## Mathematics EE SSG Presentation Reflection

The purpose of the presentation that accompanies this outline is to provide you, the Extended Essay writer, a sense of what is expected of a mathematics Extended Essay. Too often students choose to write a Math Extended Essay because they "really like math," without giving any thought to (a) what it means to write in the field of mathematics and (b) whether or not they are interested in developing their skill as writers of mathematics.

At the end of the presentation, you will be expected to write a brief reflection on one of the following reflection prompts and keep it (along with all other interim reflections) in the second sheet protector in your EE folder.

Reflection Prompt Options:

- Provide a brief account of the most interesting problem in mathematics that you have *earnestly* grappled with. In other words – don't try to impress anyone with mathematics well beyond your capacity for understanding. Rather, share a problem or question you've enjoyed considering that is within your reach.
- What was the most surprising or impactful realization you had as you walked through this mathematics SSG document? Does this realization make you more or less inclined to write a Math EE? Why?
- Consider the five skills presented as "primary source research" on page 3: data-gathering, visualization, abstraction, conjecturing, and proof. What experience do you have carrying out any of these? Which are you most interested in working to develop?

| **SSG Questions or Important Points** | **Notes** |
|---|---|
| <u>Overview</u><br>● Categories of Math Research<br>● Which of these categories resonates most with your interest in mathematics? | |
| <u>Choice of Topic</u><br>● What warnings are given in this section?<br>● The last two paragraphs before "Examples of Topics" are important. What do they mean to you as a writer of mathematics?<br>● What are the roles of "broad topics" and "focused topics"? | |
| <u>Treatment of the Topic</u><br>● You've done very little mathematical writing in your life as a student – which of these mathematical practices do you think will be easiest for you? Most difficult? | |
| <u>TotT: Research Methods</u><br>● What is a "primary source" in a Math EE?<br>● What is a "secondary source" in a Math EE?<br>● Is it necessary that a Math EE have both? | |
| <u>TotT: Writing the Essay</u><br>● Similar to above – you've written little mathematics so far. Which of these "mathematical communications" will be easiest for you? Most difficult? | |
| <u>Examples of Topics</u><br>● What three steps does the guide recommend for the development of every Math EE?<br>● By when should you have a topic? Research question? Approach? | |

**Outline of the Mathematics EE SSG Presentation:**

- Overview (5 minutes)
    - The first of these "categories," about the applicability of mathematics to solve problems is likely the clearest, most well defined, and easiest to write
    - The others are certainly possible to write, but we must take care that the Extended Essay contains mathematical reasoning and not just a narrative about mathematics
- Choice of Topic (10 minutes)
    - As above, the most obvious math EE topics come from the theory of mathematics itself, but this section makes it clear that it is possible to write Math EEs that reference math contained in other subject areas
        - With that said, it is very important that there be significant *mathematical reasoning* developed in your paper. Simply using a formula is not enough to make a Math EE
    - Be sure that your topic is neither trivial (can be answered quickly) nor too broad (can't be answered in 4000 words).
        - Note that trivial questions can often become fascinating research questions by continuing to ask questions and *wonder* about the "next natural question"
- Examples of Topics (3 minutes)
    - The main idea here, which applies in EVERY extended essay subject, is that your topic *must* be focused. Broad topics are simply inappropriate for extended essays and will always score poorly on the rubric.
- Treatment of the Topic (3 minutes)
    - The things listed here are examples of "mathematics being done"
    - When we talk about the fact that "math must be done" in the Math EE, we're not talking about multiplying, adding, and plugging into formulas…we're talking about these sorts of things – analysis, argument, modelling, and the statement of problems, postulates, and solutions
- Research Methods (5 minutes)
    - It is important to note that a good math EE will include both primary sources (the student carrying out data-gathering, visualization, conjecture, etc) as well as secondary sources (finding out how the work the student has done connects to the work done by others in the present and past in the field of mathematics
- Writing the Essay (5 minutes)
    - This section provides a clean sense of *what sort of writing* should be found in a Math EE. The importance of striking the right balance of symbols vs explanation can not be overstated.
- Examples of Topics (10 minutes)

    - Note the structure of the advice here – students are advised to have a topic, narrowed by a research question, and focused by an approach to the question. This is the type of structure that helps students avoid rambling in an EE.
- An important note on “double-dipping” (2 minutes)