

The true spirit of delight, the exaltation, the sense of being more than Man, which is the touchstone of the highest excellence, is to be found in mathematics as surely as in poetry.

~ Sir Bertrand Russell

Research Question

How does the professional application of mathematical thinking vary across fields?

Rationale & Scope

Next year, I will be entering a university programme in the sciences and I intend to complete my Bachelor's degree in mathematics. I will likely also pursue graduate studies in a related field. Mathematics has always fascinated me, and I believe it to be, at its heart, an aesthetic pursuit, contrary to the typical calculation-centered perception. I would like to explore this idea further and see how it might tangibly apply in my future career.

The structure I have in mind for this project is somewhat reminiscent of Simon Sinek's idea of the "[golden circle](#)". I will begin with *why*—that is, what fundamentally motivates me to study mathematics?—the answer being its beauty and elegance. Then I will explain *how* mathematics and its associated aesthetic ideas are applicable to such a variety of fields, and *how* important people have made some of these connections. Finally, I will look at *what* mathematical concepts are relevant in these fields from the perspective of practitioners. Although this final portion most directly answers my research question, I believe that the other two components are necessary to motivate the inquiry, and to ground the comparison between fields in my preferences.

At face value, the research question I have proposed is very broad. However, after performing some preliminary research, and based on my pre-existing interests, I plan to manage the scope by restricting my inquiry to specific fields of interest. In particular, I will focus the bulk of my efforts on the disciplines of [computer science](#), [physics](#), and [finance](#), all of which I am currently considering as career prospects.

Research Process

At this moment I have on my desk about ten books—a mix of mathematical history and biography—that will guide my research into mathematical aesthetics and the interdisciplinary contributions of inspiring figures. I will then support this information with a variety of other sources such as journal articles and videos. This covers the majority of the content for the "why" and "how" segments of the project.

The more difficult aspect to research, and the core of my inquiry, is that into the practical aspects of mathematical thinking. Some of this information can be found in books, but I believe it will be most useful to rely on published interviews with practitioners, whether in magazines or on video. However, I should remain wary that most interviewees—simply by virtue of being selected for an interview—are more successful than the average individual working in their field, and so their experience in mathematical thinking may not be that of the "typical" working professional. To address this, I can draw on information from job postings and from others familiar with the field in question.