

Maths has always played a huge part in our functioning as a species and society. What was once a simple way to ensure you had enough sheep for the harvest in the winter has truly blossomed to cover just about every aspect of day to day life you can think of. Your phone? Thank mathematicians. Your house? Thank mathematicians. The very streets and roads we drive and walk on respectively every day? You get the gist. Weather maths was your forte at school or not, it goes without saying that doing funny stuff with numbers is a massive factor in the lives and hopeful or present careers of millions across the globe, and I am no different.

As of writing this essay for the competition, I am studying A level maths at Carmel College currently, having joined last year in August. So far I have to say I have found my studies in maths to be quite enjoyable, some topics have very much so caught my attention as particularly interesting. One such topic which I have always felt quite intrigued about is that of Trigonometry.

It may seem a bit bizarre at first, of all the topics available in maths trigonometry was the one to pique my interest the most? I never thought it would've been trigonometry either, when you have the deep complexities of calculus, the mental endurance test that is mechanics, or the fascinating world of wider geometry, the triangles won me over. I found more so it was the history and uses of trigonometry in many unexpected ways by mathematicians, engineers, geographers, etc. that really made the area stand out to me. Firstly, I'd like to bring your attention to the Pythagorean Theorem.

Being quite possibly the most well known example of trigonometry, the famous formula of $a^2 + b^2 = c^2$ has earned quite the reputation among the general populous. Ask any randomly selected person, even individuals who have not pursued maths, and chances are they will probably be able to identify this as "that thing with the triangles". As per some of the legend's accounts, one day Pythagoras, being extremely bored, has the bright idea to stare at the tiles on the palace floor. There he analysed the "right triangles" (half squares) that made up eagle square tile, and payed close attention to the squares surrounding the sides of said triangles. Later on, his theorem came to be. The squares of the 2 perpendicular sides, when added together, equal the square of the hypotenuse, or the angled side. If this legend is to be believed, through the power of sheer boredom, Pythagoras came up with one of the most revolutionary equations of modern human history, now being used in many a architectural field, engineering, etc. If that isn't admirable, I dont know what is.

But dont get me wrong, Pythagoras isn't the only thing about trigonometry which just makes sense, there are also the trigonometric ratio equations. Sine, cosine, and tangent. Commonly referred to as "sohcahtoa", these 3 act as tools to many different applications of triangles. Engineer needs to figure out what angle a wing must be on a plane to allow for flight? We have sine rule or alternatively cosine rule to keep you covered. What about the area? A few rearrangements of the formula and boom, the area is now yours to go crazy with to your hearts content. These 3 formulas also help me personally as they are heavily involved in my other A level subjects, namely physics.

Now, as undoubtedly exciting as this may seem, you may still believe it to be somewhat arbitrary. That's where, believe it or not, I'd have to disagree, and I'd li to just quickly highlight some of the areas in which trigonometry has applied itself in our day to day lives. Do you play video games? The very models you look at, be it character models, terrain assets or just about anything else you can name, they're up of "tris", which are in of themselves just small triangular segments that come together to make a bigger overall image or object. What about navigation? The map is based heavily off of trigonometry. Many ancient map creators such as Mercator used a method called "triangulation" to create the images of and projections of the world that would influence the very maps your phone and GPS systems use today. As a matter of fact, google maps uses the Mercator projection as their map. So, I think it's pretty clear to see, trigonometry has its effects felt everywhere across our lives. It's a bit more than just "overthinking with triangles".

I hope in this essay I've been able to highlight a few of the many reasons why I found trigonometry to be the most intriguing aspect of mathematics for me so far. Its history ranges from interesting to just plain funny at times, its applications can be found just about everywhere if you look hard enough, and it's safe to say our lives wouldn't quite be the same without the numerous mathematicians of days past.