



الهندسة الأقليدية
وعلاقتها بالجبر والمقابلة
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2004

2004/06/23

2004/2003 :

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4.....	- 3 .I
6.....	- 4 .I
7.....	- 5 .I
11.....	- 6 .I
12.....	- 7 .I
14.....	-II
27	-III
27.....	- 1. III
29.....	- 2. III
29.....	- 3. III
31.....	- 4. III
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34.....	- 6. III
46.....	- 7. III
48.....	-VI
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53.....	

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(. 2200

(. 1600- . 2200)

.(Ahmès)

. 1650

(Papurs Rind)

1898

(Wallis Budge)

(Eisenlohr)

53

54" " - -

$$x = 6, y = 8$$

$$x = \frac{3}{4}y \quad x^2 + y^2 = 100$$

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- 6619

.2

.(. 1600 - . 2000)

300

.2 .

53

.110 . 1986

54

$a^2 + b^2 = c^2$ a, b, c 3 2

.3

(. 546 - . 640) (Thalès)

" "

(. 250 .) (Diophantus)

$ax^m = bx^n$

.4

(Aryabhata)

(Brahme Gupta)

(Mahavicarya)

$ax^2+bx=c$

.36 . 1985

.36 . 56

.37 . 57

.6 .

$$x^2 - 45x = 250$$

" "

59

$$x_1 = -5 \quad x_2 = 50$$

61

1600 800

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.2.III

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)

(10 8) :

.1

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(13 9) : .2

: () .3

. 13 : .4

62

" :

(930 .)

.3.III

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63

.7.

59

.142 . 1961

60

.122 .

61

.89 . 1980

62

.1979

63

:

. 64

17

: (Algèbre) (Larousse)

x

. $x + 2 = 5$

. 65

x

. x^2

" :

:

$x^2 - 3x + 16 = x + 12$

"

"

. $x^2 + 16 = x + 12 \Leftrightarrow x^2 - 3x + 3x + 16 = x + 3x + 12$

"

" :

. $x^2 + 16 - 12 = 4x \Leftrightarrow x^2 + 4 = 4x$

:

⁶⁵ Larousse, *dictionnaire super Major*, la série 18481-320133 B, Avril 1995.

66

67

68

(833 - 813)

" :

"

" :

69"

70

9.....1

(Algorismus)

(Algorithme)

18

.23 .

.17 .

.47 .

.13 .

66

67

68

69

70

846/232

.20 . 1989

(Guarismo)

" (Littre)

.71"

Algebra

Algèbre

.Die algebra

(Carmen de Algorismo)⁷²

.⁷³(Algorismus vulgarise)

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.74"

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71

.48 . 1989

Rara Mathematica

(Alliwell)

1220

(Alexander de villa die)

72

.1739

.1250

(John of Halifax)

73

.20 .

74

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75

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76

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⁷⁷1852

Lelevel

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78

.5.III

" : (Chasles) (1763-1880)

79"

75

.1962

1926

76

.50 .

77

1948

78

.24 .

.49 .

79

1831

.(Marre)

1915

1939

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.1

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.2

$$x = \frac{b}{a} \quad ax^2 = bx^*$$

$$x = \sqrt{\frac{c}{a}} \quad ax^2 = c^*$$

$$x = \frac{c}{b} \quad bx = c^*$$

$$x = -\frac{b}{2} + \sqrt{c + \frac{b^2}{2}} \quad x^2 + bx = c^*$$

$$x = \frac{b}{2} + \sqrt{c + \frac{b^2}{2}} \quad x^2 + c = bx^*$$

$$x = \frac{b}{2} + \sqrt{\frac{b^2}{4} + c} \quad x^2 = bx + c^*$$

.3

.4

.5

.6

.7

.8

.9

.6.III

"

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.1

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$$ax^2 = bx$$

)

(x^2)

$$. x^2 = 25 \quad x = 5$$

$$x^2 = 5x$$

.(x

.2

"

$$x = \sqrt{\frac{b}{a}}$$

$$ax^2 = b$$

) $x=3$

$$x^2 = 9$$

.(

.3

"

$$. \quad x = \frac{c}{b}$$

$$bx = c$$

()

.4

"

$$x^2 + 10x = 39$$

$$ax^2 + bx = c$$

" :

."

$x^2 + 10x = 39$ $\frac{10}{2} = 5$ $5^2 = 25$ $25 + 39 = 64$ $8 - 5 = 3 \quad :5$ $\sqrt{64} = 8$ $x = 3$	$a \neq 0 \quad ax^2 + bx = c \Leftrightarrow x^2 + \frac{b}{a}x = \frac{c}{a}$ $\left(\frac{b}{2a}\right)^2$ $\Delta = \frac{b^2}{4a} + \frac{c}{a}$ $x = \frac{-b}{2a} + \sqrt{\frac{b^2 + 4ac}{4a^2}}$
--	---

:

"

\overline{AB}

\overline{AB}

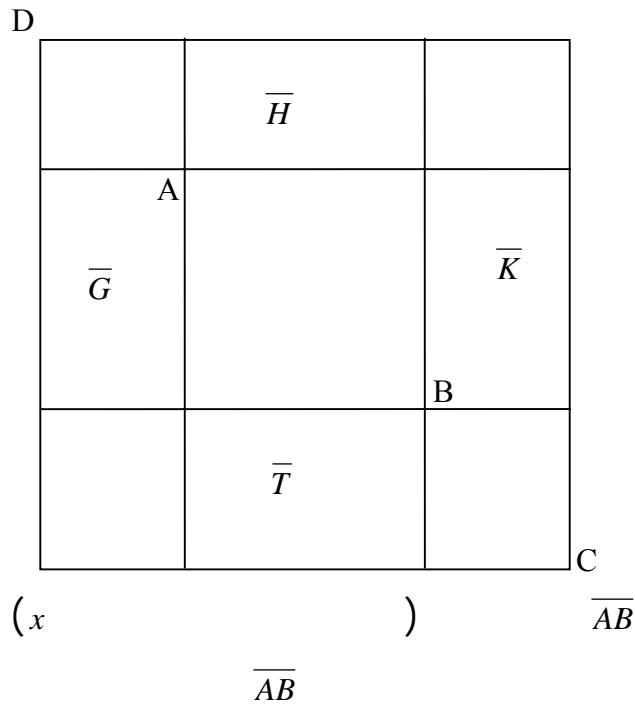
$\overline{G} \quad \overline{T} \quad \overline{K} \quad \overline{H}$

\overline{AB}

\overline{DC}

\overline{AB}

\overline{DC}



.25

5

.10x

$$.39 + 25 = 64 \quad x^2 + 10x = 39$$

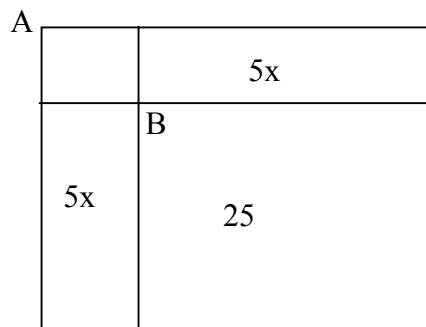
64

$$x = 3$$

\overline{AB}

8

$$x + 5 = 8 \Rightarrow x = 3 :$$



15

.5

"

"

$$ax^2+c=bx$$

" :

$$x^2+21=10x$$

"

... " :

"

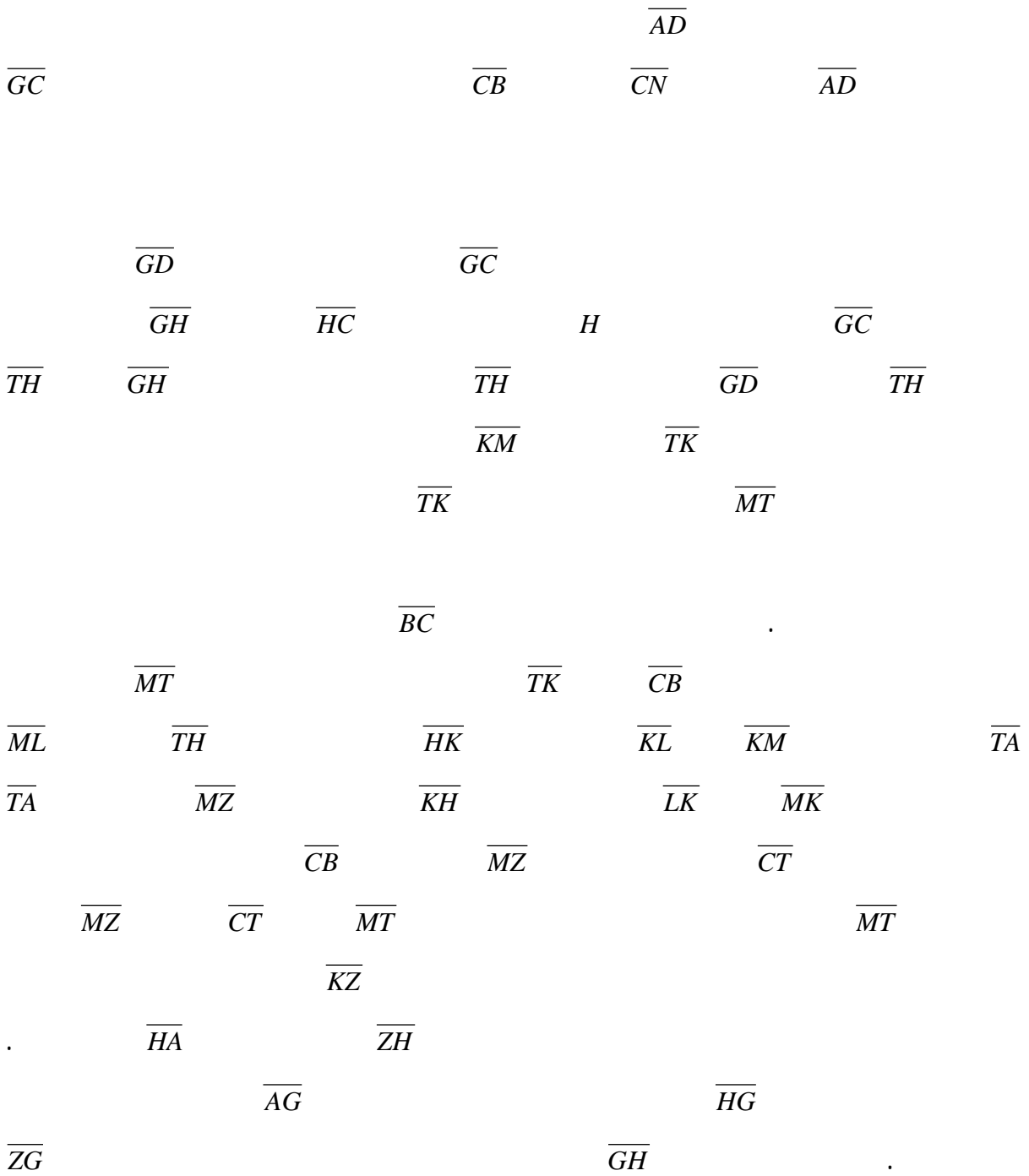
$x^2+21=10x$ $\frac{10}{2}=5$ $\left(\frac{10}{2}\right)\left(\frac{10}{2}\right)=25$ $25-21=4$ $\sqrt{4}=2$ $x_1 = 5 - 2 = 3 \quad x_2 = 5 + 2 = 7$	$a \neq 0 \quad ax^2 + c = bx \Leftrightarrow x^2 + \frac{c}{a} = \frac{b}{a}x$ $\left(\frac{b}{2a}\right)^2$ $\Delta = \frac{b^2 - c}{4a^2 a}$ $\sqrt{\Delta} = \sqrt{\frac{b^2 - c}{4a^2 a}}$ $x = \frac{b}{2a} \pm \sqrt{\Delta}$
--	--

$$(\Delta \neq 0) \quad \Delta \leq 0 \quad x = \frac{b}{2a}$$

$\Delta = 0$:

:

"



"

$$: x^2+21=10x$$

. x^2

ABDG

x

\overline{AG}

x

C

.(

) $\overline{GC} = 10$

21 ACNB

10x GDNC

. $x^2+21=10x$

[GD] [HT]

(HC=GH=5) \overline{GC}

H

($TK = \frac{10}{2} = 5$) $TK=GH$

(TH)

$HT = x$

HK

KL

KM

. $5 \times 5 = 25$

TKMN

MLZC

$LK = KH = 5 - x$

$ML=HT$

($KL = 5 - x$)

. $KLHZ = 25 - 21 = 4$

ABTH

. $2 \sqrt{4}$ AH

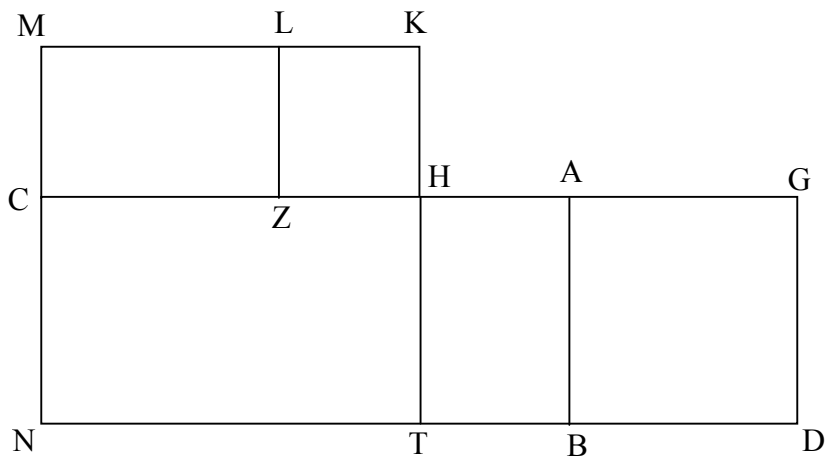
$KL = AH$

. $x=3$ $GH = 5 = x + 2$

. ($5 + 2 = 7$)

GH

:



16

.6

"

"

. $3x+4=x^2$

$bx+c=ax^2$

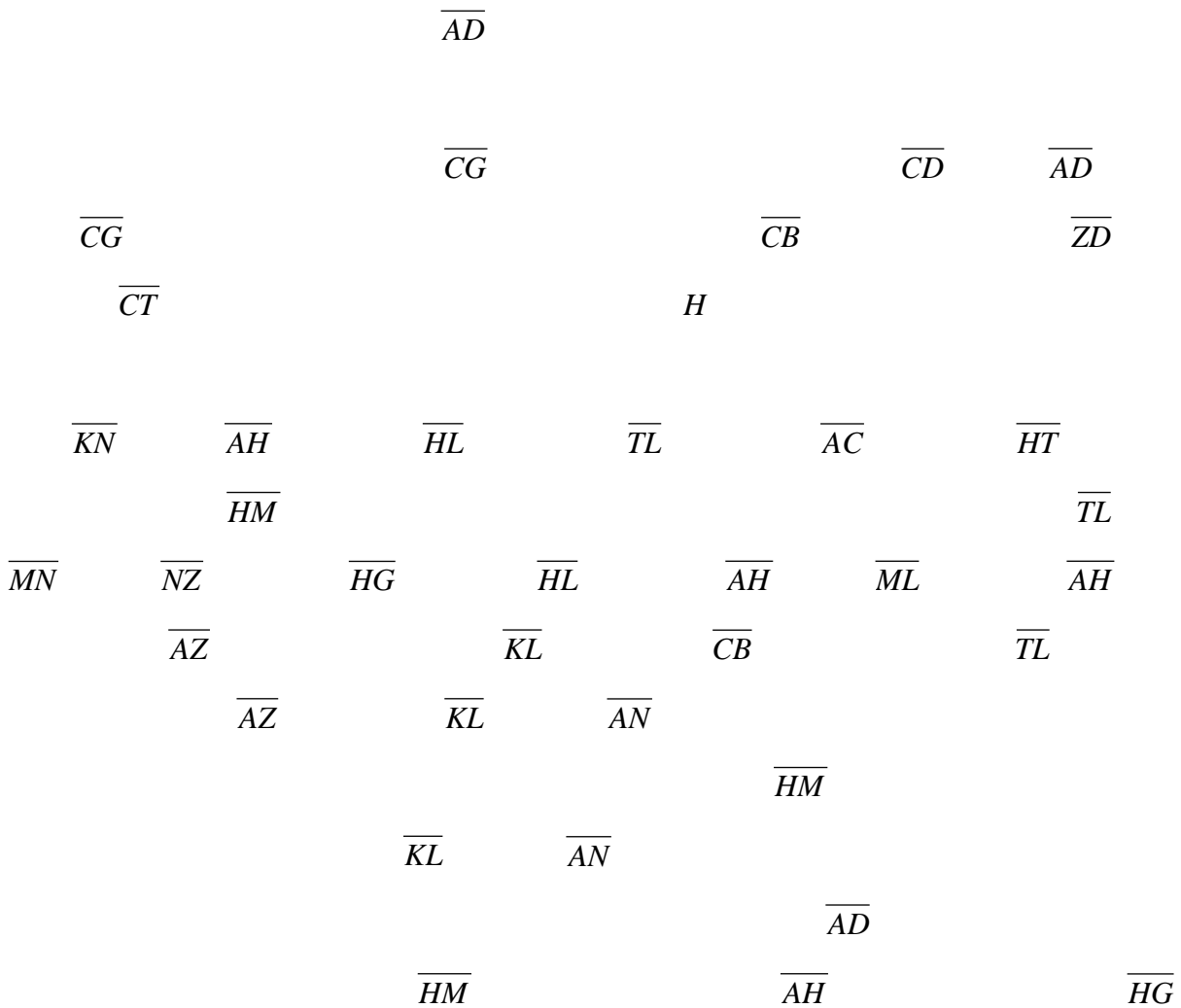
... " :

" ...

$3x+4=x^2$ $\frac{3}{2}=1,5$ $\frac{3}{2} \times \frac{3}{2}=2.25$ $2.25+4=6.25$ $\sqrt{6.25}=2.5$ $2.5+1.5=4$	$a \neq 0$ $bx+c=ax^2 \Leftrightarrow \frac{b}{a}x + \frac{c}{a} = x^2$ $\left(\frac{b}{2a}\right)^2$ $\Delta = \frac{b^2}{4a^2} + \frac{c}{a}$ $\sqrt{\Delta} = \sqrt{\frac{b^2}{4a^2} + \frac{c}{a}}$ $x = \frac{b}{2a} + \sqrt{\Delta}$
---	--

:

"



\overline{HG}

"

\overline{AD}

\overline{AG}

:

$\cdot x^2$

$ABDG$

$3x \quad CZDG$

$CG = 3$

$[AG]$

C

$\cdot x^2 = 3x + 4$

4

$HTKC$

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

$[CG]$

H

$\cdot 2.25 = 1.5 \times 1.5$

$KN = TL$

$AH = HL$

$TL = AC$

HL

HT

$\cdot HG = AG - AH = CZ - HL = CZ - CN = NZ$

$HG = NZ$

$AH = ML$

$AHLM$

$\cdot (4 + 2.25 = 6.25)$

6.25

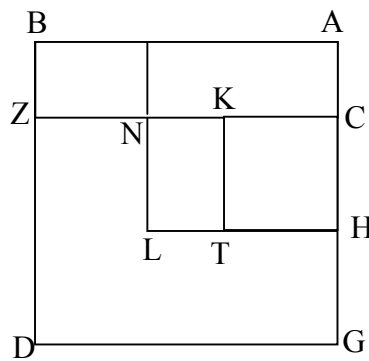
$AHLM$

$\cdot AH = \sqrt{6.25} = 2.5$

$\cdot 16$

$AG = x = 2.5 + 1.5 = 4$

$HG = 1.5$



17

" :

"

" : $x^2+10x=39$

."

" : $x^2+21=10x$

."

" : $x^2=3x+4$

."

: .

*

$$x^2 = 12x \Leftrightarrow \frac{1}{3}x^2 = 4x$$

*

. $x=4$ $5x^2 = 80 \Leftrightarrow x^2 = \frac{80}{5} = 16$

*

. $x = \frac{90}{11} \Leftrightarrow 11x = 90$

24

$$\left(\frac{1}{3} + \frac{1}{8}\right)x = 3 + \frac{1}{2} + \frac{1}{4}$$

24

(3,4,8,2)

.

:

13,14,15

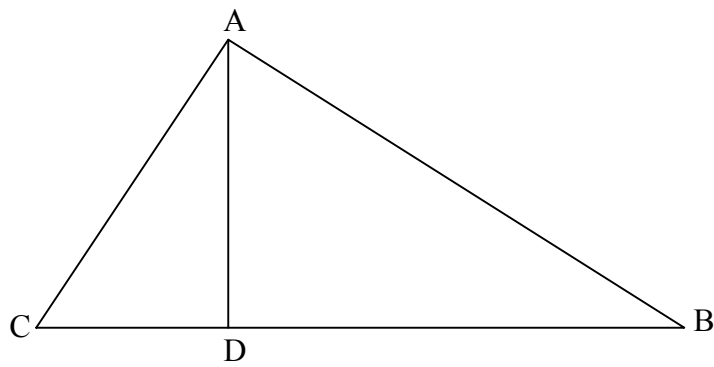
) $CD=x$

CB

AD

ABC

.(



18

:

$$ACD \quad AD^2+x^2=13^2$$

$$AD^2+(14-x)^2=15^2 \quad ADB$$

$$\therefore AD^2=15^2-(14-x)^2 \quad AD^2=13^2-x^2$$

$$13^2-x^2=15^2-(14-x)^2$$

$$169-x^2=225-(196-28x+x^2)$$

$$8x=40$$

(:)

$$x=5$$

$$AD^2+5^2=13^2$$

$$\therefore AD=12 \quad (:) \quad AD^2=144$$

$$84 = \frac{14}{2} \times 12 \quad 12$$

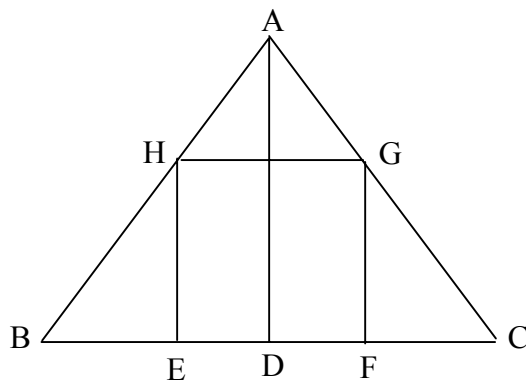
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"

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12,10,10

ABC



$$(M = \frac{1}{2}BC \times AD) \quad M$$

ADC

AD

$$DC=6, AC=10 \quad AD^2+DC^2=AC^2$$

$$AD^2=64 \quad AD^2+36=100$$

$$8 = AD$$

$$M = \frac{1}{2} \times 12 \times 8$$

$$M=48$$

$\cdot x^2$

x

EFGH

EBH

M2 FCG

M1

\cdot *EFGH*

M4 GHA

M3

$$M1=M2$$

$$M=M1+M2+M3+M4$$

$$\cdot M3 = \frac{1}{2}x(8-x) \quad M1 = x(6-x)$$

$$M1+M2+M3=10x-x^2$$

$$\cdot M=10x \quad M=10x-x^2+x^2$$

$$M=48$$

$$10x=48$$

$$\cdot \frac{4}{5}+4$$

$$\cdot x=4+\frac{4}{5}$$

.7.III

(9)

(. 212 - . 287) (Archimedes)

$$ax^3 + bx^2 = c$$

IV.

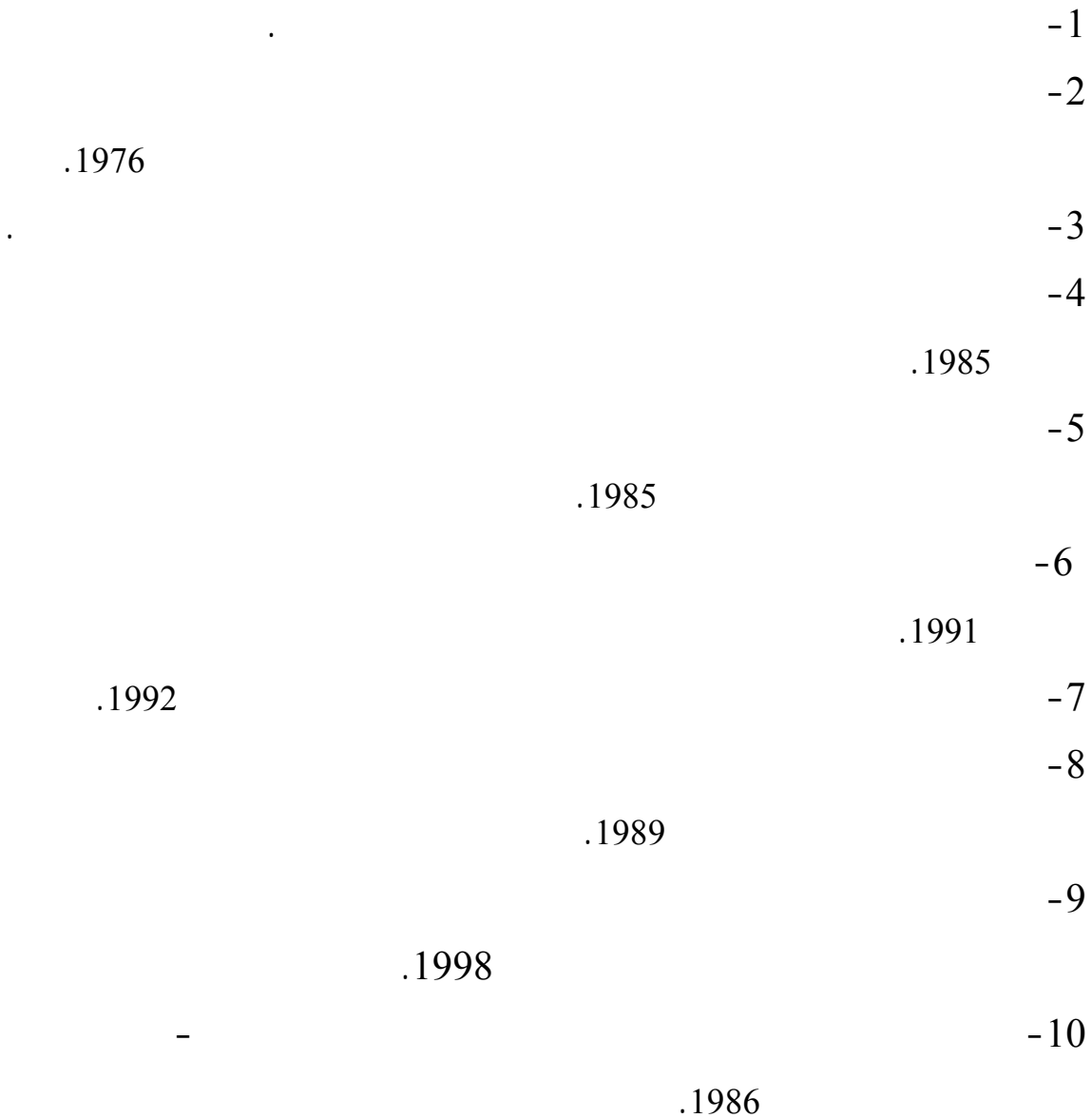
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	4 3	Hauteur
	33 32	Astrolabe
	46 10 4	Cylindre
	31 10	Irrationnel
	12 9 8 7 5	Axiome
	11 10 5 4 2 1	Démonstration
	30	structure d'algèbre
36 26 24 24 22 18 17 8 4 3		Egalité
32 12 10 9 8 7 5 3 2 1		Définition
	35	Strictement
	9	Proportion
	9 8	Parallélisme
34 33 32 31 30 29 28 27 14 2		Algèbre
	35 30	Solution
	30	Racine carré
	43 28	Terme
	30	Elimination
46 44 43 33 30 31 30 28 4 2		Arithmétique
16 15 14 12 10 9 8 5 4 3		Ligne
	9 8 5 34	Cercle

25 24 14 10 8 5 4	Angle
14 9 8	Angle droit
25 24	Angle obtus
4 3	Trapèze
43 34 9	Multiplication
42 40 39 37 36 26 17 9	Côté
36 28 24 4 3	Longueur
36 35 30 10	Nombre
29	Nombre négatif
29	Nombre positif
3	Largeur
45 44 25 22 8	Perpendiculaire
45 44 4	Base
29 10	Loi
30 6	Fraction
38 36 35 30	Bien
39	Parallélogramme
4	Parallélépipèd
28 10	Suite
17 4 3	Triangle
44	Triangle rectangle
11 10	Solide
45 44 41 36 30 29 28	Inconnue
17 16 15 4 3	Carré
26 17 9 4 3	Superficie
46 45 44 43 38 35 27 12	Problème
38	Impossible
40 37 19 18 17 16 15 14 4 3	Rectangle
22 21 20 19 18 15 14 9 8 4	Droite
46 45 12 7 4	Posulat
48 46 44 43 30 28 27 24 9 2	Equation
43	Coefficient
48 6 3	Quantité

										28	Inverse
										10 4	Cube
										9 4	Tangent
										10 4	Prisme
										16 15 9 8 4 3	Point
										30 8	Limite
										10	Pyramide
										27 12 10 7 6 5 4 3 2 1	Géométrie



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-23

1990/12/3-1

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-24

1986/12/3-1

.4

1988 ()

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