How did mathematics teachers work four thousand years ago?

Curricula and syllabuses in Mesopotamia

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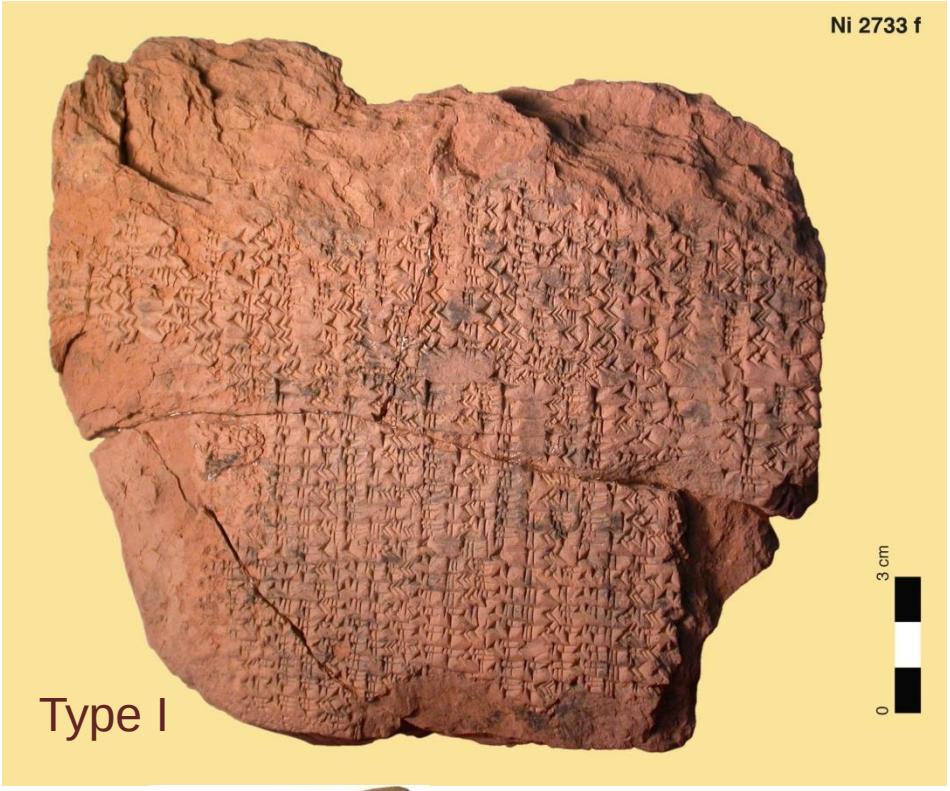
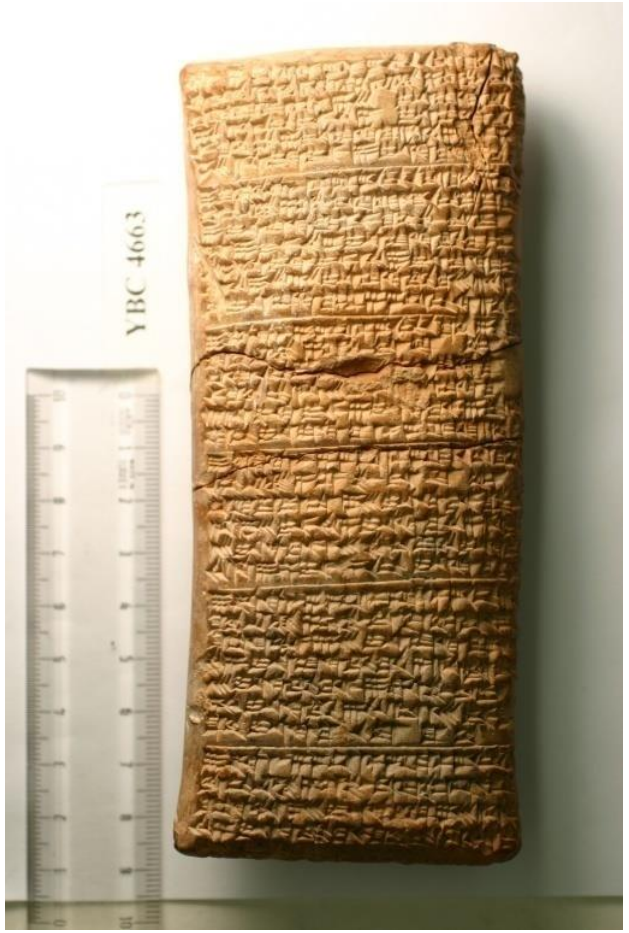
Scribal schools in the Old Babylonian period (ca 2000-1600 BCE)

Mathematical school tablets

- Uruk 16
- Sippar 21
- Kish 65
- Ur 72
- Mari 116
- Nippur 998



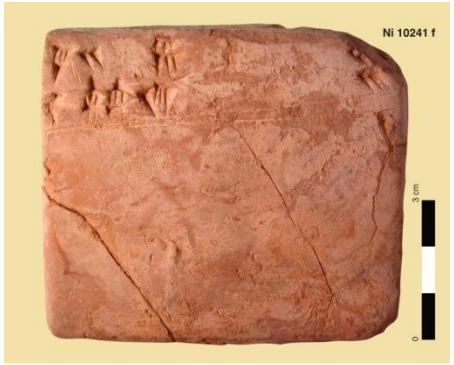
Type I



Type S

Type II

Type III



Type IV

The literacy curriculum

Niek Veldhuis. 1997. Elementary Education at Nippur, The Lists of Trees and Wooden Objects. Ph. D. dissertation Thesis, University of Groningen

- **Elementary level (lexical lists)**
  - lists of cuneiform signs,
  - Sumerian vocabulary and
  - grammatical structures
- **Intermediate level**
  - Sumerian sentences (proverbs)
  - administrative forms (models of contracts)

Metrological lists: measurements of capacity

1/3 *sila*
1/2 *sila*
2/3 *sila*
5/6 *sila*
1 *sila*
1 1/3 *sila*
1 1/2 *sila*
1 2/3 *sila*
1 5/6 *sila*
2 *sila*
3 *sila*
4 *sila*
5 *sila*
6 *sila*
7 *sila*
8 *sila*
9 *sila*
1 *ban* še
1 *ban* 1 *sila*
1 *ban* 2 *sila*
1 *ban* 3 *sila*$_3$

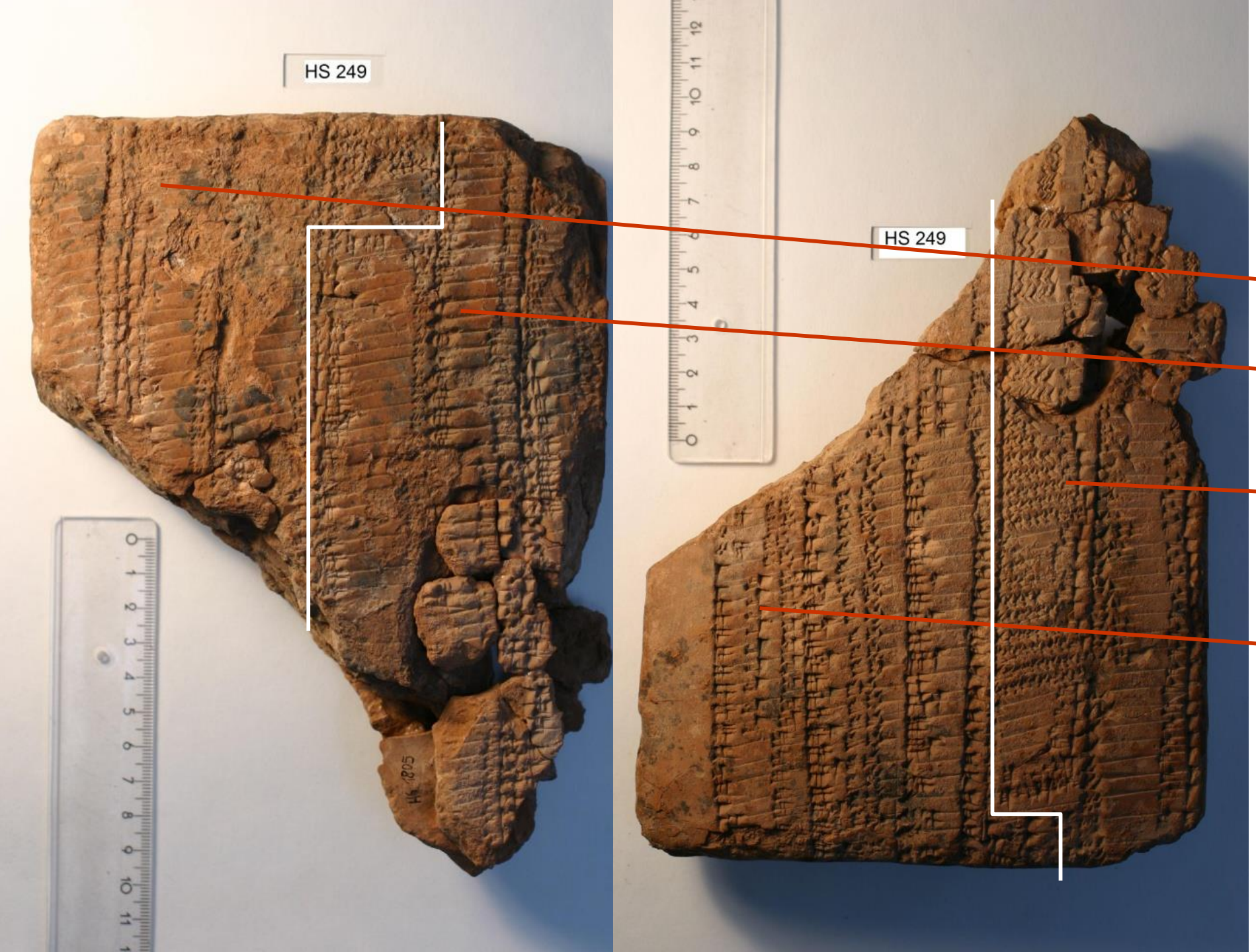
1 *sila* worth ca. 1 liter

1 ban worth ca. 10 liters

School tablet from Nippur, Old Babylonian period (HS 1703, University of Jena)

Metrological lists

School tablet, Nippur,
Old Babylonian period
University of Jena (HS 249)



capacity

weight

surface

length

Metrological tables (capacities, weights, surfaces)

1 *gin* grain	1
…	
18 *gin*	18
19 *gin*	19
1/3 *sila*	20
1/2 *sila*	30
2/3 *sila*	40
5/6 *sila*	50
1 *sila*	1
1 1/3 *sila*	1:20
1 1/2 *sila*	1:30
1 2/3 *sila*	1:40
1 5/6 *sila*	1:50
2 *sila*	2
3 *sila*	3
4 *sila*	4
5 *sila*	5
6 *sila*	6
7 *sila*	7
8 *sila*	8
9 *sila*	9
1 *ban še*	10
…	

1/2 *še* silver	10
…	
18 *gin*	18
19 *gin*	19
1/3 *mana*	20
1/2 *mana*	30
2/3 *mana*	40
5/6 *mana*	50
1 *mana*	1
1 1/3 *mana*	1:20
1 1/2 *mana*	1:30
1 2/3 *mana*	1:40
1 5/6 *mana*	1:50
2 *mana*	2
3 *mana*	3
4 *mana*	4
5 *mana*	5
6 *mana*	6
7 *mana*	7
8 *mana*	8
9 *mana*	9
10 *mana*	10
…	

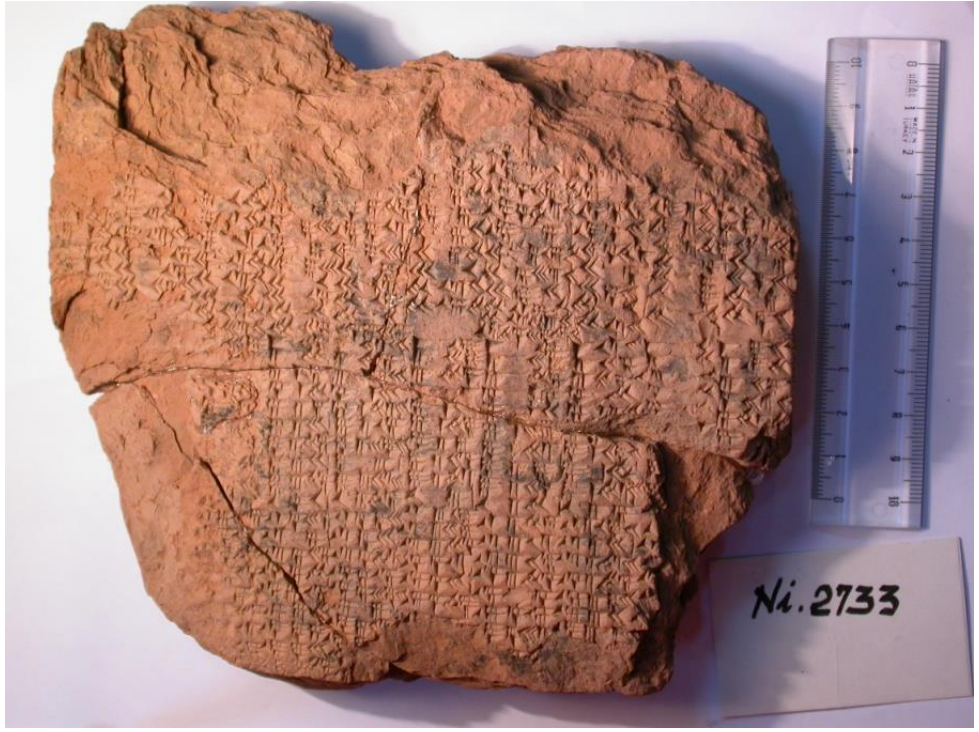
1/3 *sar* surface	20
1/2 *sar*	30
2/3 *sar*	40
5/6 *sar*	50
1 *sar*	1
1 1/3 *sar*	1:20
1 1/2 *sar*	1:30
1 2/3 *sar*	1:40
1 5/6 *sar*	1:50
2 *sar*	2
3 *sar*	3
4 *sar*	4
5 *sar*	5
6 *sar*	6
7 *sar*	7
8 *sar*	8
9 *sar*	9
…	
30 *sar*	30
40 *sar*	40
1/2 *GAN*	50
1 *iku GAN*	1:40
…	

Numerical tables

Reciprocals
Multiplication tables by
50
45
44:26:40
40
36
30
25
24
22:30
20
18
16:40
16
15
12:30
12
10
9
8:20
8

7:30
7:12
7
6:40
6
5
4:30
4
3:45
3:20
3
2:30
2:24
2
1:40
1:30
1:20
1:15

Table of squares



School tablet, Nippur, OB period
(Ist Ni 2733, Istanbul Museum)

School tablet, Nippur, OB period

50
45
44:26:40
40
36
30
25
24
22:30
20
18
16:40
16
15
12:30
12
10
9
8:20
8
7:30
7:12
7
6:40
6

1	9
2	18
3	27
4	36
5	45
6	54
7	1:3
8	1:12
9	1:21
10	1:30
11	1:39
12	1:48
13	1:57
14	2:6
15	2:15
16	2:24
17	2:33
18	2:42
19	2:51
20	3
30	4:30
40	6
50	7:30
8:20 a-ra$_2$ 1	8:20

Multiplication table by 9

→ First line of the multiplication table by 8:20

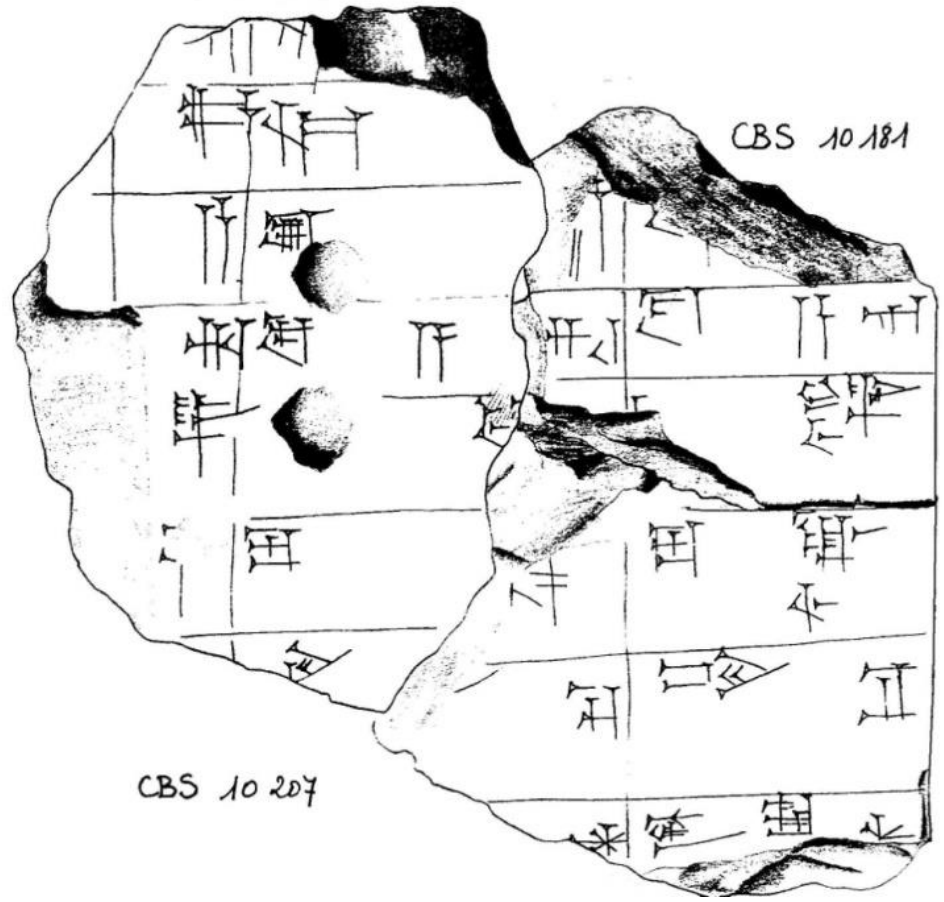
Ist Ni 4623

…	
6 *gun*	6
7 *gun*	7
8 *gun*	8
9 *gun*	9
10 *gun*	10
==========	
$^{1}/_{3}$ *sar*	20


HS 1703

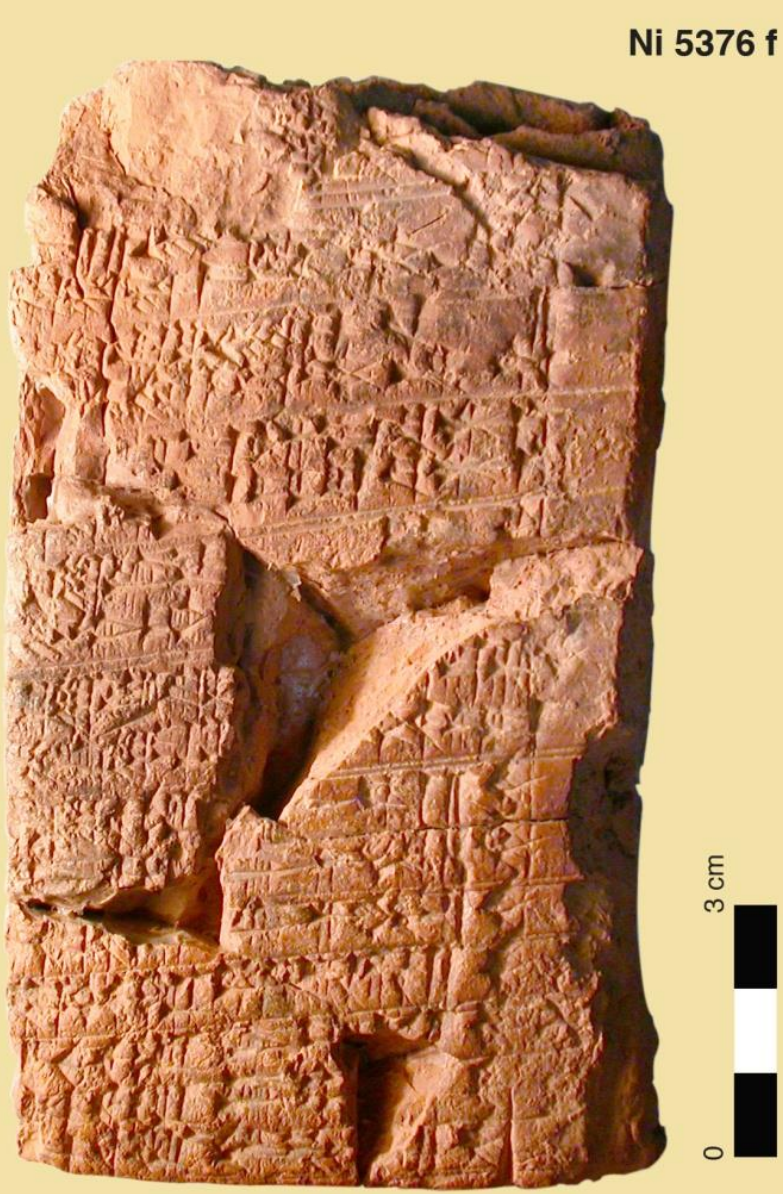

HS 1703

10 135




HS 236


3711



Ni 5376 (Istanbul Museum)
Nippur, OB period

1 Someone who cannot produce "a-a“,
from where will he achieve fluent speech?

---

2 A scribe who does not know Sumerian, from where will he produce a translation?

---

3 The scribe trained in counting is deficient on clay.
The scribe skilled with clay is deficient in counting.

---

4 A chattering scribe's guilt is great,

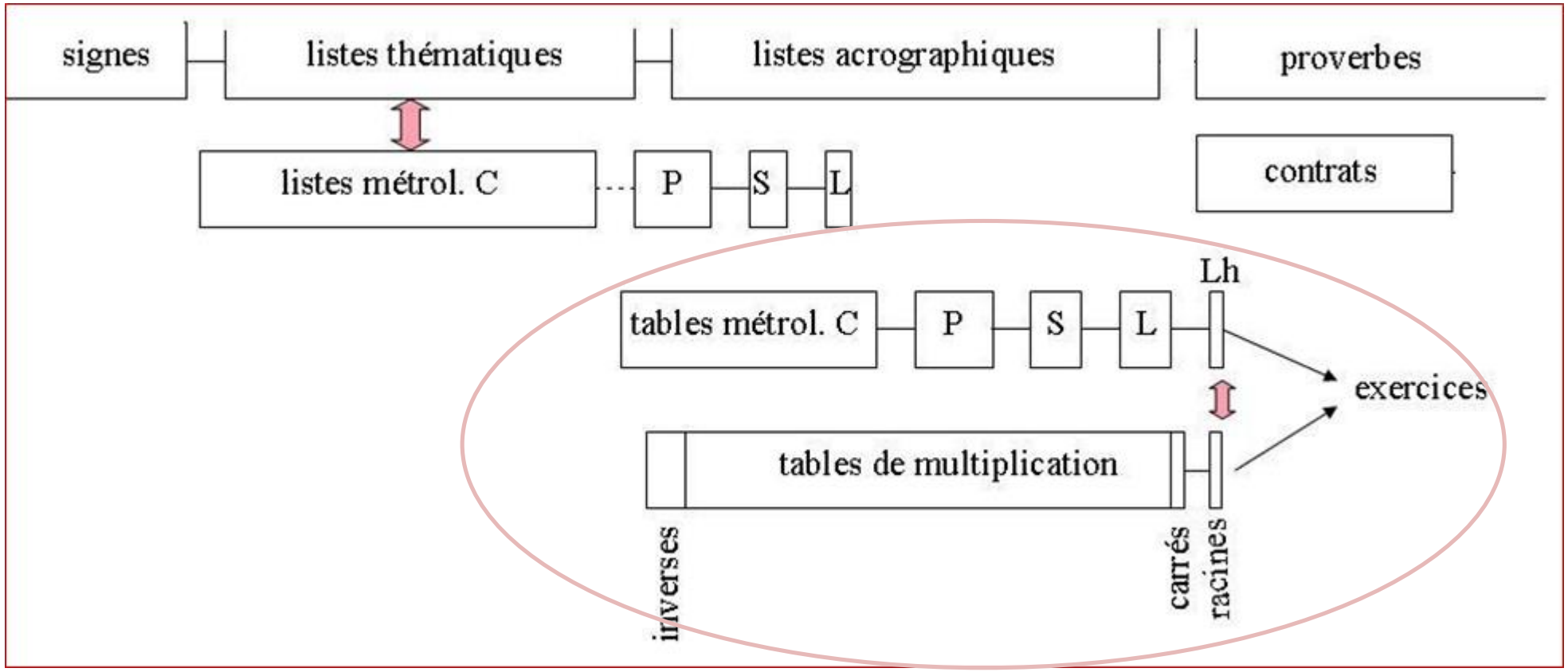
---

5 A junior scribe is too concerned with feeding his hunger; he does not pay attention to the scribal art.

---

6 A disgraced scribe becomes an incantation priest.

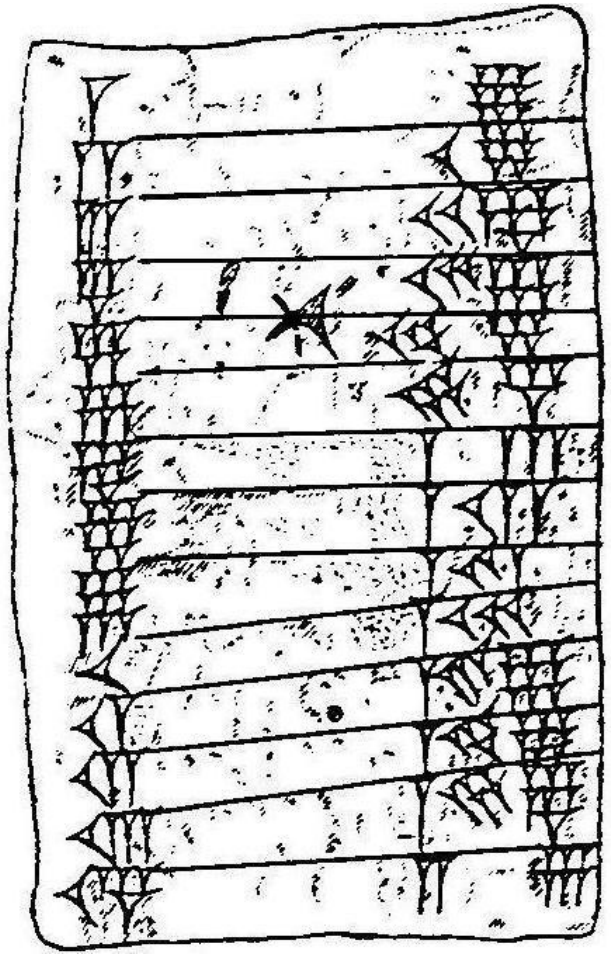
The curriculum at Nippur

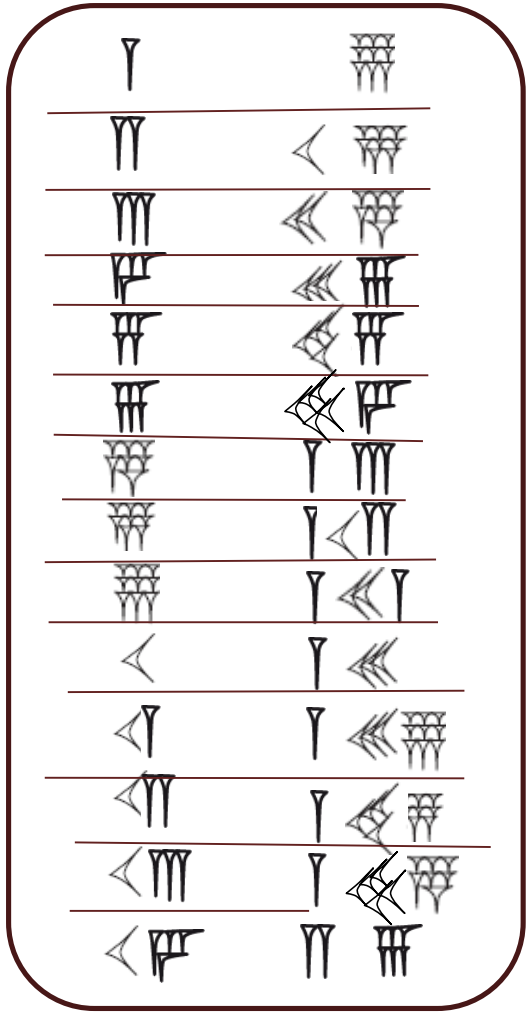


Level	Content	Type
Elementary	**Metrological lists**: capacities, weights, surfaces, lengths **Metrological tables**: capacities, weights, surfaces, lengths, heights **Numerical tables**: reciprocals, multiplications, squares **Tables of square** roots and cube roots	I, II I, II I, II, III
Intermediate	**Exercises**: calculations of surfaces, reciprocals, linear problems	IV

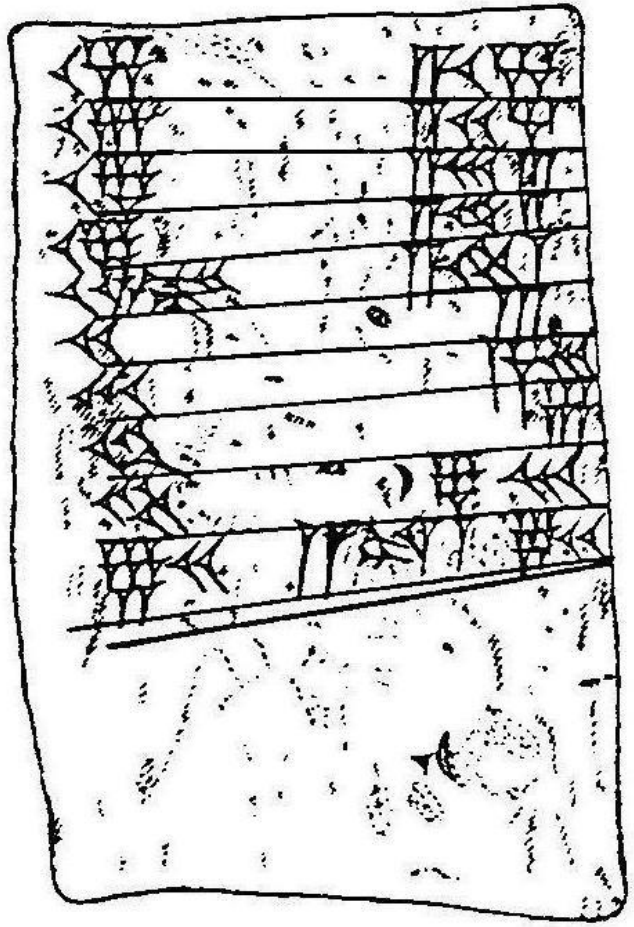
School tablet, Nippur, OB period

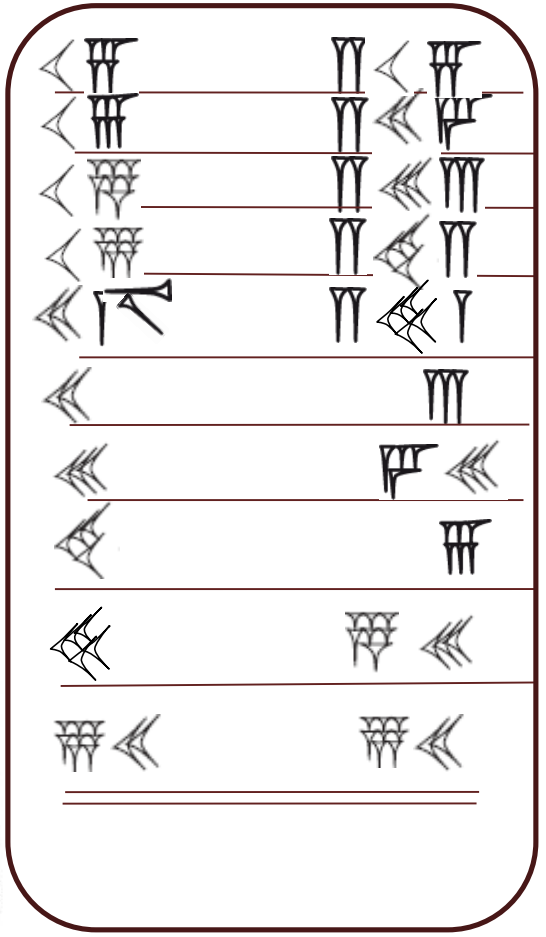
Obverse

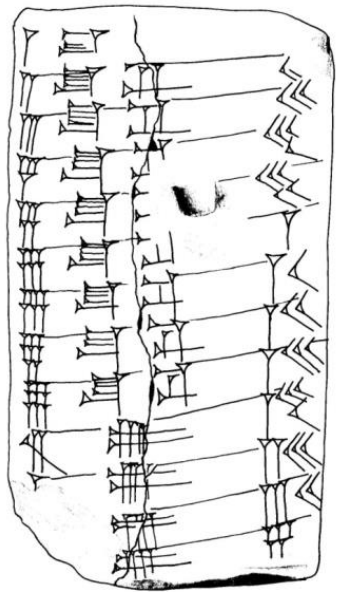


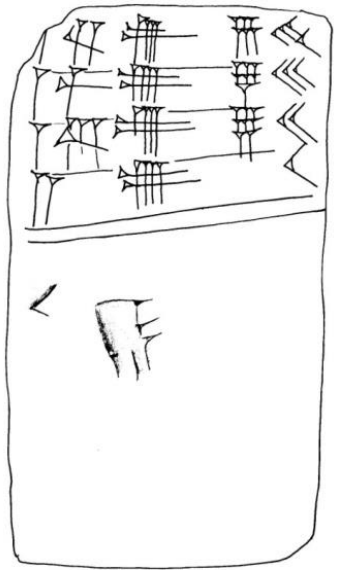


Reverse









1 *šusi*	10
2 *šusi*	20
3 *šusi*	30
4 *šusi*	40
5 *šusi*	50
6 *šusi*	1
7 *šusi*	1:10
8 *šusi*	1:20
9 *šusi*	1:30
1/3 *kuš*	1:40
1/2*kuš*	2:30
2/3 *kuš*	3:20
5/6 *kuš*	4:10
1 *kuš*	5
1 1/3 *kuš*	6:40
1 1/2*kuš*	7:30
1 2/3 *kuš*	8:20
2 *kuš*	10

1 *šusi* = 1 *finger* (ca. 1.6 cm)

1 *kuš* = 1 *cubit* (ca. 50 cm)

School tablet, Nippur, Old Babylonian period (HS 241, University of Jena)

MS 2186, unknown provenience.
Duplicate of
Ist Ni 5072 from Nippur (damaged)

Obverse

$^{1}/_{2}$ *še* silver	10
1 *še*	20
1 $^{1}/_{2}$ *še*	30
2 *še*	40
2 $^{1}/_{2}$ *še*	50
3 *še*	**1**
4 *še*	1:20
5 *še*	1:40
6 *še*	2
7 *še*	2:20
8 *še*	2:40
9 *še*	3
10 *še*	3:20
11 *še*	3:40
12 *še*	4
13 *še*	4:20
14 *še*	4:40
15 *še*	5
16 *še*	5:20
17 *še*	5:40
18 *še*	6
19 *še*	6:20
20 *še*	6:40
21 *še*	7
22 *še*	7:20
23 *še*	7:40
24 *še*	8
25 *še*	8:20
26 *še*	8:40

Reverse

27 *še*	9
28 *še*	9:20
29 *še*	9:40
1/6 *gin*	10
1/6 *gin* 10 *še*	13:20
1/4 *gin*	15
1/4 *gin* 5 *še*	16:40
$^{1}/_{3}$ *gin*	20
$^{1}/_{3}$ *gin* 15 *še*	25
$^{1}/_{2}$ *gin*	30
$^{1}/_{2}$ *gin* 15 *še*	35
$^{2}/_{3}$ *gin*	40
$^{2}/_{3}$ *gin* 15 *še*	45
$^{5}/_{6}$ *gin*	50
$^{5}/_{6}$ *gin* 15 *še*	55
1 *gin*	**1**

Metrological table for weight, small surfaces, small volumes

Intermediate level:

Multiplication and division

Evaluating surfaces

Computing reciprocals

Solving small linear problems


55-21-76
2N-TH72

[20]
20
6:40

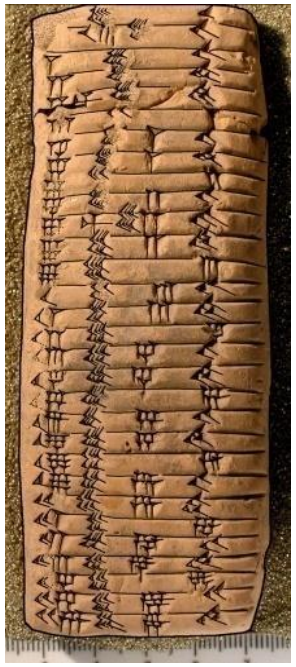
2 *šu-si*, the side of a square
How much is the surface?
Its surface is 1/3 *še*.

Lengths

1 *šu-si*	10
2 *šu-si*	**20**
3 *šu-si*	30
4 *šu-si*	40
5 *šu-si*	50
6 *šu-si*	1

Surfaces

1/3 *še*	**6:40**
1/2 *še*	10
1 *še*	20
2 *še*	40
2 ½ *še*	50
3 *še* s	1



Computing a reciprocal: the factorization algorithm

Obverse

4:26:40

Its reciprocal 13:30

==========

Reverse

4:26:40	9
40*	1:30
13:30	

*mistake of the scribe: he wrote 41 instead of 40

Obverse	
igi 2	30
igi 3	20
igi 4	15
igi 5	12
igi 6	10
igi 8	7:30
igi 9	6:40
igi 10	6
igi 12	5
igi 15	4
igi 16	3:45
igi 18	3:20
igi 20	3
igi 24	2:30
igi 25	2:24

Reverse	
igi 27	2:13:20
igi 30	2
igi 32	1:52:30
igi 36	1:40
igi 40	1:30
igi 45	1:20
igi 48	1:15
igi 50	1:12
igi 54	1:6:40
igi 1	1
igi 1:4	56:15
igi 1:21	44:26:40

igi

The division of *a* by *b* (*b* regular) is a sequence of two operations: finding the reciprocal of *b*, and multiplying *a* by the reciprocal of *b*.

$5 \div 30 \rightarrow 5 \times 2 \rightarrow 10$

$4{:}26{:}40 \div 6{:}40 \rightarrow 4{:}26{:}40 \times 9 \rightarrow 40$

2	30
3	20
4	15
5	12
6	10
8	7:30
9	6:40
10	6
12	5
15	4
16	3:45
18	3:20
20	3
24	2:30
25	2:24
27	2:13:20
30	2
32	1:52:30
36	1:40
40	1:30
45	1:20
48	1:15
50	1:12
54	1:6:40
1	1
1:4	56:15
1:21	44:26:40

2	30
3	20
4	15
5	12
6	10
8	7:30
9	6:40
10	6
12	5
15	4
16	3:45
18	3:20
20	3
24	2:30
25	2:24
27	2:13:20
30	2
32	1:52:30
36	1:40
40	1:30
45	1:20
48	1:15
50	1:12
54	1:6:40
1	1
1:4	56:15
1:21	44:26:40

4:26:40	9
40	1:30
13:30	

- 4:26:40 ends with the regular number 6:40, so 4:26:40 is "divisible" by 6:40.
- Divide 4:26:40 by 6:40, that is, multiply 4:26:40 by the reciprocal of 6:40.
- The reciprocal of 6:40 is 9.
- This number 9 is placed on the right.
- The product of 4:26:40 by 9 gives 40, so 40 is the quotient of 4:26:40 by 6:40; this number is placed on the left.
- The reciprocal of 40 is 1:30. The number 1:30 is placed on the right.
- To find the reciprocal of 4:26:40, we only have to multiply the reciprocals of the factors of 4:26:40, that is to say, the numbers 9 and 1:30 placed on the right. This gives 13:30, the reciprocal sought.

To sum up:

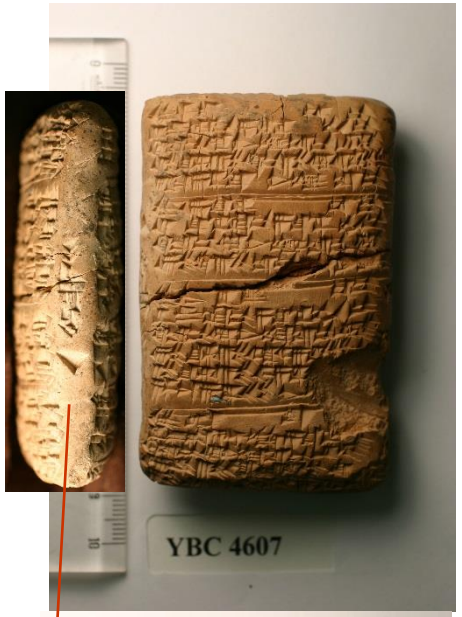
Right 4:26:40 = 6:40 × 40

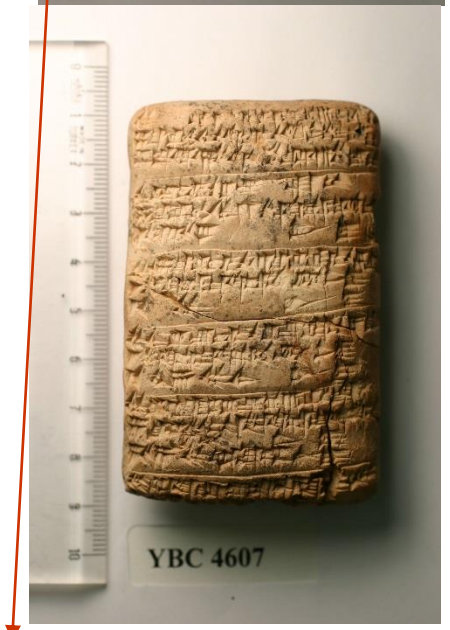
Left 9 × 1:30 = 13:30

Mathematical Catalogues

YBC 4657 (fields)

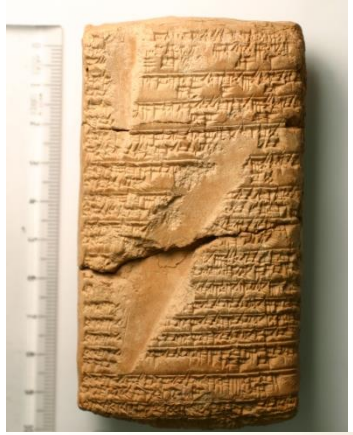
YBC 4604 (bicks)

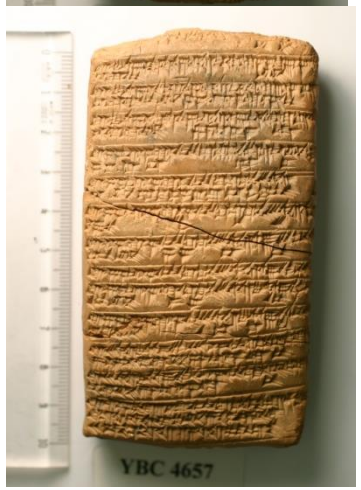




10 sections

YBC 4657 (trenches)



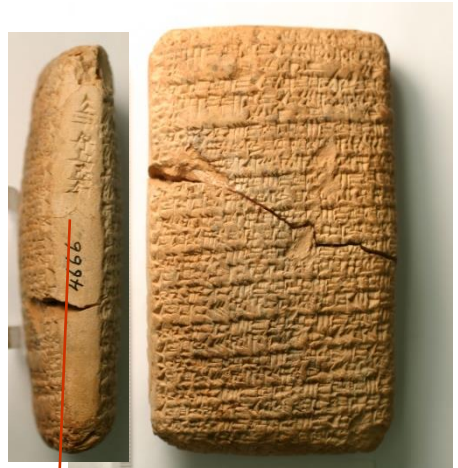


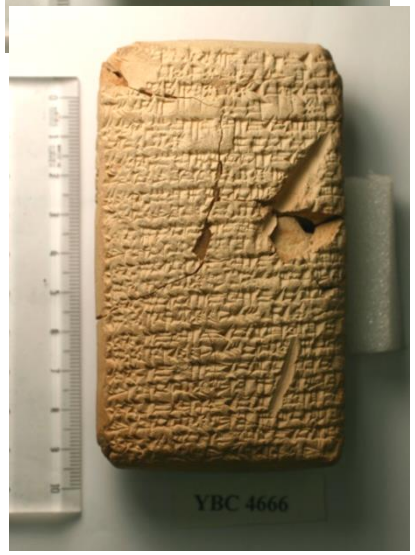
31 sections on trenches

YBC 5037 (trenches)

44 sections

YBC 4666 (canals)





26 sections

The catalogue texts and associated procedure texts

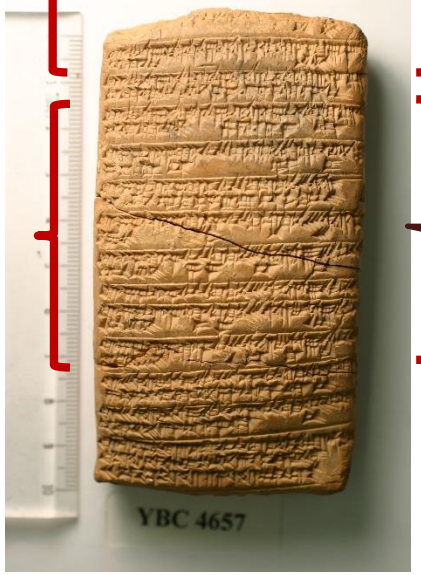
	Museum nb	**Content**	**Associated procedure text**
C1	YBC 4612	15 statements on fields	Ø (lost?)
C2	YBC 6492	24 statements on fields	Ø (lost?)
C3	YBC 4607	10 statements on bricks	Ø (lost?)
C4	YBC 4652	22 statements on stones	Ø (lost?)
C5	YBC 4657	31 statements on trenches	YBC 4663 (P5a, solves C5 #1-8) Ø (lost P5b) YBC 4662 (P5c, , solves C5 #19-28)
C6	YBC 5037	44 statements on trenches	Ø (lost?)
C7	YBC 4666	26 statements on canals	Ø (lost?)
C8	YBC 7164	19 statements on canals	Ø (lost?)

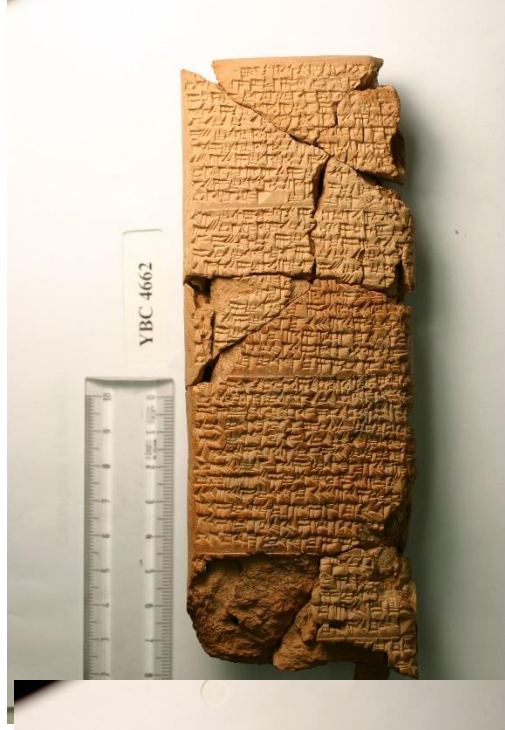
Catch line

Catalogue YBC 4657 (C)

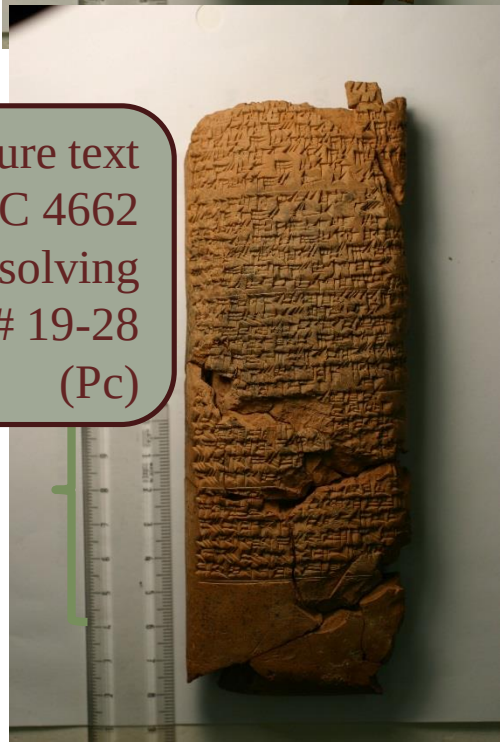
Procedure text
YBC 4663
solving
YBC 4657 # 1-8
(Pa)

Lost
procedure text
(Pb)





Procedure text
YBC 4662
solving
YBC 4657 # 19-28
(Pc)



Text	Tablet	Content	# in the catalogue	Colophon
Catalogue text C	YBC 4657	31 statement of problems on trenches		31 sections on trenches
Procedure text Pa	YBC 4663	8 problems with procedures	1-8	No colophon
Procedure text Pb	lost	10 problems with procedures	9-18	No colophon
Procedure text Pc	YBC 4662	10 problems with procedures	19-28	No colophon

YBC 4663

A procedure text (Neugenabuer & Sachs 1945, text H)

Old Babylonian period
Unknown provenience (probably Southern Mesopotamia)
Yale Babylonian Collection

8 problems with procedures dealing with the cost of digging a trench.

YBC 4663 #1

1. A trench. **5** ***ninda*** is its length, **1 1/2** ***ninda*** (is its width), **1/2** ***ninda*** is its depth, **10** **<*gin*>** is the volume of the work assignment, **6** ***še*** [silver is the wages of the hired man].
2. The base, the volume, the (number) of workers and the silver (of the total expenses) are how much? **You, to know it**,
3. the length and the width cross, **7:30** it will give you.
4. **7:30** to its depth raise, **45** it will give you.
5. The reciprocal of the work assignment detach, **6** it will give you. To **45** raise, **4:30** it will give you.
6. **4:30** to the wages raise, **9** it will give you. **Such is the procedure.**

YBC 4663 #1: the statement

A trench. **5 *ninda*** is its length, **1 1/2 *ninda*** (is its width), **1/2 *ninda*** is its depth, **10 <*gin*>** is the volume of the work assignment, **6 *še*** [silver is the wages of the hired man].

5 *ninda* is its length,

1 1/2 *ninda* (is its width),

1/2 *ninda* is its depth,

10 <*gin*> is the volume of the work assignment,

6 *še* [silver is the wages].

Table of length / width

½ *ninda*	30
1 *ninda*	1
1 ½ *ninda*	**1:30**
2 *ninda*	2
2 ½ *ninda*	2:30
3 *ninda*	3
3 ½ *ninda*	3:30
4 *ninda*	4
4 ½ *ninda*	4:30
5 *ninda*	**5**
…	

Table of height / depth

…	
1 *kuš*	1
2 *kuš*	2
3 *kuš*	3
4 *kuš*	4
5 *kuš*	5
½ *ninda*	**6**
1 *ninda*	12
1 ½ *ninda*	18
…	

Table of surface / volume

…	
10 *gin*	**10**
11 *gin*	11
12 *gin*	12
13 *gin*	13
14 *gin*	14
15 *gin*	15
16 *gin*	16
17 *gin*	17
18 *gin*	18
19 *gin*	19
1/3 *sar*	20
1/2 *sar*	30
2/3 *sar*	40
5/6 *sar*	50
1 *sar*	1
…	
7 *sar*	7
7 ½ *sar*	**7:30**
…	
45 *sar*	**45**
…	

Table of weight

½ *še*	10
1 *še*	20
1 ½ *še*	30
2 *še*	40
2 ½ *še*	50
3 *še*	1
4 *še*	1:20
5 *še*	1:40
6 *še*	**2**
7 *še*	2:20
…	
1 *gin*	1
2 *gin*	2
3 *gin*	3
4 *gin*	4
5 *gin*	5
6 *gin*	6
7 *gin*	7
8 *gin*	8
9 *gin*	**9**
10 *gin*	10
…	

1. A trench. **5 *ninda*** is its length, **1 1/2 *ninda*** (is its width), **1/2 *ninda*** is its depth, **10 <*gin*>** is the volume of the work assignment, **6 *še*** [silver is the wages of the hired man].

Length 5 *ninda*	5
Width 1 1/2 *ninda*	1:30
Depth1/2 *ninda*	6
Volume per man-day 10 *gin*	10
Weight 6 *še* (silver)	2

2. The base, the volume, the (number) of workers and the silver (of the total expenses) are how much? **You, to know it**,
3. the length and the width cross, **7:30** it will give you.
4. **7:30** to its depth raise, **45** it will give you.
5. The reciprocal of the work assignment detach, **6** it will give you. To **45** raise, **4:30** it will give you.
6. **4:30** to the wages raise, **9** it will give you. **Such is the procedure.**

2. Provide the synopsis of the procedure
3. Computes the **base** of the trench:
   length × width
   5 × 1:30 gives 7:30
4. Computes the **volume** of the trench:
   base × depth
   7:30 × 6 gives 45
5. Computes the **number of workers**
   total volume / volume per man-day
   45 / 10
   45 × (reciprocal of 10)
   45 × 6 gives 4:30
6. Computes the total salary in **silver**
   salary per man-day × number of workers
   2 × 4:30 gives 9
   9 corresponds to 9 *gin*

YBC 4663 #2

7. **9** ***gin*** is the silver for a trench, **1 ½** ***ninda*** (is its width), **1/2** ***ninda*** is its depth, **10 (*gin*)** is the volume of the work assignment, **6** ***še*** (of silver) is the wage.
8. Its length is how much? **You, to know it**, the width and the depth cross,
9. **9** it will give you. The reciprocal of the work assignment detach,
10. (and) to **9** raise, **54** it will give you.
11. **54** to the wage raise, **1:48** it will give you.
12. The reciprocal of **1:48** (detach), **33:20** it will give you. **33:20** to **9**, the silver, raise,
13. **5** it will give you. **5** ***ninda*** is its length. **Such is the procedure**.

8. Its length is how much? **You, in your procedure**, the width and the depth cross,
9. **9** it will give you. The reciprocal of the work assignment detach,
10. (and) to **9** raise, **54** it will give you.
11. **54** to the wage raise, **1:48** it will give you.
12. The reciprocal of **1:48** (detach), **33:20** it will give you. **33:20** to **9**, the silver, raise,
13. **5** it will give you. **5** ***ninda*** is its length. **Such is the procedure**.

Lines 8-9	1:30 × 6 gives 9 (corresponding to a vertical surface)
Lines 9-10	9 ÷ 10, that is, 9 × recip (10), that is, 9 × 6, gives 54 (corresponding to nothing)
Line 11	54 × 2 gives 1:48 (corresponding to nothing)
Lines 12-13	9 ÷ 1:48, that is, 9 × recip(1:48), that is, , 9 × 33:20 gives 5 (corresponding to the length 5 *ninda*)

Procedure 1

length × width × depth × recip(assignment) × wage → silver

Subroutine A

Procedure 2

[width × depth × recip(assignment) × wage]recip × silver → length

Subroutine A

Procedure 1 :	**length × A → silver**
Procedure 2 :	**silver / A → length**

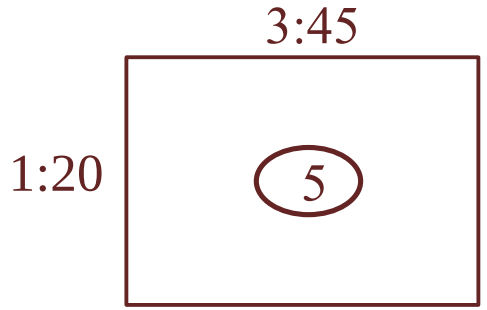
Catalogue YBC 4612 #1-5

1	1.	3×60 + 45 *ninda* is the length,
		60+ 20 *ninda* is the width, its
	2.	surface is how much?
		Its surface is 1(*bur'u*) *GAN*.
2	3.	1(*bur'u*) *GAN* is the surface,
		3×60 + 45 *ninda* is the length,
	4.	its width is how much? 60+ 20
		ninda is the width.
3	5.	180 *GAN* is the surface, 60+ 20
	6.	*ninda* is the width,
		its length is how much? 3×60 +
		45 *ninda* is the length.

Length → 3:45
Width → 1:20
Surface?

Surface → 5
Length → 3:45
Width?

Surface → 5
Width → 1:20
Length?



YBC 4663 #7

0. 9 *gin* is the silver for a trench.
1. The length and the width I added, it is 6:30. ½ *ninda* [is its depth].
2. 10 *gin* is the work assignment, 6 *še* (silver) is the wage. Its length and its width how much?
3. You, in your procedure, the reciprocal of the wage detach.
4. To 9 *gin*, the silver, raise. 4:30 it will give you.
5. 4.30 to the work assignment raise. 45 it will give you.
6. The reciprocal of its depth detach. To 45 raise. 7:30 it will give you.
7. ½ of the length and the width which I added break. 3:15 it will give you.
8. 3:15 cross itself. 10:33:45 it will give you.
9. 7:30 from 10:33:45 tear out.
10. 3:3:45 it will give you. Its equal-side take.
11. 1:45 it will give you. To the one append, from the other cut off.
12. The length and the width it will give you. 5 (*ninda*) is the length, 1 ½ *ninda* is the width.

Catalogue C5	Procedure texts	Concrete situation	Nature of the problem	Tools
C #1	Pa #1	Dimensions of the trench and costs in silver	Linear	Reference linear problem (steps meaningful)
C #2	Pa #2	Dimensions of the trench and costs in silver	Linear	Subroutine of the reference linear problem
C #3	Pa #3	Dimensions of the trench and costs in silver	Linear	Subroutine of the reference linear problem
C #4	Pa #4	Dimensions of the trench and costs in silver	Linear	Subroutine of the reference linear problem
C #5	Pa #5	Dimensions of the trench and costs in silver	Linear	Subroutine of the reference linear problem
C #6	Pa #6	Dimensions of the trench and costs in silver	Linear	Subroutine of the reference linear problem
C #7	Pa #7	Dimensions of the trench and costs in silver	Quadratic	Reference quadratic problem 1
C #8	Pa #8	Dimensions of the trench and costs in silver	Quadratic	Reference quadratic problem 2
C #9	Lost Pb #1	Dimensions of the trench	Linear	Reference linear problem (steps meaningful)l
C #10	Lost Pb #2	Dimensions of the trench	Linear	Subroutine of the reference linear problem
C #11	Lost Pb #3	Dimensions of the trench	Linear	Subroutine of the reference linear problem
C #12	Lost Pb #4	Dimensions of the trench	Linear	Subroutine of the reference linear problem
C #13	Lost Pb #5	Dimensions of the trench	Quadratic	Reference quadratic problem 1
C #14	Lost Pb #6	Dimensions of the trench	Quadratic	Reference quadratic problem 2
C #15	Lost Pb #7	Dimensions of the trench	False quadratic	Quadratic reduced to linear
C #16	Lost Pb #8	Dimensions of the trench	False quadratic	Quadratic reduced to linear
C #17	Lost Pb #9	Dimensions of the trench	False (?) quadratic	Quadratic reduced to linear (?)
C #18	Lost Pb #10	Dimensions of the trench	False (?) quadratic	Quadratic reduced to linear (?)
C #19	Pc #1	Dimensions of the trench	Quadratic	Reference quadratic problem 1
C #20	Pc #2	Dimensions of the trench	Quadratic	Linear portion with fractions. Reference quadratic problem 2
C #21	Pc #3	Dimensions of the trench	Quadratic	Linear portion with fractions. Reference quadratic problem 2
C #22	Pc #4	Dimensions of the trench and workdays	Linear	Subroutine of a reference linear problem not given
C #23	Pc #5	Dimensions of the trench and workdays	Linear	Subroutine of a reference linear problem not given
C #24	Pc #6	Dimensions of the trench and workdays	Linear	Subroutine of a reference linear problem not given
C #25	Pc #7	Dimensions of the trench and workdays	Linear	Subroutine of a reference linear problem not given
C #26	Pc #8	Dimensions of the trench and workdays	Linear	Subroutine of a reference linear problem not given
C #27	Pc #9	Dimensions of the trench and workdays	Linear	Subroutine of a reference linear problem not given
C #28	Pc #10	Dimensions of the trench and workdays	Linear	Subroutine of a reference linear problem not given
C #29		Dimensions of the trench and workdays	Quadratic	Reference quadratic problem 1
C #30		Dimensions of the trench and workdays	Quadratic	Reference quadratic problem 2
C #31		Dimensions of another trench and costs in grain	Linear	Cath line?
Colophon		“31 sections (about) trenches”		

Series of problems

School texts of elementary level

School texts of intermediate level

Catalogue YBC 4612 #1-5

First cycle of the catalogue YBC 4657

Other cycles of the catalogues YBC 4657 and YBC 5037

Curriculum and elements of syllabus

- Metrological tables
- Numerical tables
- Surface of a square, reciprocals, skeletons of small linear problems
- Paradigm of the rectangle

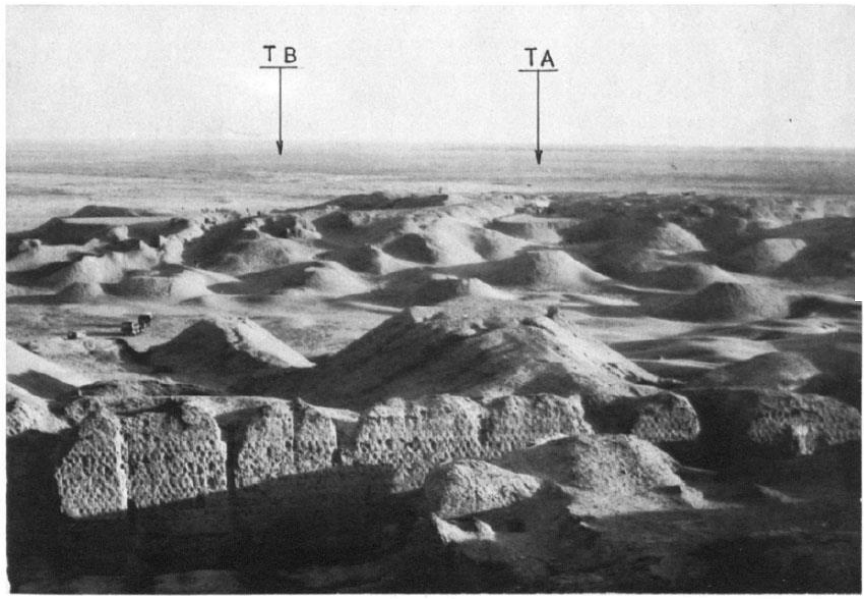
3:45

1:20 | 5

- Giving a meaning to each step of the procedure
- Using subroutines of a reference linear problem (generally, the first of the cycle)
- Making a reference quadratic problem (reduction by multiplications and divisions)
- Solving reference quadratic problems (two models)
- Refinements of the first cycle

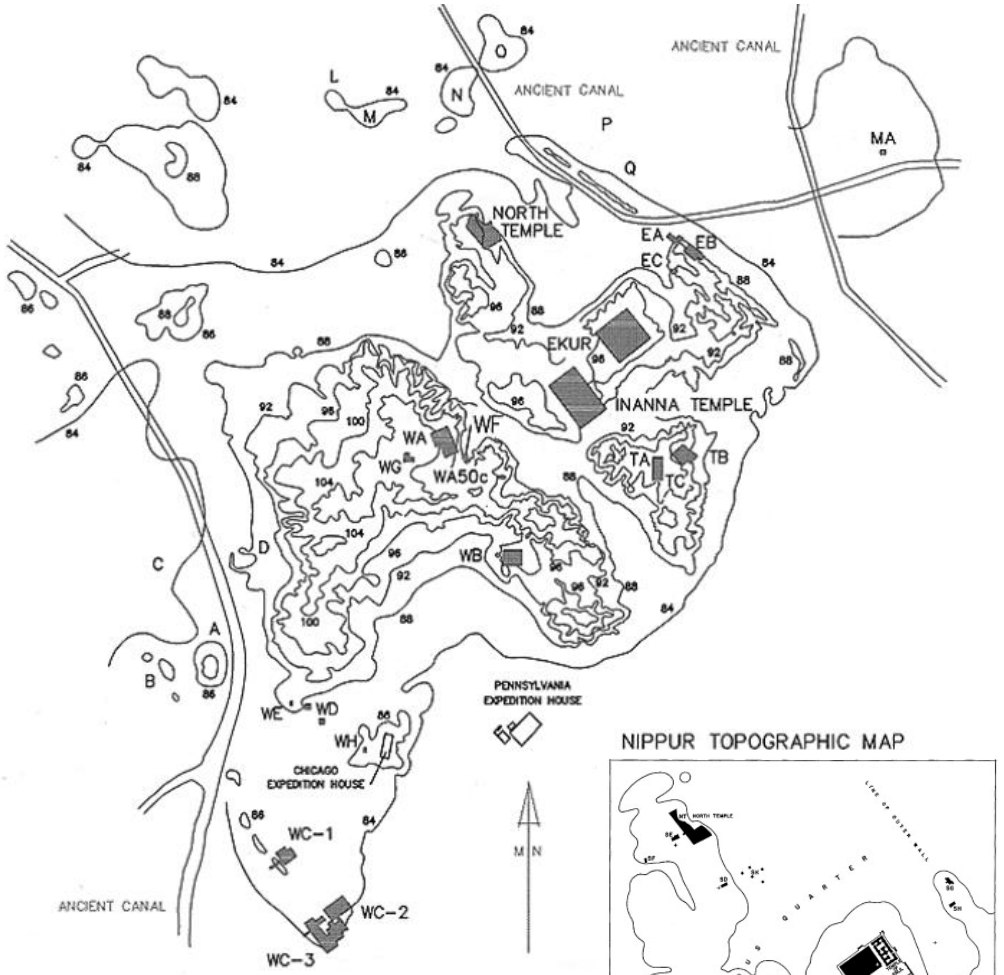
	Place	Tablet type	Structure	Content
Elementary	Nippur	I, II, III	Curriculum	Metrological and numerical lists and tables
Intermediate	Nippur	IV	Small variations	Exercises: surface of squares, reciprocals, small linear problems
Advanced	South	S	Spiral syllabus	Linear and quadratic problems

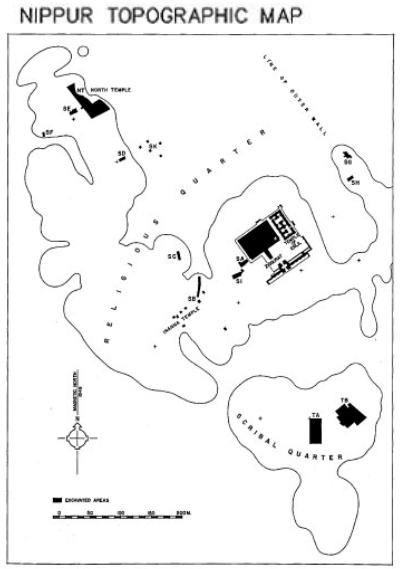
Thank you for your attention



B

A. Northwest Corner of Religious Quarter, Looking Northwest from Ziggurat.
B. Scribal Quarter, Looking South from Ziggurat





Plan of Eastern Nippur Showing Excavated Areas

Gibson *et al.* 2001; McCown, Pl. 2, 3, 5

Multiplying

	4	50
	4	50
	41	40
3	20	
3	20	
16		
23	21	40

YBC 4663 #1: the procedure

3.	the length and the width cross, 7.30 it will give you.	5 × 1:30 gives 7:30 (the surface of the base)
4.	7.30 to its depth raise, 45 it will give you.	7:30 × 6 gives 45 (the volume of the trench)
5.	The reciprocal of the work assignment detach, 6 it will give you. To 45 raise, 4.30 it will give you.	45 / 10, that is, 45 × 6, which gives 4:30 (the number of workers)
6.	4.30 to the wages raise, 9 it will give you.	4:30 × 2 gives 9 (the total cost of the trench)

3. the length and the width cross, 7:30 it will give you.

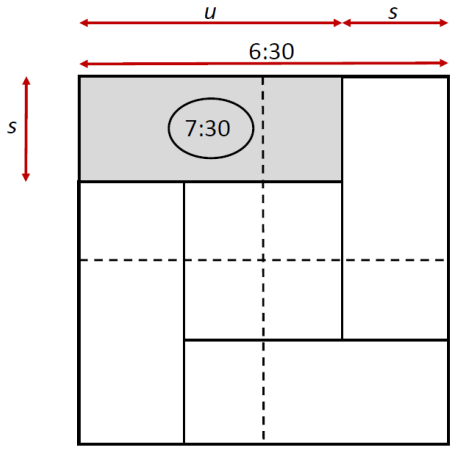
5 1:30

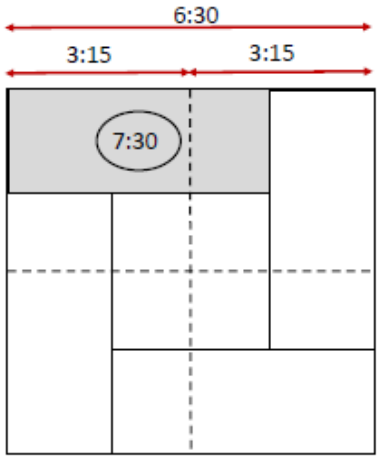
Multiplication table by 1:30

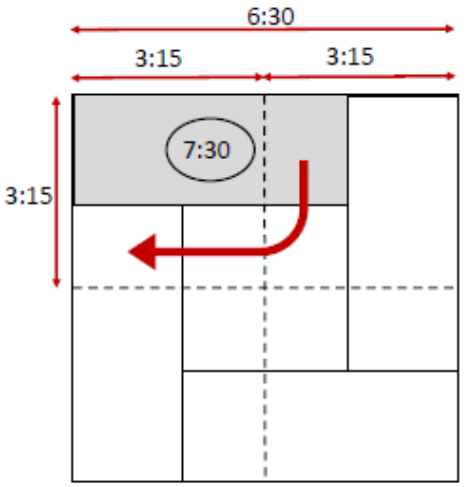
1	1.30
2	3
3	4.30
4	6
5	**7.30**
6	9
7	10.30
8	12
9	13.30
10	15
11	16.30

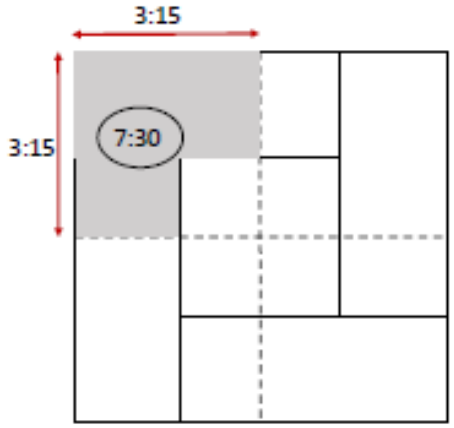
12	18
13	19.30
14	21
15	22.30
16	24
17	25.30
18	27
20-1	28.30
20	30
30	45
40	1
50	1.15

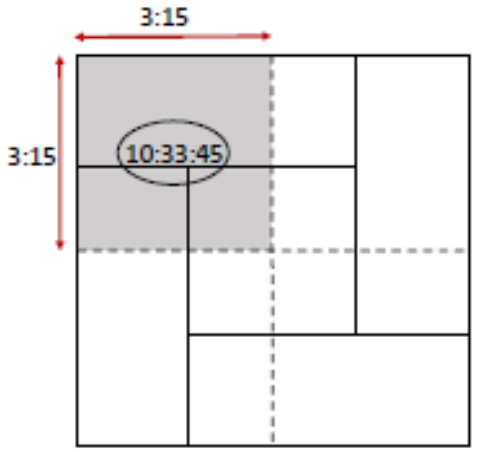
l.	Text of #7	Arithmetical operation			
1. 7.	The length and the width I added, it is 6:30. (The base is) 7:30				
7.	½ of the length and the sag which I added break. 3:15 it will give you.	½	6 3	30 15	
	(Manipulation which shows that the initial rectangle has the same area as the gnomon; not explained in the text)				
8.	3:15 cross itself. 10:33:45 it will give you.	 ×	3 3 10	15 15 33	 45



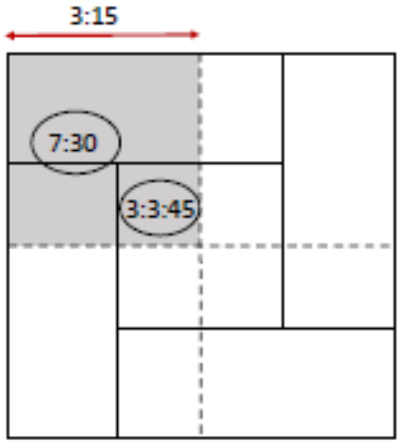


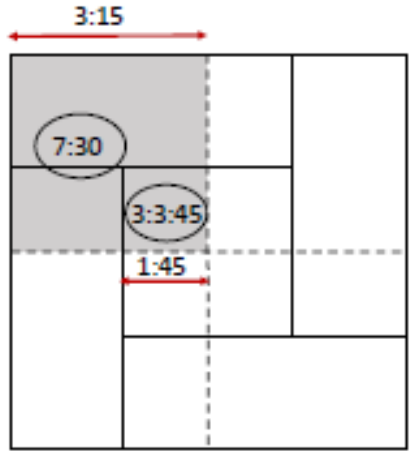


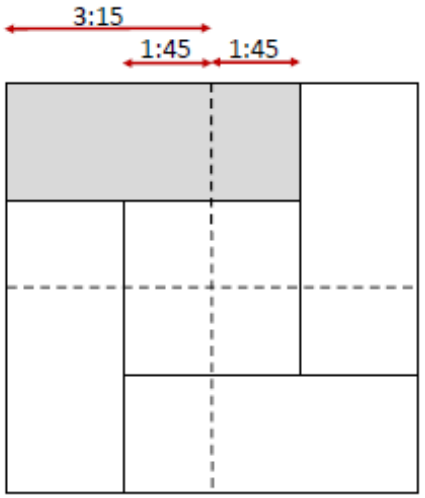


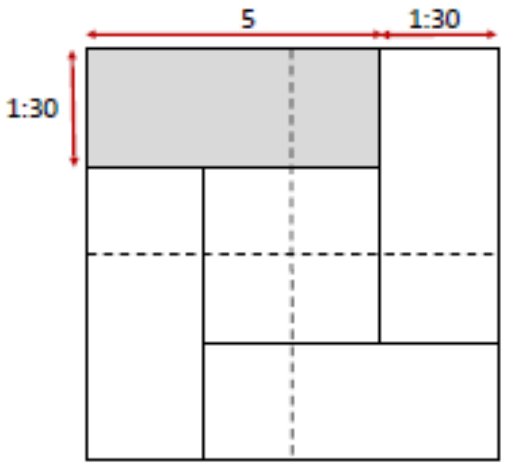


9. 10.	7:30 from 10:33:45 tear out. 3:3:45 it will give you….	 –	10 7 3	33 30 3	45 45
10. 11.	…Its equal-side take. 1.45 it will give you…	 Sq. root	3 1	3 45	45
11.	…To the one append, from the other cut off.	 + ---- – 	3 1 5 ---- 3 1 1	15 45 ---- 15 45 30	
12.	The length and the width it will give you. 5 (*ninda*) is the length, 1 ½ *ninda* is the width.	Transformations with metrological tables 5→5 *ninda* 1:30→1 ½ *ninda*			









Catalogue C1, the very beginning of the syllabus developed in C5?

	Concrete situation	Dimensions	Nature of the problem
C1 #1	Dimensions of a rectangle	3 (*US*) 45 *ninda* length, 1 (*US*) 20 *ninda* width	Linear
C1 #2-3	idem	idem	Linear, reverse of #1
C1 #4-5	idem	idem	Quadratic
C1 #6	Dimensions of a rectangle	2 (*US*) 30 *ninda* length, 24 *ninda* width	Linear
C1 #7-8	idem	idem	Linear, reverse of #6
C1 #9-10	idem	idem	Quadratic
C1 #11	Dimensions of a rectangle	8 (*US*) 53 *ninda* 4 *kuš* length, 6 ½ *ninda* 3 *kuš* width	Data for a new cycle
C1 #12-15	Dimensions of 4 rectangles	Various	Data for 4 new cycles

Table A Old Babylonian catalogues

	Museum number	Type	Prov.	Content	Colophon
C1	YBC 4612	S	Unknown	15 sections on fields (a - š a_3)	Ø
C2	YBC 6492	S	Unknown	24 sections on fields (a - š a_3)	Ø (unfinished tablet?)
C3	YBC 4607	S	Unknown	10 sections on bricks (s i g_4)	10 sections (10 i m - š u - m e š)
C4	YBC 4652	S	Unknown	22 sections on stones (n a_4)	22 sections (22 [i m - š u])
C5	YBC 4657	S	Unknown	31 sections on trenches (k i - l a_2)	31 sections on trenches (31 i m - š u k i - l a_2)
C6	YBC 5037	S	Unknown	44 sections on trenches (k i - l a_2)	44 sections (44 i m - š u)
C7	YBC 4666	S	Unknown	26 sections on canals (p a_5 - s i g)	26 sections (26 i m - š u p a_5 - s i g)
C8	YBC 7164	S	Unknown	19 sections on canals (p a_5 - s i g)	Ø
	BM 80209	S	Unknown (north?)	18 sections on canals (p a_5 - s i g)	Ø
	IM 52672	?[39]	Unknown (north?)	2+ sections on fields	Destroyed?
	IM 52916 + IM 52685 + IM 52304	S	Tell Harmal (north)	70+ sections on fields and coefficients table	[...]
	TMS 5	M (3/3)	Susa	262 sections on squares	262 lines (4.22 m u - b i n i g i n - m e š) + date + NP
	TMS 6	M (2+/2+)	Susa	60+ sections on squares	[...]