

Group Discussion: The Golden Ratio/Rectangle in Our World

Friday, January 30

Readings:

- H.E. Huntley, The Divine Proportion: A Study in Mathematical Beauty, (Dover Publications, 1970), Chs. 2, 4, 5.
- G. Markowsky, "Misconceptions about the Golden Ratio," *College Mathematics Journal*, 23 (1), 1992.
- M.D. Schlatter, "Discovery or Creation?: Mathematical Platonism and the Visual Arts," preprint.

Discussion Questions:

After reading Huntley, you might have the impression that the golden ratio, called ϕ ("phi") by the mathematicians, is something of a magical number of the universe (much like the number π or e). However, there is some controversy surrounding the extent to which the golden ratio can be attributed/applied to nature, architecture, and art, as Markowsky's article suggests. We will explore these ideas in group discussion in today's class, and in this week's writing assignment.

Some questions to get our discussion started are given below. You may find it helpful to look through the questions and the readings before Friday's class, to organize your thoughts!

1. Huntley describes appearances of the Golden Ratio in a wide variety of disciplines. have you encountered instances of this proportional relationship in your own areas of study? If so, where? What, if any, scientific/philosophical/religious/aesthetic aspects of the Golden Ratio have you encountered or studied in the context of your own disciplines?
2. Markowsky (p. 12) discusses the claim that a golden rectangle is the most aesthetically pleasing rectangle. (A credit card's sides have ratio 1.588, not too far from ϕ , and we know how much people like those!) If this claim has merit, why do you think this might be? Have we been conditioned to appreciate this proportional relationship, or does its aesthetic properties precede our appreciation for it? If you think the latter, how might you account for such an "innate" aesthetic preference."
3. Discussing the golden rectangle's claim to aesthetic merit, Huntley (p. 62) states that "The proportions of the well-known Parthenon bear witness to the influence exerted by the golden rectangle on Greek architecture." By contrast, Markowsky (pp. 8-9) writes "The dimensions of the Parthenon vary from source to source... With so many numbers available a golden ratio enthusiast could choose whatever numbers gave the best result." How "exact" do you think computations ought to be to prove a point? How would you define "provability" or "disprovability?" Is Markowsky saying that the golden rectangle definitely doesn't apply to the Parthenon?
4. Writing about ϕ , Huntley (p. 51) states that "...the properties of this remarkable mathematical constant may have an interest for the mathematically wise and prudent but can never be revealed to babes." and that "...the golden section, appropriately displayed, appears to have an immediate artistic appeal which demands no preliminary mathematical education." What is your interpretation of these remarks? How does this interpretation compare with the background of Schlatter and Markowsky, and their challenges about the ubiquity of ϕ ?
5. Schlatter (p. 3) states that "many mathematical practitioners believe that mathematics exists in some objective sense. According to this point of view, the number π ... has an existence independent of the human mind. A subscriber to this belief would assert that any other sufficiently advanced civilization in the universe would also discover π ..." This belief is an example of *mathematical Platonism*. Do you agree or disagree with this viewpoint about π ? What about ϕ ? How do your reasons compare, in terms of these two numbers?