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# A School Exercise in Multiplication: P.Cair.Eg.Lib.inv. 2368 v

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## Abstract

This paper examines the papyrus P.Cair.Eg.Lib.inv.2368 v, a Coptic school exercise from the National Library and Archives of Egypt. It was presented during the Coptic seminar, held by the Coptic Studies Center, Bibliotheca Alexandrina, under the supervision of Prof. Dr. Maher Eissa. The text contains a multiplication table written in Greek letters, arranged in eight columns, and displays features of a developing, semi-skilled hand. Although the school exercises are difficult to date, the papyrus likely belongs to the 9th–10th century and probably comes from Hermoupolis/al-Ushmūnayn. and the papyrus itself shows signs of reuse, including remnants of an Arabic text on the reverse. As a rare example of a complete Coptic school exercise, the document provides valuable evidence for educational practices, the materiality of school papyri, and the transmission of mathematical instruction in late antique and early Islamic Egypt.

## Keywords

School Exercise;
Dār al-Kutub;
Multiplication Table;
Coptic Education;
Middle Egypt.

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Author 1. **Mai Mahmoud**: Transcription, codicology, and drafting.
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## 1. Introduction

Education in the Greek and Coptic traditions in Egypt was characterized by a structured progression from elementary literacy to increasingly advanced instruction in texts and numbers. At the initial stage, students engaged in the repeated practice of individual letters, often outside strict alphabetical order, to internalize their forms. This was followed by exercises in alphabets and syllabaries, combining consonants and vowels in systematically varied patterns, while intermediate instruction incorporated word lists, copying exercises, and short texts such as maxims and standard epistolary formulae. Alongside this literary training, learners were introduced to numerical literacy, acquiring the ability to perform basic mathematical operations: addition, subtraction, multiplication, and division through the use of alphabetic numerals.

Within this framework, mathematical learning was closely tied to sustained methodical practice, particularly in scribal education. Exercises preserved on ostraca and papyri demonstrate that students worked repeatedly through numerical problems, not merely as a mechanical reproduction but as a means of developing accuracy, confidence, and control over calculation. A particularly illustrative example of this pedagogical approach is the Coptic papyrus from Akhmim (Or.5707), which provides valuable evidence of instructional methods and underscores its importance to the history of calculation (p. Lond. Copt. 528; Drescher, 1948-49, pp. 137-138). Given the practical significance of mathematics in administrative contexts, including accounting and measurement, such training was essential for professional competence. Repeated engagement with numerical exercises thus functioned as a central pedagogical tool, shaping both the acquisition of knowledge and its practical application.

The papyrus labelled P.Cair.Eg.Lib.inv. 2368 v (ID 3031) is part of the Coptic collection housed in the National Library and Archives of Egypt (Dār al-Kutub wa-al-Wathāʾiq al-Qawmiyya). (Boud'hors, Eissa & Vanthieghem 2020, pp. 57-58). The collection dates mainly after the Arab conquest and includes texts written on papyrus, parchment, and paper. A significant part of the material comes from important Coptic centers such as Hermoupolis, Aphrodito, and the Fayoum. (Boud'hors, Eissa & Vanthieghem 2020, pp. 57-72) Fortunately, countless examples of papyrological literature have survived in the sands of Egypt, giving us an insight into the daily practices of Egyptian schools during this period: alphabetical practices, syllabuses, lists, epistolary exercises, and practice pieces. (Cromwell 2015, pp. 205-218) P.Cair.Eg.Lib.inv.2368v contains a multiplication table that was used for a school exercise. (Cribiore 1996, p.43) The text is a school exercise "Writing exercises level", (Cribiore 1996, p 31; Debut, 1968, pp. 251- 287; Zalateo 1961, pp. 160-235) for middle school students (Cribiore 1996, p. 112) "The Developing Hand" is not elementary and not professional. It is difficult to draw sharp boundaries between the three educational levels. However, the hands of beginners are usually repellent, rough, uncouth, misshapen, ugly, or simply. (Cribiore 1996, p 10.)

## 2. Textual Description

P.Cair.Eg.Lib.inv.2368v contains the numbers eight, nine, and ten with Greek letters. (Megally, 1991, p 1820). Each letter has a numerical value written in eight columns in black ink. It contains eight columns and approximately 6 to 9 rows. In addition, a second hand may have been added from the sixth column onwards. There are also two different groups of numbers in the table. In one group, the whole numbers are united, for example, 2, 3, 4, 5, the tens are united, i.e., 40, 80, 90, and the hundreds are likewise grouped as 100.

It is difficult to date this type of text (school exercise), which was made to improve untrained hands. School exercises lie in the gray area between documentary and literary documentary papyri. (Cribiore 1996, p. 27) It can be dated to 9/10 centuries (?), from Middle Egypt (Al-

Ushmūnayn)? due to the fact that most of the texts from this collection come from Hermoupolis/ al-Ushmūnayn after the Arab conquest of Egypt (Boud'hors, Eissa & Vanthieghem, 2020, pp. 57-58; Eissa & Boud'hors, 2022, pp. 161-167)

This text is indeed complete, and the script has many ligatures and italics in all columns. It is noticeable that some paleographic peculiarities, the letters ⲍ, ⲙ, ⲑ, ⲇ, are higher and larger than the others. At the end of most letters is the vertical stroke, next to the oblique strokes that separate syllables; these strokes are used as punctuation in mathematical texts (Cribiore 2011, p. 323). Vertical rulers are used to separate the columns, regardless of whether adjacent columns contain the same text or different tasks; however, students placed their columns very close together (Cribiore 1996, p. 77). Line fillers place hyphens at the end of lines in column 3, line 2. Spaces can be used as punctuation to indicate a break between two paragraphs or a pause (Cribiore 1996, p. 83). It should be noted that there is a space at the end of the fifth column; perhaps this space was there because of the change of trainee in the next column (Litinas & Bay 2012, p. 16). Most mathematical materials were written with skillful hands (Cribiore 1996, p. 30), but this document was written in a middle hand. Although there were no standards for distinguishing between trained and untrained hands (Cribiore 1996, p.13), the slips for the student's hands are mediocre, immature, and do not appear confident or professional in handwriting. Although the development of handwriting is not a sure criterion for our understanding of the purpose of the slates.

This is a handmade papyrus from an Arabic document, because the last part of the papyrus contained Arabic letters, from the bottom. The document could therefore have been cut from an earlier papyrus that was written in Arabic, and the left side of the page was torn away. This type of multiplication, which seems to have gained in importance after the Arab conquest in the 9th century, appears to have been less common in Greco-Roman Egypt than the use of fraction tables (van der Vliet & Worp 2011, p. 156).

Teaching texts were also written on wooden tablets, ostraca, parchment, and wax tablets. (Cribiore 2011, p. 321). However, the students wrote most of their exercises on papyrus. School papyri are of poor quality, being thick and rough, so you can see traces of damage and missing fibers. To repair the fibers, one would try to wash them off or cut out a blank spot on already used papyrus. A student had no chance of getting good-quality papyrus. As soon as a student had a piece of papyrus, no matter how big it was, he used it for practicing. (Cribiore, 1996, p.59). The papyrus has enough blank space and damage, such as in. Col.1 l. 6, Col.3 l.5, Col.5 l.4, Col.6 l.4, Col.8 l.3, but this damage doesn't affect the text. The text is inscribed across the fibers of the papyrus on the back (verso), as the students did not have to follow the horizontal fibers in order to write on a less smooth surface. (Cribiore 2011, p. 322)

The collected inscriptions were then classified across seven dimensions: language, function, content, patron, stylistic features, region, and inscriptional type. Where inscriptions were missing, illegible, or damaged, they were still included in the database with appropriate notes and provisional metadata.

In cases where inscriptions were inaccessible or partially lost, satellite imagery, published architectural surveys, and museum catalogues were consulted. While full decipherment and translation were not always possible due to erosion or prior destruction, all available inscriptions were documented and categorised, creating a foundational inventory for further epigraphic scholarship.

## 3. Text

P.Cair.Eg.Lib.inv. 2368 v
Papyrus (fig. 1)

Al-Ushmūnayn (?)
9th/ 10th Century (?)

| | Col. I | II | III | IV | V | VI | VII | VIII |
|---|---|---|---|---|---|---|---|---|
| 1 | ηα η | ηε μ | ηι π | δθ λς | ζθ ζγ | ια ι | δι μ | ζι ο |
| | ηβι ς | εη μ | ιη π | θε με | θη οβ | ιβ κ | ει ν | ιη π |
| | βη ις | ης μη | θα θ | εθ με | ηθ οβ | βι κ | ις ζ | ιθ ϥ |
| | ηγ κδ | ςη μη | θβ ιη | θς νδ | θθ πα | ιγ λ | ςι ζ | ια ρ |
| 5 | γη κδ | ηζ νς | βθ ιη | ςθ νδ | θι ϥ | γι λ | ιζ ο | |
| | ηδ λβ | ζη νς | θγ κζ | θζ ζγ | ιθ ϥ | ιδ μ | | |
| | δη λβ | ηη ζδ | γθ κζ | | | | | |
| | | ηθ οβ | θδ λς | | | | | |
| | | θη οβ | δθ λς | | | | | |

| Col. I | II | III | IV | V | VI | VII | VIII |
|---|---|---|---|---|---|---|---|
| 8x1= 8 | 8x5= 40 | 8x10= 80 | 4x9= 36 | 7x9= 63 | 10x1= 10 | 4x10= 40 | 7x10= 70 |
| 8x2= 16 | 5x8= 40 | 10x8= 80 | 9x5= 45 | 9x8= 72 | 10x2= 20 | 5x10= 50 | 10x8= 80 |
| 2x8= 16 | 8x6= 48 | 9x1= 9 | 5x9= 45 | 8x9= 72 | 10x3= 30 | 6x10= 60 | 10x9= 90 |
| 8x3= 24 | 6x8= 48 | 9x2= 18 | 9x6= 54 | 9x9= 81 | 3x10= 30 | 10x6= 60 | 10x10= 100 |
| 3x8= 24 | 8x7= 56 | 2x9= 18 | 6x9= 54 | 9x10= 90 | 10x4= 40 | 10x7= 70 | |
| 8x4= 32 | 7x8= 56 | 9x3= 27 | 9x7= 63 | 10x9= 90 | | | |
| 4x8= 32 | 8x8= 64 | 3x9= 27 | | | | | |
| | 8x9= 72 | 9x4= 36 | | | | | |
| | 9x8= 72 | | | | | | |

## 4. Commentary

The multiplication system follows a well-attested system (Fournet 2001, p. 170). Each line was repeated in the following line, changing the position of the letters, and this repetition ensured that you got better and better with practice. (Brune 2005, p.33). The repetition of the formula parts focuses on the aspect that is clearly expressed in the lesson (Harrauer & Sijpesteijn 1985, p. 9), and each summand of the given equation appears twice, once as the first and once as the second. This is known as the commutative law (Brune 2005, p. 42). This repetition system is also found in P. Rain. Unterricht Kopt. 307 (8$^{th}$ century) fig.2, and P. Rain. UnterrichtKopt. 309, (11$^{th}$ century), which also contains a multiplication table for the numbers 8, 9, and 10. And P. Rain. UnterrichtKopt. 310a, (11/ 12$^{th}$ century) P. Rain. UnterrichtKopt. 311, (11$^{th}$ century) P.Rain. UnterrichtKopt. 317a. (10/11$^{th}$ century) (Fowler 1995, pp. 225–228). The purpose of mathematical tables in general is difficult to assess. They may originate from an academic milieu, either in the form of school exercises by pupils or lessons by teachers (Cribiore 1997, p. 54), or they may have originated in a commercial or governmental environment in the form of tables for simple mathematical operations that were hung up in the offices of lawyers or businessmen for reference. (Cribiore 1993, pp. 24-25)

## 5. References


1. Boud'hors, A., Eissa, M. A. & Vanthieghem, N. (2020), Coptic Fragments in the National Library of Egypt (Dār al-Kutub). In A. Kaplony & D. Potthast (eds.), *From Qom to Barcelona. Aramaic, South Arabian, Coptic, Arabic, and Judeo-Arabic Documents*, Islamic History and Civilization 178. Brill. 57–72.
2. Brune, K.-H. (2005). School days in the Fayoum in the first millennium. In G. Gabra (Ed.), *Christianity and monasticism in the Fayoum Oasis* (pp. 33–43). Cairo: American University in Cairo Press.
3. Cribiore, R. (1993). A table of squares (P. Tebt. II 683 verso). *Bulletin of the American Society of Papyrologists, 30,* 23–25.
4. _____ (1996). *Writing, teachers, and students in Graeco-Roman Egypt* (American Studies in Papyrology, No. 36). Atlanta: Scholars Press.
5. _____ (1997). Literary school exercise. *Zeitschrift für Papyrologie und Epigraphik, 116,* 53–60.
6. _____ (2011). Education in the papyri. In R. S. Bagnall (Ed.), *The Oxford handbook of papyrology* (pp. xx–xx). Oxford: Oxford University Press.
7. Cromwell, J. (2015). Coptic writing exercise in the Petrie Museum with a concordance of its published Coptic texts. *Zeitschrift für Papyrologie und Epigraphik, 195,* 205–218.
8. Crum. W.E. (1905), Catalogue of the Coptic Manuscripts in the British Museum I.
9. Debut, J. (1986). Les documents scolaires. *Zeitschrift für Papyrologie und Epigraphik, 63,* 251–287.
10. Drescher, J. (1948-49). A Coptic calculation manual. Bulletin de la Société d'Archéologie Copte (BSAC) 13, pp. 137-160.
11. Eissa, M. A., & Boud'hors, A. (2022). Draft of a late Coptic letter. In L. Berkes (Ed.), *Christians and Muslims in early Islamic Egypt* (pp. 161–167). The American Society of Papyrologists.
12. Fournet, J.-L. (2001). Nouveaux textes scolaires grecs et coptes. *Bulletin de l'Institut Français d'Archéologie Orientale, 101,* 159–180.
13. Fowler, D. H. (1995). Further arithmetical tables. *Zeitschrift für Papyrologie und Epigraphik, 105,* 2225–228.
14. Harrauer, H., & Sijpesteijn, P. J. (1985). *Neue Texte aus dem antiken Unterricht* (MPER XV, p. 9). Vienna.
15. Litinas, N., & Bay, S. M. (2012). An addition and multiplication table. *Bulletin of the American Society of Papyrologists, 49,* 15–19.
16. Megally, F. (1991). Numerical system (Coptic). In A. S. Atya (Ed.), *Coptic encyclopedia* (Vol. 6, pp. 1820–1822). New York: Macmillan.
17. Van der Vliet, J., & Worp, K. A. (2011). A multiplication table on a tablet in Leiden. *The Journal of Juristic Papyrology, 41,* 153–157.
18. Zalateo, G. (1961). Papiri scolastici. *Aegyptus, 41*(3–4), 160–235.


**Figure 1** P.Cair.Eg.Lib.inv.2368 verso / ID 3031.

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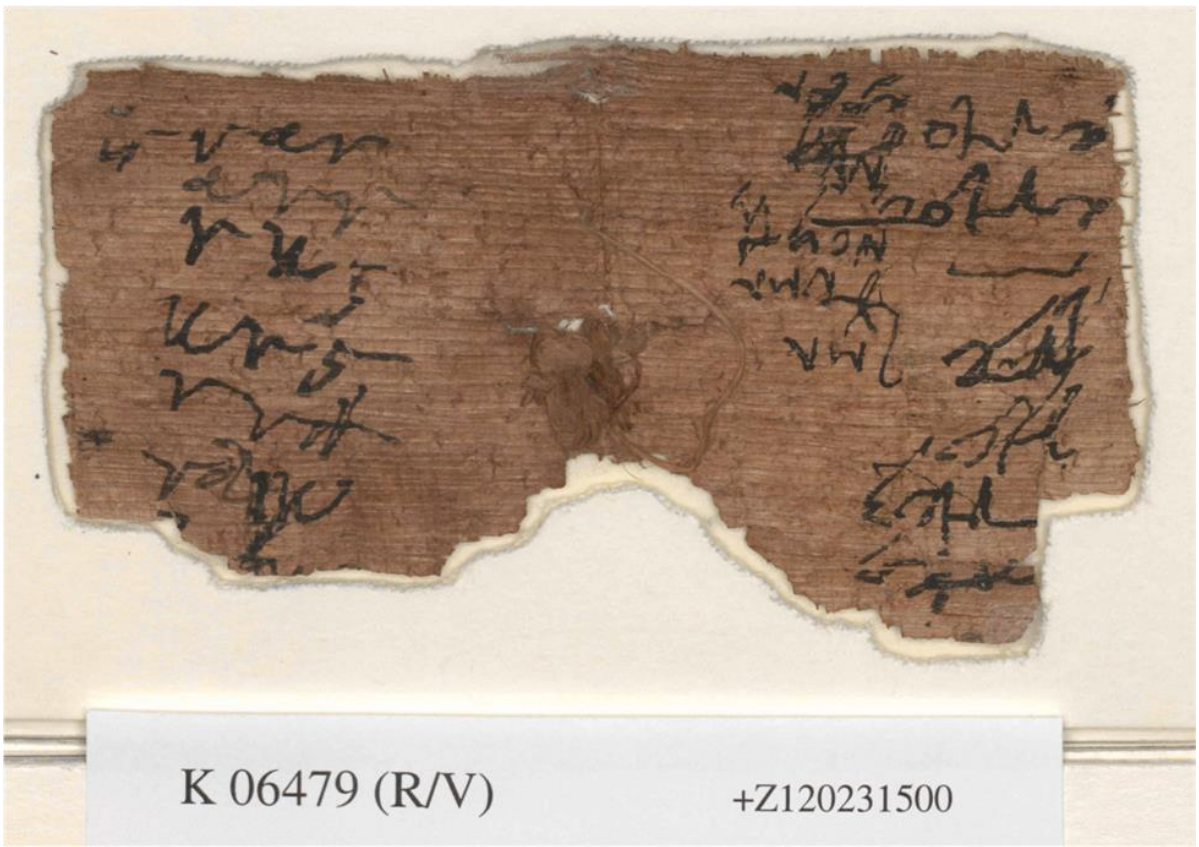


**Figure 2** P. Rain. UnterrichtKopt. 307 (MPER N.S. 18). 307

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