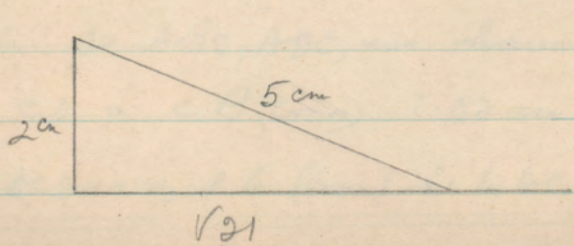




$$13 = 9 + 4$$
$$= 3^2 + 2^2$$

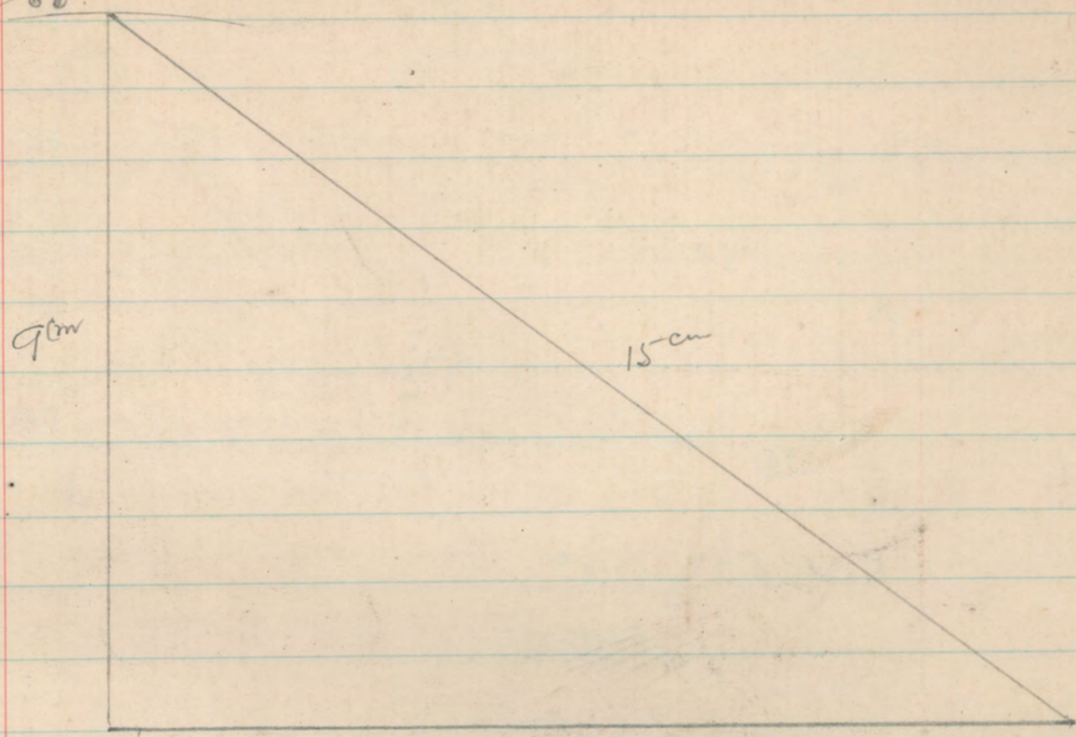


$$21 = 25 - 4$$
$$= 5^2 - 2^2$$



21/7/25 Page 63

1.



1cm = 1 in

ans 15 ins

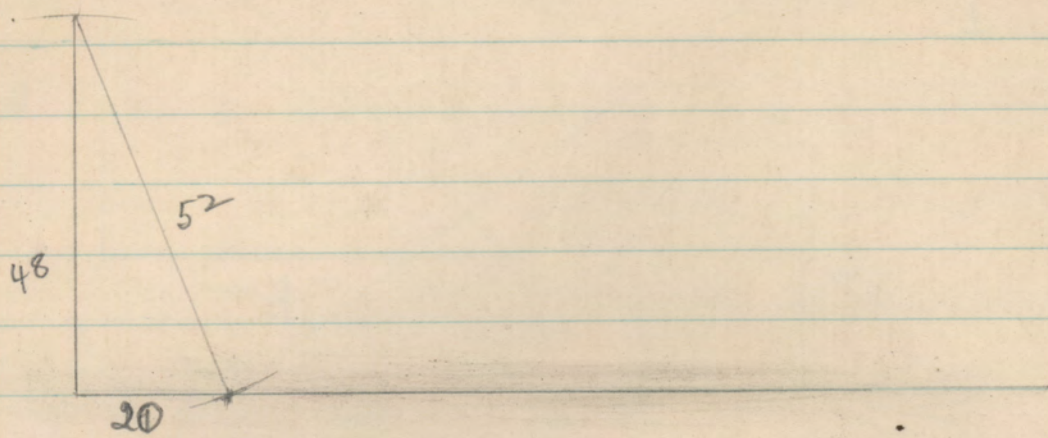
Proof $9^2 + 12^2 = 225$

$15^2 = 225$

$\therefore$ 15 ins is the ans

$$\begin{array}{r} 15 \\ 15 \\ \hline 75 \\ 15 \\ \hline 225 \end{array}$$

2



Proof $52^2 - 48^2$

$= 400$

$\sqrt{400}$

$= 20$

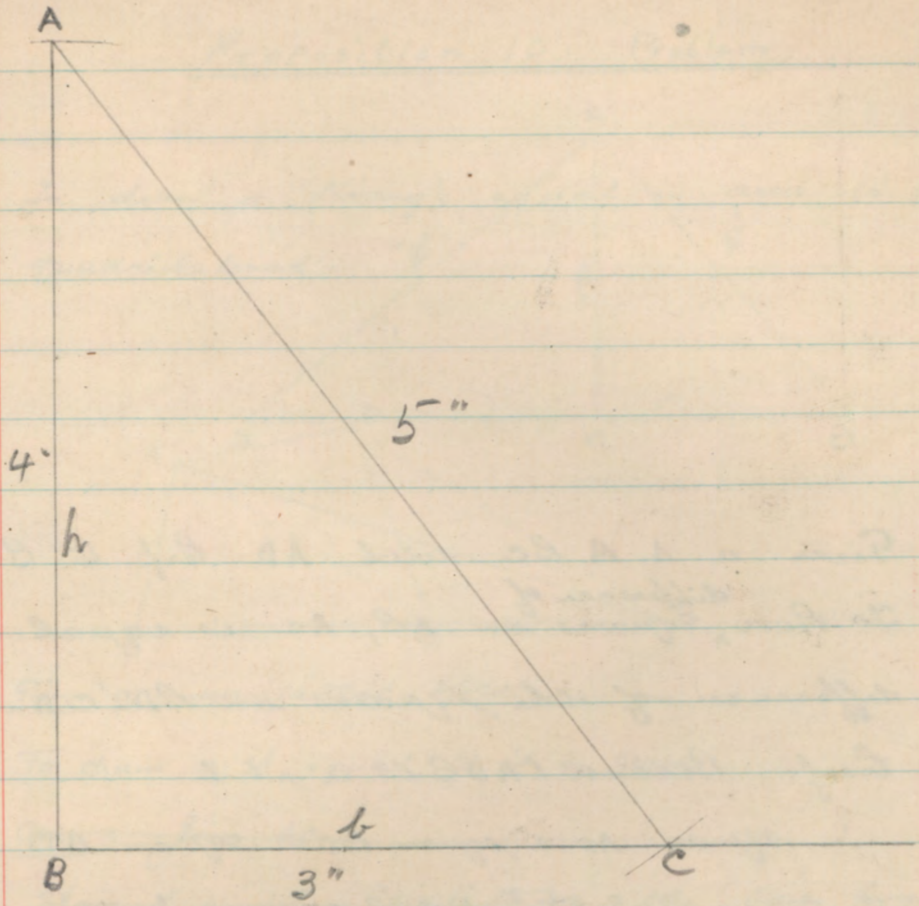
Ans 20 ins. ✓

$$
\begin{array}{r}
52 \\
52 \\
\hline
104 \\
260 \\
\hline
2704
\end{array}
\qquad
\begin{array}{r}
48 \\
48 \\
\hline
384 \\
192 \\
\hline
2304
\end{array}
\qquad
\begin{array}{r}
2704 \\
2304 \\
\hline
\sqrt{400} \\
= 20
\end{array}
$$

$52^2 - 48^2$

$= (52 + 48)$

3

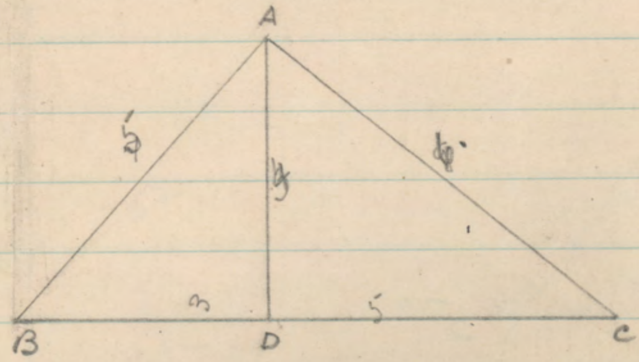


Ans 3 ins.

$$\text{area of } \Delta = \tfrac{1}{2} bh$$
$$= \tfrac{1}{2}(3 \cdot 4)$$
$$= 6 \text{ sq ins} \quad \text{Ans}$$

$\frac{1}{2}(2 \cdot 4 \times 5)$
$= 1.2 \times 5$
$= 6.$

[30]



Given a Δ ABC with AD perp to BC

To prove difference of squares on AB, AC is equal to the difference of the squares on BD, CD.

Proof: Because $\angle$ ADB is a rt $\angle$

$\therefore$ ~~sq on AD + sq on BD = sq on AB~~

$\cancel{3.55^2 + 3.2^2 = 4.75^2}$

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

$AB^2 = AD^2 + BD^2$

$AC^2 - AB^2 = DC^2 - BD^2$

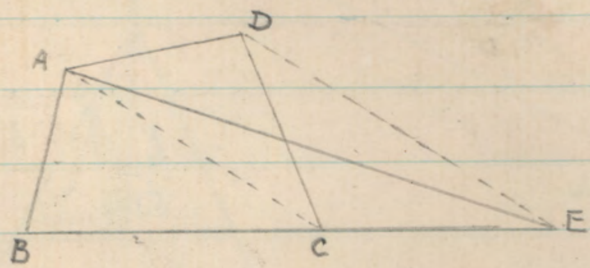
i.e the difference of the squares on the sides is equal to the difference of the squares on the segments of the base.

6/27/41 16

27th 7. 75

Proposition 10. Problem

To draw a triangle equal in area to a given quadrilateral.



Given a quadrilatral ABCD

To draw a Δ equal to it in area

Cons: Join AC.

Through D draw DE // to AC, the base produced in E

Join AE, then ABE is the Δ required.

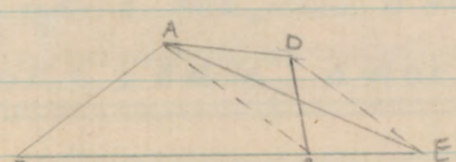
Proof: The Δs ADC, AEC are on the same base AC, and between the same //s AC, DE

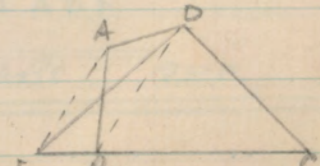
∴ they are equal in area

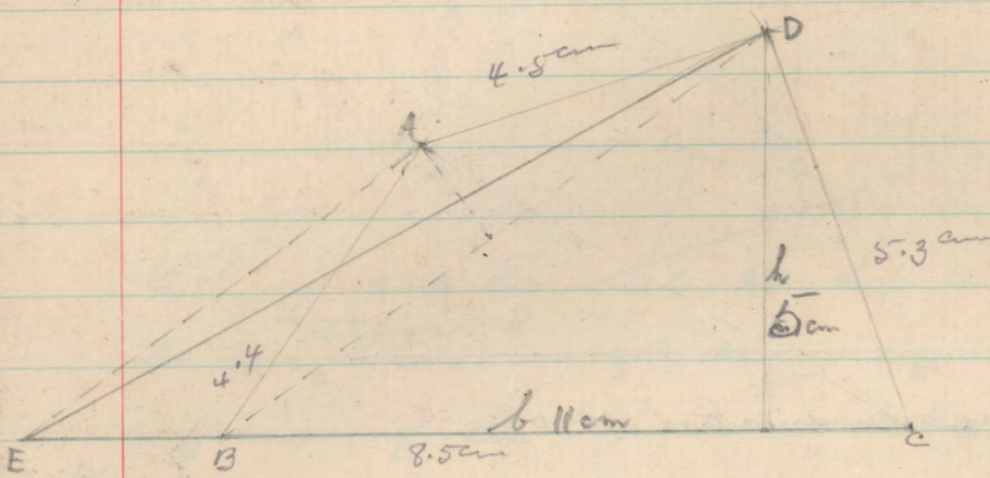
To each add the ΔABC

then the quadrilateral ABCD = ΔABE

Q.E.F







5.1
11
5.1
5 1
5 6.1

area of Δ = $\frac{1}{2}bh$

$= \frac{1}{2}(11 \times 5.1)$

$= \frac{55.1}{2}$

$= 27.55$ sq cm.

Proof :.

area of ~~Triangle~~ ABD = $\frac{1}{2}(8.4 \ 1.5)$

$= 6.3$

8.4
1.5
420
84
1260

area of Triangle BDC = $\frac{1}{2}(8.5 \times 5)$

$= 21.25$

2)42.5
21.25

21.25
6.3
27.55

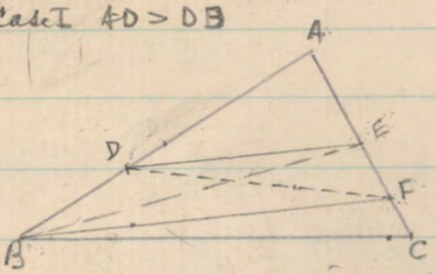
Page 67

[33]

3.3
1.7
231
33
2)5.61
2.805

30/7/25

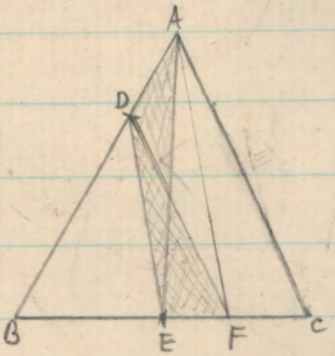
(1) Case I AD > DB



area of Δ ADF

= base = 3.3 h = 1.7
area = $\frac{1}{2}(3.3 \times 1.7)$

Δ ADF = 2.805



Δ DFB base 4.6 h .7
$\frac{1}{2}(4.6 \times .7)$ 2.3 .7 1.61

Δ DFB = 1.61

ΔBFc. base 4.9 × .5
.5
2)2.45 4
Δ FBC = 1.221
1.61
DFBC = 2.831

$\therefore$ area of DBFC = area of Δ ADF.

Given a Δ ABC with D a given point in AB.

To Bisect it.

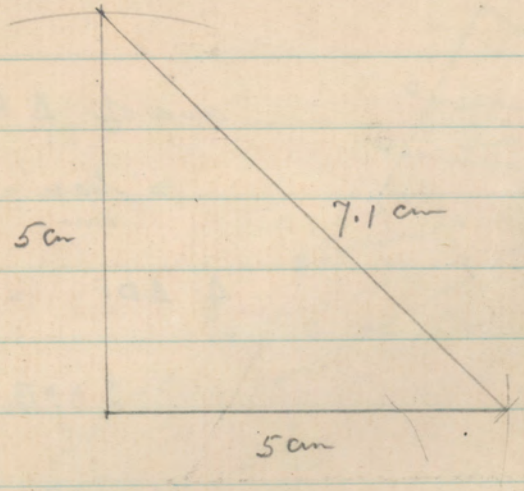
Cons: bisect AC at E and draw BF // to DE to meet AC in F.

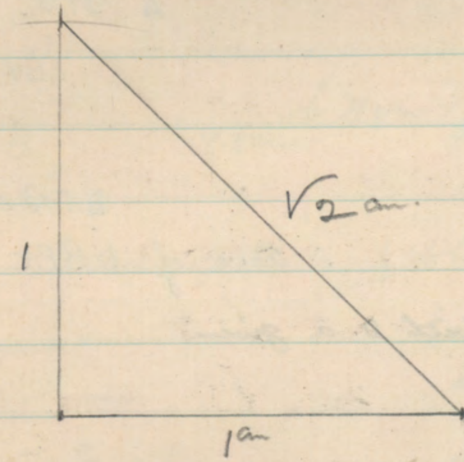
The Δ ADF will be the Δ required. But if AD is less than DB the Construction fails.

Proof: Δs BDE, FDE are on the same base DE and between the same //s DE, BF $\therefore$ they are equal in area to each add Δ ADE, then Δ ABE = Δ ADF

but Δ ABE = $\frac{1}{2}$ Δ ABC $\therefore$ Δ ADF = $\frac{1}{2}$ Δ ABC. Q.E.F.

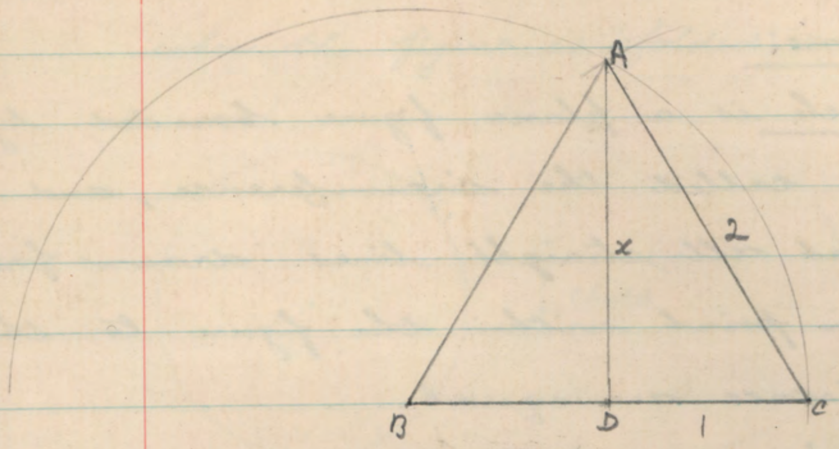
68. No 5
[34]





7	50	(7.071
7	49	
1407	10000	
7	9849	
	15100	
1		
14141	14141	
	959	

$= 5\sqrt{2}$
$= 5 \times 1.414$
$= 7.07$ cm



$$2^2 - 1^2 = x^2 .$$

$$-x^2 = -2^2 + 1^2$$

$$-x^2 = -4 + 1$$

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

$$x = \sqrt{3}$$

4-8-25

Book III. The Circle

Definitions:

1. A circle is a plane figure bounded by one line called the circumference, and is such that all straight lines drawn from a certain point within the figure to the circumference are equal.

2. A chord of a circle is a finite straight line joining any two points on the circumference.

3. Any straight line which cuts the circumference of a circle at two points is said to be a Secant of the circle.

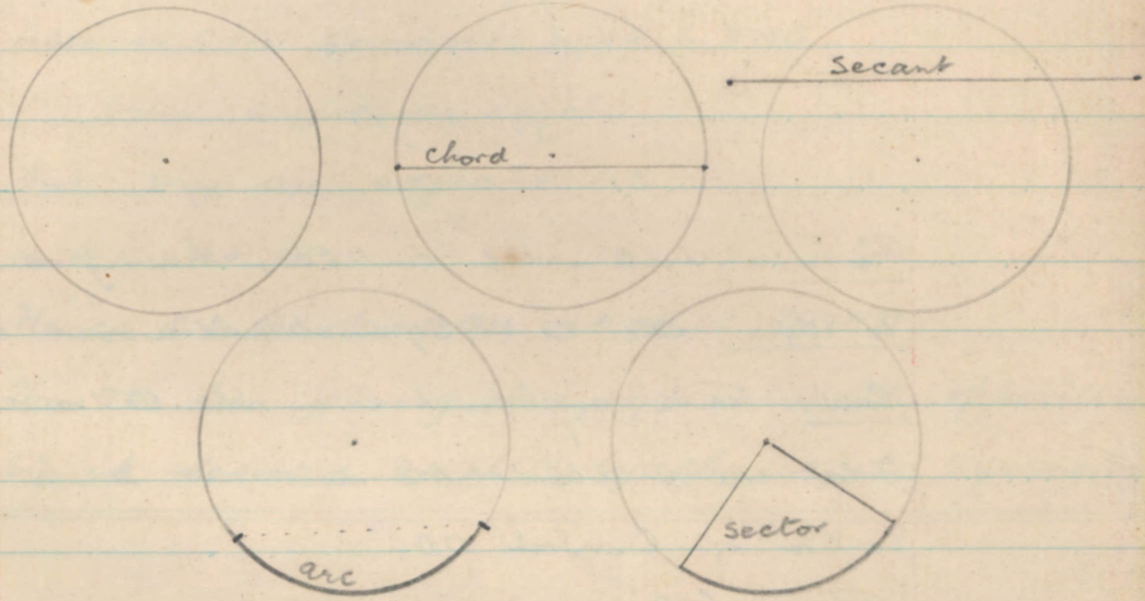
4. An arc of a circle is a part of the circumference.

5. A segment of a circle is the figure bounded by a chord and the arc which it cuts off.

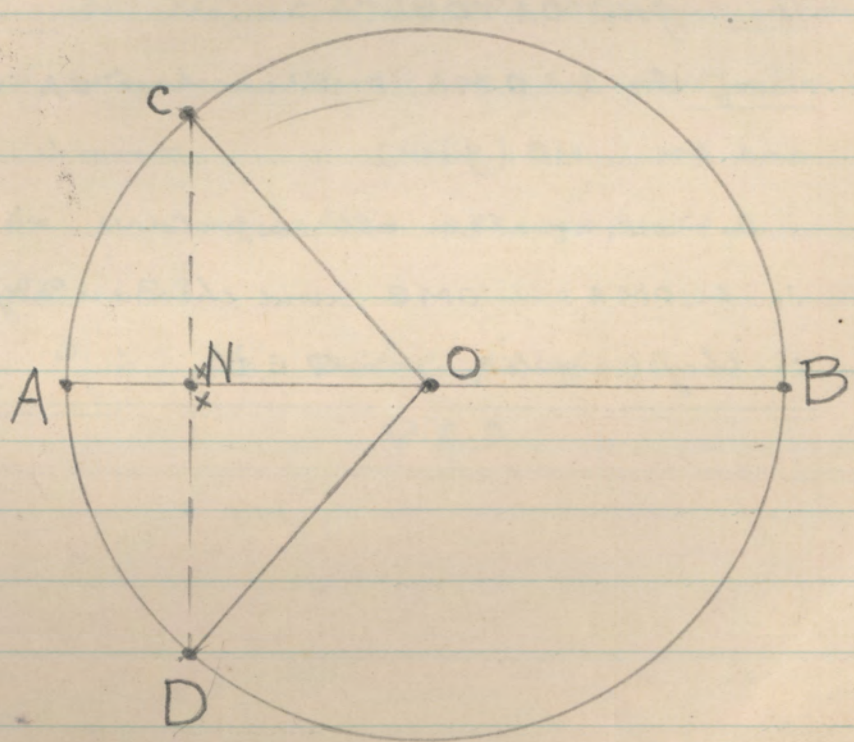
6. A sector of a circle is a figure bounded by two radii and the arc between them

7. A figure is said to be Symmetrical

about a line if the part on one side coinsides with the part on the other side when the figure is folded about that line.



<u>Corollary.</u> Join CD and let CD cut AB at N.
When the ⊙ is folded about AB,
CN and ND coincide,
∴ CN = ND
Also ∠ CNO coincides with ∠DNO,
∴ these angles are equal,
but they are adjacent ∠s
and ∴ rt ∠s
Hence CD is bisected at rt ∠s by AB
Thus a line joining two symmetrically opposite pts is bisected at rt∠s by the axis of symmetry.

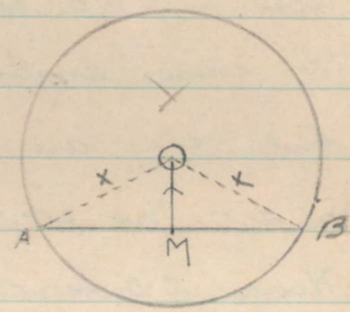


[40]

10/8/25

Proposition 2. Theorem

A straight line which joins the centre of a circle to the middle point of a chord is perpendicular to the chord, and conversely.



Given: a ⊙ centre O

and a chord AB in it, with M the middle pt of AB

To prove OM is perp to AB.

Cons:. Join OA, OB.

Proof In △s OMA, OMB we have OA = OB (radii) OM common

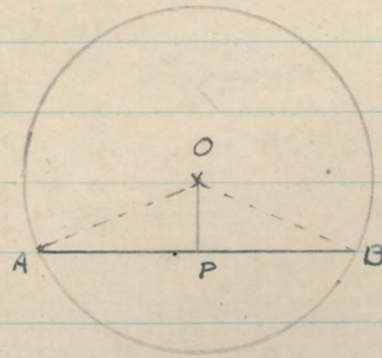
and AM = MB (given)

∴ △s are equal in all respects

∴ ∠ OMA = ∠ OMB, and these are adjacent ∠s

∴ they are rt ∠s. Q.E.D.

Converse: The perpendicular drawn from the centre of a ⊙ to a chord bisects the chord.



Given a ⊙ centre O, and a chord AB in it, and a st line OP drawn from O perp to AB.

To prove P is the middle pt of AB

Cons: Join OA, OB.

Proof: In the rt ∠ᵈ Δs OPA, OPB we have the hypotenuses OA, OB equal (radii) and one side, OP common

∴ Δs are equal in all respects

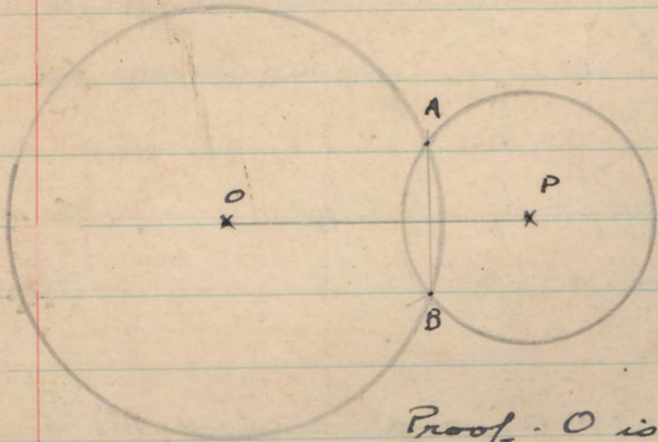
∴ AP = PB

i.e P is the middle pt of AB.

Q.E.D.

[42]

The line of centres of two intersecting circles bisects their common chord at rt $\angle$s.



Given 2 $\odot$s centres O and P, cutting each other at A and B

To Prove that OP bisects AB at rt $\angle$s

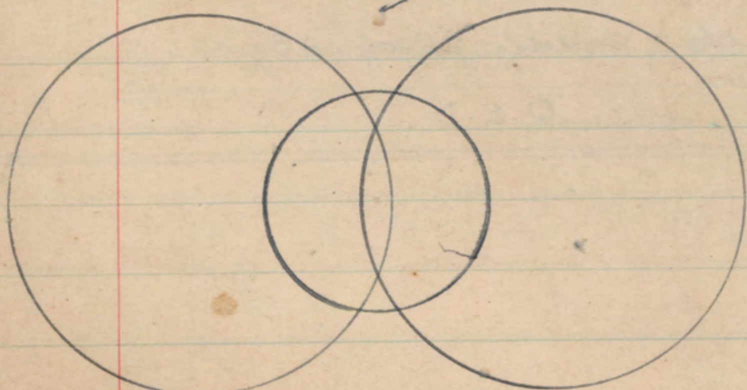
Proof. O is equidistant from A + B

So also P is equidistant from A + B.

$\therefore$ OP is the locus of a pt equidistant from A + B

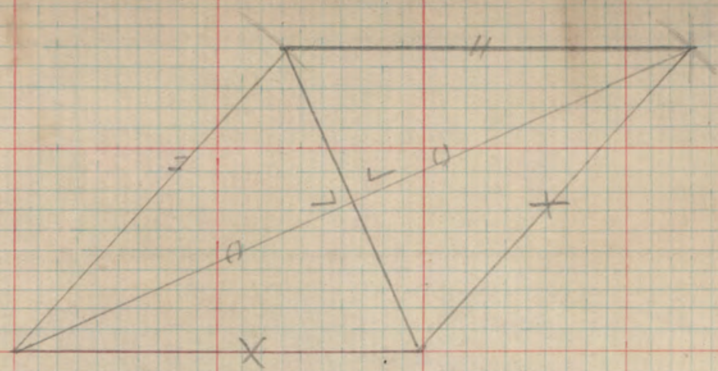
$\therefore$ OP bisects AB at rt $\angle$s   Q.E.D.

Aug 11th 1935

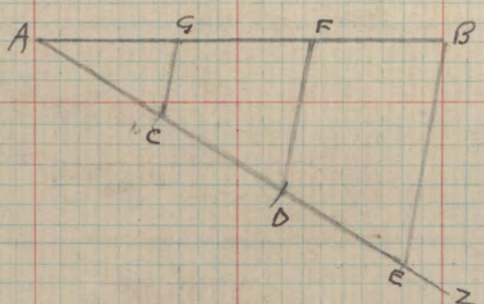


Std VII B.

Hours	7–7.45	8.45–9.30	9.30–10.15	10.15–11	11.30–12.10	12.10–1		2–2.45	2.45–3.30
Monday	History	Maths + Com. Sub	Latin + Com. Sub	Arithmetic + Com. Subj	Maths + Library + Prep	English		Manual Work	
Tuesday	English	Latin + Com Subj	Science	Library	Scripture	Singing		Native Languages + Dutch	
Wednesday	History	Staff meeting	Latin + Com. Subj	Maths + Com. Subj	Phy Exercise	English		Native Languages + Dutch	
Thursday	English	Latin + Com. Subj	Arith + Library or Prep	Science	Science	History		Manual Work	
Friday	History	Scripture	Latin + Com. Subj	Maths + Com. Subj	Science	English		Native Languages + Dutch	



28/4/25 Page 67 No 3. To divide a st line into 3 equal parts



Given a st line AB
To divide it into 3 equal parts.
Cons draw a st line AZ of indefinite length at any convenient ∠ to AB.
Starting at A, mark 3 equal steps AC, CD, DE along AZ
join EB
Through C & D draw CG // to EB, meeting AB in G & F
Then AB is divided into 3 equal parts
Proof because the //s BE, FD, GC intercept equal segments on AZ
∴ they intercept equal segments on AB Q.E.F

~~Showing how to divide a st line into any equal parts. Q.E.F~~

Show how to divide a st line into any equal parts

Geometry = Measurement of the earth

Geography writing of the earth

The counting of numbers in 60° and 90° and 12[illegible]one the Syrians. 360°

Geometry 13th February 1934.

Ex. B. 1.

Draw a line 3ins long.

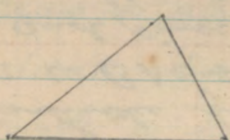
1. 3"
   7.6 c.m.
   3" = 7.6 c.m.
   ∴ 1" = 3)7.6
   2.53.. c.m. ans

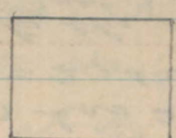
2. 4"
   10.2 c.m
   4" = 10.2 c.m
   ∴ 1" = 4)10.2
   2.55.. c.m ans

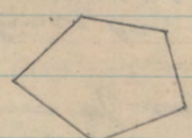
3. 6.c.m.
   $2\frac{7}{16}$"

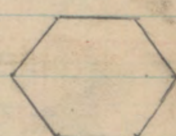
5. 11.45 c.m
   $4\frac{1}{2}$" or 4.5"

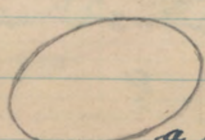
6. Rectilineal Figures are figures contained by straight lines


a triangle.
(3 sides)


a quadrilateral.
(4 sides)


a pentagon.
(5 sides)


a hexagon.
(6 sides)

7. 
a curvilinear.

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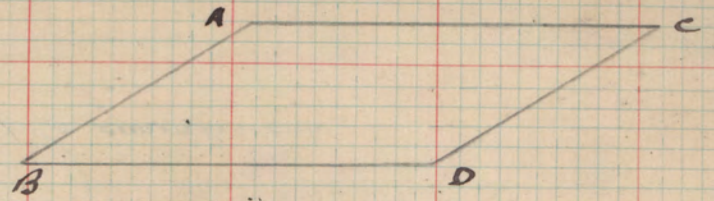
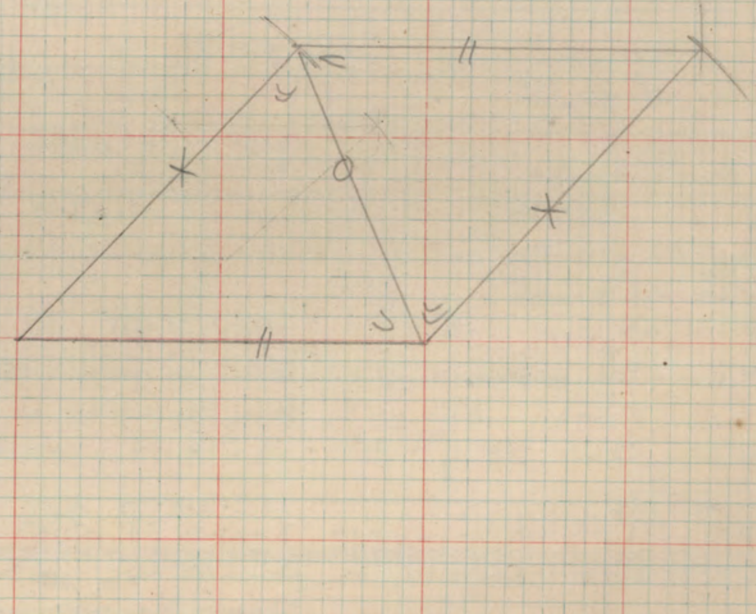
[4]



Given a quadrilateral ABCD in which
∠ACD = ∠ABD and ∠BAC = ∠BDC
To prove ABCD is a parm
Proof: Because the 4 ∠s of a quad. together = 4 rt ∠s
and the fig ABCD has 2 pairs of equal ∠s
∴ ∠BAC + ∠ABD = 2 rt ∠s
and since AB meets the st lines AC, BD
making the 2 inte~~rsecting~~rnal ∠s supplementary
∴ AC is ∥ to BD
Similarly AB is ∥ to CD
∴ ABCD is a parm Q.E.D.

5



20th February 1924.

Definitions.

A straight line is the shortest distance between two points, its ends.

A point in Geometry has position but not magnitude.

A line has length but no breadth or thickness.

It has therefore one dimension.

A surface has length and breadth.

A solid has three dimensions, length, breadth and thickness.

An angle is the amount of turning made by a straight line in moving from one position to another.

27th February 1924

Making and measuring Angles.

1. To make an angle, using the protracter. e.g to make an angle of 30°

Draw a straight line, A.B. At A place the middle point of the straight line along AB.

Mark a point, C, at the figure 30, measuring up from the line AB.

Join AC, then CAB is the angle required.