

Readings (I)

Mon Jan.25

Babylon I: background – accounting, scribal schools; sexagesimal place value numbers and their cuneiform representation; arithmetic with sexagesimals

Begin with introduction to the cuneiform numbers themselves in scan of Aaboe, pp. 5-27. Then from sourcebook, Chapter 2, sections I, II and III.a, read pp.57-68 for background, skim pp.70-72, read section II.d and note the letter from supervisor to student and the tablet AOT 304 (checking the metrology tables, you can see what *forced* the sexagesimal system on them). See also Ash 1923.366 on pp.88-89: converting lengths in fingers, cubits, rods, cables and leagues into uniform sexagesimal numbers – but without a 'decimal' point! And the positive and negative powers of 16 in IM 73355, p.90. Also MS 2351 (scan from privately owned (!) Schoyen collection) of huge power of 2 and amazing approximation of $\sqrt{2}$ in YBC 7289 (in section IIIc as well as Aaboe).

Wed Jan.27

Babylon II: Geometric Algebra in Old Babylon: esp Pythagoras's theorem and completing the square

Look at the the rest of Chapter 2, section III (ends on p.153). There are huge numbers of examples which can be skimmed. But read carefully a selection of the tablets: BM 15285, pp.93-99 for geometric figures; IM 55357, p.100 for similar triangles; YBC 6967 pp. 102 and AO 8862, p.128 for completing the square; Db₂-146, p.100 (plus scan from Hoyrup, p.257ff) which will lead to a class discussion for evidence of how Pythagoras's theorem might have been found; MS 3049 (see scan from Friberg) for 3D distances; Strasbourg 362 p.127-128 for arithmetic progressions. From section III.c, check the proverbs on the obverse of the tablets pp.145-148; and the famous Plimpton 322, p.151. For on Plimpton 322, see scan from Neugebauer and Sachs.

Mon Feb.1

Early India I: Vedic background and Sulbasutras: Pythagoras's (=Baudhayana's) theorem and geometrical algebra.

Sourcebook, pp. 385-393 (includes Baudhayana's sutras, sections 1-2), xerox (a) Plofker's book (pp. 1-28 has general Indian background and more quotes), (b) excerpt from Dani's excellent article on the approximation of $\sqrt{2}$ and (c) some of the full altar designs from Sen & Bag.

Wed Feb.3

Early India II: Other roots of mathematics in India: (a) Panini – variables and recursion through a grammar of Sanskrit and (b) Pingala – binary numbers and binomials through the study of prosody in Sanskrit verse.

Sourcebook, pp. 393-395, plus a bit more in Plofker's book, pp. 53-57, Gillon's article on Panini's grammar (and on what grammars are) and b) by Shah on Pingala with more detail.