

## The Joys of Reading Euclid in Greek: Strategies for Teaching Greek Mathematical Texts

This paper derives from part of the introduction to an intermediate reader to Book I of Euclid's *Elements*, which I am preparing. Originally, my intention was to appeal to STEM students, but in testing the reader out on Classics students, I saw the need to situate Greek mathematics within the larger context of Greek culture.

Why Book I? It contains mathematics familiar even to students who are not mathematically inclined: triangles, parallel lines and parallelograms culminating in the Pythagorean theorem, where triangles and squares interact. In addition, there are the famous definitions of points and lines as well as the parallel postulate.

Clearly, Euclidean Greek will reinforce what students have learned in the first-year grammar course, e.g. 3<sup>rd</sup> person imperatives (“let there be (ἔστω) a triangle ABC”), the various uses of αὐτός (“things equal to the same thing (τῷ αὐτῷ) are equal to each other”), the use of the article where the noun must be supplied (τὸ ABΓ (τρίγωνον)). As Reviel Netz (1999) has argued, most of the mathematical terms and operations in an Euclidean proof are formulaic. Each formula must be unique: τό + three letters must only refer to a triangle. So, also, separate verbs are used for drawing a line (ἄγω) and a circle (γράφω). Netz (2022) sees the use of formulas as a mnemonic device. Instead of referring to an earlier proof, these set phrases reinforce that we have seen this before, e.g. once it is postulated in Postulate 3 that circles may be drawn from a center with the radius, the same phraseology turns up every time a circle is drawn. On a larger scale, the six-part schema of a Euclidean proposition is also characterized by formulas, e.g. the conclusion (συμπέρασμα) of a theorem always ends with ὅπερ ἔδει δεῖξαι = QED.

How then does Greek mathematics fit within Greek culture? Netz (1999 and 2022) sees the development of mathematics as parallel to other genres within Greek society in which debate and rhetorical persuasion are paramount. He indeed speaks of a mathematical genre. We have already seen parallels with other genres in speaking about mathematical formulas and schemas. Doxiadis

and Sialaros relate the six-part schema of a proposition to the different parts of an oration. Both Netz (2005) and Loomis speak about the narrative and other literary qualities of mathematics, resulting in surprise for Netz (2009) and wonder for Loomis. While not all these parallels are exact, these authors view mathematics as reflecting the qualities of Greek culture that we see in the literature that we teach.

### Bibliography

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