

Thoughts on High School Math
by Stan Reeves

Homeschooling at the high-school level is a challenging undertaking. Our students are often studying material we never studied or never really understood or studied 30 years ago and recall slightly less than perfectly. Responding to this challenge is difficult. That's especially true in the area of advanced math, where many of us are particularly weak...or deathly afraid! If we don't know of any good options or don't consider advanced math to be that important, we may be tempted to direct them to an easier course of study or to stop short of their ability.

First, I'd like you to know that there are some good options. There are several opportunities locally each year to participate in high school math courses for homeschool students. There are also self-study and online options such as Chalkdust, Alecks, Math-U-See, and Patrick Henry Academy.

Second, I'm convinced that advanced math in high school is important for more than the relatively few who will pursue technically oriented degrees. (Full disclosure: I'm an engineering professor at Auburn University.) I'd like to address the importance of advanced math in more detail.

1. Advanced high school math opens doors of opportunity.

Studies have shown that students who complete a course in math beyond Algebra 2 go to college at much higher rates and are more likely to complete a college degree. In a recent conversation with the Dean of Engineering at Auburn University, he told me that the single best predictor of college success in engineering – better than GPA or ACT scores – was whether the student had taken AP Calculus. AP Calculus study can lead directly to college credit and can help students find this challenging subject much easier when they see it again in college.

Earning power after college is also affected by the level of mathematics studied. According to the National Association of Colleges and Employers, every one of the top ten majors in starting salary is a technical field, where starting salaries range from \$54,000 to \$86,000. Higher-level math courses correlate strongly to earning potential. Even non-technical majors increasingly require math skills. Our world has become more quantitative and digitized. Small business owners, teachers, managers, health providers, and office administrators, to name just a few, need to be both competent and confident in thinking mathematically. Higher-level math courses can help make that happen.

2. Advanced high-school math sharpens the mind in ways other subjects don't.

Math moves students beyond memorization and trains them to think deeply, logically, and systematically. It teaches them how to tackle problems in which the solution isn't immediately obvious. And it gives them the confidence that they can do it successfully. It teaches them to work methodically through challenging issues. Those who discipline

their minds with math are better equipped to identify and analyze patterns, to see relationships, and to connect the abstract world of thought to the concrete physical world. Even if your student is not called to be an engineer or mathematician, these thinking skills will discipline his mind and prepare him to use it well throughout life. Your student has made a good beginning when she can add fractions and solve basic algebra problems. But the challenges need to grow with her intellectual capacity if she is to continue to grow these thinking skills.

3. Advanced high-school math can be part of building and living out a deeper Christian worldview.

God has blessed us with the privilege of bearing his image and ruling and subduing the earth on his behalf. Because of this, he has graciously equipped us with abstract tools and concepts to grasp the concrete stuff of the seemingly messy material world. We can see the moon orbiting the earth and then describe that with equations. Not only that, we can then use the same basic equations to predict how to put a satellite into orbit and make it stay there. As a result, we have ruled and subdued directions with GPS and distances with international telephone calls. Math helps us to carry out our role and display God's image.

Higher-level math and calculus in particular are great cultural achievements. They address some important philosophical questions and provide us with practical tools to solve real-world problems. Understanding these achievements allows us to see God's hand working out the ruling and subduing process in history. More importantly, it gives us a small glimpse into the creativity, complexity, and beauty of God's mind. Those who know advanced algebra, trigonometry, and calculus have an opportunity to praise God in specific ways that others are not equipped to do.

For all these reasons, the hard work of higher-level math study is well worth the effort.

May the Lord bless and direct your homeschooling efforts.

Stan Reeves