

MEFTAH AL-HESAB: A SUMMARY

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Introduction. *Meftah al-hesab* (“The Key of Arithmetic” or “The Calculator’s Key”) was written in Arabic by Jamshid Kashani. In the preface of *Meftah al-hesab*, Kashani (Al-Kashani) introduced himself as Jamshid-ibn-e Masud-ibn-e Mahmud-e Tabib-e Kashani mulaqqab be Ghiyath ud-din; that is, “Jamshid son of Masud, Masud son of Mahmud, a physician from the city of Kashan, known as Ghiyath ud-din.” Although Kashani was a physician, his main interest was in mathematics and astronomy. Kashani’s exact birth date is not known, but it was sometime during the second half of the fourteenth century in the city of Kashan in central Iran. Kashani died on the morning of Wednesday June 22, 1429 (Ramadan 19, 832 A. H. L.) outside Samarqand at the observatory he had helped to build in Uzbekistan. (For the start of the Islamic calendar and the lunar months, see the remark just before the acknowledgment.)

Meftah al-hesab is Kashani’s best known work. It contains some of Kashani’s original findings, as well as his improvements on earlier Muslim mathematicians’ works. Written primarily as a textbook, *Meftah al-hesab* was used for more than five centuries, not only as a textbook, but also as an encyclopedia; it served many generations of students, accountants, astronomers, architects, engineers, land surveyors, merchants, and other professionals. It took Kashani more than seven years to complete *Meftah al-hesab*, which he did on March 2, 1427 (Jamadi al-awwal 3, 830 A. H. L.). To support himself financially, he dedicated this unique mathematical masterpiece to Sultan Ulugh Beg, grandson of Timur and the ruler of Samarqand.

An English summary of *Meftah al-hesab*, like this present paper, is long overdue. Original handwritten copies of *Meftah al-hesab* can be found in libraries throughout the world. The most authentic manuscript of *Meftah al-hesab* was written by Abdul Razzaq-ibn-e Mohammad, known as Muein ud-din Kashi, just two months after its completion. This copy is preserved at the Ketabkhaneh-e Melli-e Malek (“National Library of Malek”) in Iran as part of the collection number 3180. Also in this library, another handwritten copy of *Meftah al-hesab* exists under collection Number 3252. Some other handwritten copies of *Meftah al-hesab* which exist in Iran are: Numbers 445 and 165 at the Central Library of the Astan-e Quds-e Razavi (in Mashhad); Numbers 2066, 1790.1, and 6287 at the Central Library of the University of Tehran; Number 442.1 at the School of Literature of the University of Tehran; Number 1530 (1519) of the Library at the Majlis-e showra-e Melli.

Meftah al-hesab has been translated in part or in whole with comments into other languages. A. Dakhel [4] used the Princeton University copy as well as other copies to write an English translation with commentary of the fifth chapter of the