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Final Reflections on AwesomeMath summer program

Thanks to the Garwin Family Foundation, I had the opportunity to learn with the three week long online AwesomeMath summer program. AwesomeMath is known for guiding and providing unique classes to aspiring problem solvers around the world. The program builds off of materials learned in school to further explore the various aspects of mathematics often not taught in class. There are three levels of courses, with each level offering different materials and difficulties. I chose Level 1- Algebra 1.5 and Level 2- Computational Geometry, as I wanted to build a stronger foundation for my problem solving skills.

The AwesomeMath summer program is an intensive curriculum built on fostering mathematics. Every weekday, each course has a dedicated three hour window for virtual meetings, two hours for lecture and one hour for problem session and questions. After each lecture, the teacher would assign a problem set, which tries to explore more on the topics learned that day by using theorems and ideas from class. We could work and ask questions on the topics and problem sets during the problem session. There is also an online discussion page after class to ask questions. Even though the classes were online, there was a lot of peer interaction through collaborations and discussions on problems and topics. Fridays had the same schedule, but were mostly composed of reviewing the materials learned that week. For the lecture on Friday, the teacher would go over problems that students requested, and the problem set would contain questions based on putting all the past materials together. On Saturday, I had tests related to the topics learned that week for the classes. I had a 3 hour long, five question test for Computational Geometry and a 2 hour long, 12 question test for Algebra 1.5.

One of the best moments in the course for me was the very last day of class. In my Algebra 1.5 class, the teacher gave us American Invitational Mathematics Examination (AIME) and USA (Junior) Mathematics Olympiad problems to work on. The teacher then divided us into groups to collaborate on the problems and come up with the solutions based on the materials learned in class. I had a ton of fun working with other amazing students and problem solvers to come up with solutions to these problems. On the last day for Computational Geometry, the lecture was a review of the whole course, and we basically came up with alternate solutions to problems in the past. One of these problems was about a tetrahedron, basically a 3 dimensional triangle. This problem sparked a debate in the chat and the Teacher's Assistant (TA) ended up explaining a super cool method for these types of problems during problem session, and we spent 20 minutes of problem session learning for fun. I won't go into the details, but he basically said to turn the 3 dimensional problem into a 4 dimensional problem to make it easier to solve

(Logically, this doesn't make sense, but it works). Here's a direct quote from my TA that I thought was really amazing:

"You can't really visualize a 4-dimensional diagram, but you can believe in the algebra."

This problem made me realize the amazing and unique solutions to so many problems, and that is the beauty of mathematics. It really stood out to me, as I realized that math is not limited to just basic equations. Literally everything around us revolves around math, as math is the backbone of reality, and I can't imagine where mathematics will take us in the future.

The problems at AwesomeMath require creative thinking, and just "memorizing" the formulas and theorems taught in class will often not be enough. In fact, every theorem and formula that we learned in class always had a proof to explain the process. This was a great aspect, as understanding the formulas is more important than just "knowing" the formulas. One thing that AwesomeMath has taught me is that sometimes simple logic is required for a problem solution, or the cliché notion "think outside of the box". For example, most of the problems in my Computational Geometry class are proofs, and sometimes these problems are unsolvable with the theorems learned, but are able to be solved simply by rotating the diagram or drawing in an auxiliary line. In a sense, AwesomeMath has taught me to enjoy the process of problem solving, and not just simply getting the right answer. For problems and tests, both of my classes will give 0 or 1 points out of 7 if your work doesn't justify or support your answer, even if it is right. In most math competitions that I have attended, only the answer matters, either resulting in 0 points for a wrong answer, or 1 point for a correct answer. Some problems have really unique and interesting solutions, but those solutions are often lost from assumption-based answers. AwesomeMath has reminded me of the excitement in problem solving, and to enjoy the process of figuring out a solution.

Before attending this program, I have always labeled and thought AwesomeMath was solely based on competition mathematics. True this is a big part of the structure, the information and notions learned can be used in any type of math setting. I think that this camp is worth attending even if someone is not into competition math. I went in expecting to learn formulas and ideas to help me in future math competitions and classes, and in that aspect, this program really lived up to my expectations, even if it was the online version. The AwesomeMath summer program has brought joy and excitement to me during this summer. These classes have helped me build a stronger foundation in mathematics, and I will definitely use the ideas learned in the future. This program has further solidified my enjoyment and love for mathematics, and has reminded me why I have spent so much time and effort in this field. I have truly learned a lot through this program and was able to meet amazing people from all around the world. In summary, the AwesomeMath summer program was a great experience and helped me further my education. Thank you to the Garwin Family Foundation for providing me with this wonderful opportunity!