**Topic:** Pythagoras of Samos

**Notes on Topic:** Born in 572BC in Samos in eastern Aegean, studying with Thales himself according to legend

When the tyrant Polycrates took over in this region Pythagoras fled to the Greek town of Crotona, in southern Italy

Here he founded the scholarly society now known as the Pythagorean brotherhood in which they contemplated the world around them

One of the major concepts studied was the whole number as the critical foundation of all natural phenomena; whether in astronomy or music or philosophy, numbers were everywhere evident

The modern notion of the physical world could be understood through “mathematization”

His great discoveries: of course the pythagorean theorem, of which there is no record of the original proof, but the ancients were unanimous in attributing it to pythagoras

The other great discovery was considered with much less enthusiasm, for it defied intuition and went against the supremacy of the whole number

The discovery was irrational quantities, but they approached it from a geometric POV

Commensurable: Two segments AB and CD are commensurable if there exists EF < AB, CD such that EF goes evenly into both AB and CD. Let p, q be numbers such that AB = pEF and CD = qEF, so AB/CD = pEF/qEF, hence AB/CD = p/q. Since p/q is a ration of two integers, we say the ratio of lengths of commensurable segments is “Rational”

The brotherhood felt that ANY two segments were commensurable, if you were able to choose a small enough “EF”, the brotherhood needed this to be true because they used this notion in some of their proofs involving similar triangles, and they needed this notion to support their philosophical stance of the whole number and its central role in nature

The Pythagorean Hippasus was accredited to discovering that a square and its diagonal are not commensurable.

This discovery shattered their previous similar triangle proofs, and it would be centuries until Eudoxus found a way to patch up the similar triangle theory.

This meant that whole numbers were not the most adequate in representing the natural world and the ratios of geometric lengths

Finally, this discovery showed the superiority of geometry over arithmetic in greek mathematics

One last consequence of this discovery was, Hippasus caused so much trouble, supposedly he was taken far out on the Mediterranean and tossed him overboard to his death. Although this is not proven, it shows the consequence of free thinking even in the every changing and debated discipline of mathematics.

**In Class Activity**: Talk about the square root of two being irrational

Given that the pythagorean theorem has been proven, and we know that a square and it’s diagonal are incommensurable. Discuss a square with side of length 1.

**Additional Suggested Reading**: N/A

**Assignment:** Homework 1, Problem 3