The Socratic Method in the time of the Coronavirus

An Appendix to the Modified Socratic Method

See my essay on my teaching method posted on the class website:

http://webhome.auburn.edu/~smith01/math5200/

Since, with my teaching method, most of the learning takes place at home, or where you've found a secluded place where you can think, it follows that this method is well suited for the remote teaching that we will be doing this semester. In order to understand mathematics, one must do mathematics. Much like learning to ride a bicycle, regardless of any explanations of the physics involved, you can't say that you've learned to ride a bicycle until you've gotten up on one and tried it out - and suffered the pitfalls and misbalances that comes from that effort. In the course of the semester you will be given theorems to prove and exercises to work through. I like to consider them as interesting puzzles. Some of the easy puzzles you'll be able to do overnight, or in the days between class meetings; some of the harder ones may take up to a week to figure out. My job, in the Socratic tradition, is to ask questions that are solvable with the information provided (the axioms and previous theorems). Most of my questions are in the form of notes - for example, a list of theorems where you are asked to prove the theorems from the axioms. And, for some of the more challenging "puzzles" I'll give hints, often in the form of "questions."

Unlike the traditional question and answer method described in Plato's Dialogues, where the person addressed by Socrates answers the question right away, in my class you'll generally have a couple of days to think about the question before coming up with an answer. Sometimes I will employ the Platonic version of the Socratic method and engage with a student (through Zoom) in a question and answer session.

It's difficult to master a bicycle alone, often a friend who can hold you up as you try working the instrument is helpful. Similarly, it's often helpful to share one's attempts at problem solutions with other students. To facilitate this, I will set up discussion groups in Canvas where you can ask questions of your peers and share ideas about problems - or to review solutions presented at the Zoom sessions.

Given that the struggle to work towards a solution is part of the learning process, students from the class may not use any outside sources for proofs to the theorems. You may not look up a proof in a textbook or online and you may not ask someone outside the class to help you with the proofs. I am always available to answer questions about the material.

Following is the procedure that I will use for the course: at a class meeting, I will assign a set of theorems or exercises for homework for the next class and I will select a group of students to write up their proofs/solutions. The students will be expected to come up with solutions (or proofs) to as many of the homework problems as they can and submit to me their work by midnight of the day before the next class meeting. Then the next day in class I'll ask each of the students who were assigned problems to go over the solution with me in a question and answer format (in the more traditional Platonic dialogue technique.) In the case that you cannot find a

solution to a problem, take the problem as far as you can, and I'll give a hint in class on how to continue. In the case where you had help with the solution from a member of your discussion group, give credit to the person (or persons) who helped you. This is much like the process of writing a joint mathematics paper wherein all the people who contributed to the work are given credit for their contribution. If you happen to know a proof to a theorem from another class or from your reading or web surfing, then you should indicate this, and I will give someone else the honor of going over their solution with me. If you happen to know a solution, don't "spoil" the problem for someone else; just like you wouldn't want someone to tell you "who dunnit" in the middle of a murder mystery.