

# Final Report of My 2026 AwesomeMath Algebra 1.5 Course

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This summer was my first time taking an advanced online math course designed to prepare students for math competitions. I joined AwesomeMath Algebra 1.5 Course because I had participated in competitions such as the AMC and the ICTM Math Contest in previous years, and I wanted to improve my math skills and prepare myself for future math competitions. The program was a three-week course, with a two-and-a-half-hour class each day. The first hour and a half was mainly lectures and an overview of the topics, followed by about an hour of solving different types of practice problems. We also had a test every Saturday. We could take the test at a time that worked for us, write out our solutions, and submit them online. Looking back, I think the biggest thing I gained from the program was learning how to approach competition-level math problems, especially problems where the solution is not immediately obvious. Instead of just learning new topics and techniques, I learned how to think through unfamiliar problems and find a way to approach them.

The first week started with factoring. We went much deeper into factoring than I had before and worked on problems that could only be solved by finding the right way to factor them. We learned different patterns and shortcuts that made factoring much faster. I think these techniques will be useful for math competitions because recognizing the right factorization quickly can save a lot of time. We also learned how to find the coefficient of a specific term in an expression, such as the coefficient of  $(x^2y)$ , without expanding the entire expression. Another method we learned was replacement, where we could let one variable equal another expression, such as letting  $(x=y+2)$  to make a problem easier to factor. We also learned synthetic division and how to use it to work with polynomials more efficiently.

The first week's homework usually took me around 15 minutes, with about three or four problems each day. Even though it did not take very long, the problems still made me think because I could not always solve them by simply following a familiar set of steps. The test at the end of the week took me less than the two hours we were given, and I scored 83%. Since most of the material was connected to things I had already learned, I felt pretty comfortable during the first week.

The second week became more advanced. We continued building on the algebra from the first week, but we also learned about sine and cosine, telescoping sums, discriminants, and Vieta's formulas. We also learned how subtracting one equation from another could create a third equation that helped us solve a problem. I liked this because it showed me that sometimes

the best way to solve a problem is to change the information we are given instead of trying to use it exactly as it is. The homework took a little longer than it did during the first week, but I did not struggle very much with solving it. The test at the end of the week took me around two hours, and I scored 80%. At this point, I was starting to notice that the class was becoming less about knowing a certain formula and more about figuring out what to do with the information in the problem.

By the third week, the problems had become much harder. A lot of the difficulty came from not immediately knowing which method to use. I could understand the concepts we had learned, but that did not mean I could immediately figure out how to apply them to every problem. I had to spend more time looking for patterns and figuring out how different ideas could work together. Sometimes I would start with one method, realize it was not working, and then have to try something different. This was frustrating at times, but it also helped me get better at working through problems instead of giving up when I did not see a solution right away.

As the program went on, I became more comfortable asking questions when I was stuck. Getting help did not always mean that I was given the answer. A lot of the time, a small hint or a different way of looking at the problem was enough to get me moving again. My classmates were also helpful because we could discuss problems and compare different ways of solving them. This made the online class feel more interactive than I originally expected.

One of the biggest things I took away from the program was the importance of thinking creatively. Before the program, I mostly thought of math as learning a concept and then applying the correct steps to a problem. This class showed me that competition math does not always work that way. Even if you know all the formulas and concepts, you may still not immediately know how to start a problem. The difficult part is often recognizing a pattern or realizing that something you learned earlier can be used in a completely different way. Learning factoring shortcuts, substitutions, Vieta's formulas, and different ways to manipulate equations all helped with this.

I also became more comfortable with difficult problems. At the beginning, if I saw a problem that I could not solve right away, I was more likely to think that I did not know how to do it. During the program, I became more willing to spend time trying different approaches. I learned that getting stuck is normal, especially when working on competition problems. Sometimes the solution only becomes clear after trying a few things that do not work. I think this will help me a lot when I start working on harder competition problems during the school year.

Overall, I am very glad that I took part in the program. It was challenging, and there were definitely times when the work was difficult, but I also enjoyed learning things that I would not normally learn in a regular math class. I learned new mathematical techniques, improved my problem-solving skills, and became more comfortable with challenging problems. Most importantly, I learned that being good at math is not only about knowing a lot of concepts and formulas. It is also about knowing how to use them in creative ways. I plan to keep practicing these techniques and working on competition problems during the school year so that I can continue to improve. I am very thankful to the Garwin Family Foundation for giving me the opportunity to participate in this program and supporting my interest in mathematics.