

## Reading

- In Euclid's *Elements* online, read the guide at the end of book I, then read book I through Proposition 32.
- Stillwell, Chapter 2
- Bertrand Russell, "The Teaching of Euclid" on the MacTutor site.
- This is totally optional: For some flavor of Greek intellectual life c420BC, read the short play *The Clouds* by Aristophanes.

## Exercises

**Stillwell:** # 2.1.1, 2.1.2, 2.2.1, 2.3.1, 2.3.2, 2.3.3, 2.3.4

**Converse/Contradiction:** It is possible to prove Book I Proposition 19 without using I.18 (see our web page for an argument due to Heron of Alexandria, 10-70AD). Your job is to prove I.18 using I.19 and the method of contradiction.

**12-gon:** Construct a regular 12-gon.

**Pentagon Construction:** Follow Euclid's *Elements* to construct a regular pentagon. The construction is given in Book IV Proposition 11. Along the way, you'll need to construct a  $36^\circ - 72^\circ - 72^\circ$  triangle, known as a *golden triangle*, using IV.10. In turn, this uses II.11, the division of a segment into the extreme and mean ratio, known as the *golden ratio*. You'll also need IV.2, to copy a triangle into a circle.

**15-gon:** After constructing the pentagon, continue with Book IV Proposition 16 and construct a regular 15-gon.