

Constructive Use of Generative AI in the Mathematical Tripos

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AI is a powerful tool that readily provides answers to an incredible range of questions. It is here to stay and it seems likely that it will play an increasingly important role in your future, whether that be in academic research or beyond. Used constructively, AI has the potential to enhance your mathematical learning. However, as with all powerful machinery, you risk harming yourself if it's not handled with care.

This guidance document has two mutually supporting aims:

1. to protect the sustained independent thought through which you'll acquire a strong mathematical education; and
2. to help you, if you do decide to use AI, to find ways of using it critically, honestly and effectively to support and complement your mathematical studies.

These are not competing aims. Having your own mathematical knowledge, experience and judgement is crucial in helping you assess the relevance and correctness of AI output.

1 Scope and terminology

This document covers all parts of the Mathematical Tripos (Parts IA, IB, II and III). It was approved by the Faculty Board in October 2026 in response to a request from the General Board's Education Committee.

For this document, *GenAI* (or AI for short) means any system¹ that generates text, mathematics, computer code, images or other content in response to a user's request. This includes conversational large-language-model systems and generative functions embedded in search engines, editors and coding tools.

It is well established that students taking the Mathematical Tripos are not permitted to use AI in examinations or assessed work (such as CATAM or the Part III essay), unless the written instructions for that particular assessed component explicitly permit it. In particular, presenting work that is not yours as your own constitutes academic misconduct (see [2]).

The purpose of this document is to provide guidance on the use of AI in other personal study throughout the year, including supervision work for undergraduates. The same general principles apply to work on example sheets and for examples classes in Part III.

2 Guidance at a glance

The University permits appropriate use of AI for personal study, research and formative work. Used carefully, it can help you review material, test your understanding and explore mathematics beyond the course.

¹Familiar examples include ChatGPT, Claude, Microsoft Copilot, Google Gemini, DeepSeek and Qwen, though there are many other similar products.

The Faculty recognises that students are likely to be actively engaged in using and learning about AI in parallel with their studies and that some limited use of AI in relation to Tripos work may be appropriate. However it is also important that students are aware of various pitfalls associated with the use of AI. In particular, the benefit of working on example sheets comes from learning to solve hard mathematical problems for oneself. Therefore:

The use of AI for supervision work or examples classes is **strongly discouraged**, and should never occur without the prior agreement of the supervisor or instructor.

In more detail, the Faculty makes the following recommendations.

1. **Supervision work.** AI should not be used to generate, complete or rewrite work handed to a supervisor or instructor. They will be in a much better position to help you if they see what you can do genuinely by yourself. An incomplete attempt at a question—with the point of difficulty clearly identified—is much more educationally useful than a complete answer you did not produce or cannot explain.
2. **Supplement, not substitute.** AI should not displace lectures, lecture notes, books, engagement in supervisions or examples classes, and conversations with your fellow students.
3. **Responsibility.** Students remain responsible for every mathematical claim they make or use. They should be aware that AI can commonly produce incorrect or unsubstantiated information. Asking an AI system again, or asking a second system, does not constitute independent verification.

3 Why these limits matter

Needless to say, you will not have access to AI during any Tripos exam. Also, we're sure you already realise there's no point using AI to produce work that gives your supervisor, instructor or lecturer a misleading impression of your true understanding. However, the greater danger is that the AI itself makes you believe you know something when in fact you've not spent the time thinking deeply enough about it to be able to develop real understanding.

Mathematical judgement is both the goal and a prerequisite

Effective use of AI in mathematics requires the user to judge the relevance, correctness, level and context of its output. Developing precisely that judgement is one of the principal purposes of a mathematics education. Using AI to bypass the hard work of solving problems, whilst easier in the short run, prevents you from acquiring the very expertise you will later need both to work independently and to use such tools well, whatever the field. Developing an independent problem solving ability will not just help you with solving further problems, but will also make you more efficient at learning the new material covered in your lecture courses.

Using AI simply to 'check' an answer also requires care. Genuine checking means being able to justify each step independently, test it against examples and edge cases, or compare it with an authoritative source. The ability to decide for yourself whether an argument is logically sound, or identify where its weak points may lie, is a key goal of your education. You are giving up a lot if you hand this responsibility over to a machine.

The activity that feels easiest may teach least

Reading a clear solution or refining prompts can create a strong sense of familiarity. That feeling is not the same as being able to construct a proof, solve a new problem or recover a definition without assistance. Retrieval, unsuccessful approaches, revision and eventual correction are not wasted time: they are part of learning to do mathematics. Looking at an AI generated solution to a well-designed example sheet question risks forever losing the opportunity to discover the principle it was teaching.

AI can offer useful guidance to help you improve at many things beyond mathematics. You would not confuse reading its advice on improving your swimming stroke, or learning a musical instrument or a new language with actually practising those skills. Do not confuse it with actually doing mathematics either.

Tripos context is important

AI may not reliably know the current content, notation, conventions or expected level of a particular lecture course, even when some contextual material is supplied. It may use a later theorem that trivialises a question (when the whole purpose of the question was to show you why such a theorem is needed), change definitions, omit required detail or produce an argument at an inappropriate level. Lecture notes, example sheets, and the accompanying supervisions or classes remain authoritative.

4 Constructive study practices

4.1 Recapping a lecture

The following are some examples of good learning practices in reviewing a lecture.

- Close your notes and reconstruct the new definitions, theorem statements, proof structures, calculational strategies, examples and outstanding questions from your memory; then reopen your notes and mark any omissions or errors you made.
- Check your understanding of a proof or derivation. Useful questions to ask include: Where is each hypothesis used? What fails if one hypothesis is removed? Is the converse true? Is a partial converse true? What is the simplest non-trivial example or counterexample? Which earlier result is doing the main work in this proof?
- In applied mathematics, analogous useful questions include checking dimensions and considering limiting cases, sign conventions, assumptions and physical interpretation.

Productive uses of AI are likely to be ones that complement these good learning practices. Don't simply use AI to summarise the lecture. Instead you might use it to administer closed-book quizzes, to provide further practice problems, to fill *small* gaps in your understanding, or to provide additional motivation for a topic, concept or result. Always request the least revealing help, before returning to independent work.

4.2 Revisiting an example sheet *after* the supervision or examples class

If there is an example sheet question you did not have time to discuss with your supervisor or instructor, it could be instructive to ask AI the following (much as you would in a supervision):

- For questions you have already solved – was there a more efficient proof, or perhaps a simpler counterexample?
- For questions where you have been stuck for a long time – explain the approaches you have tried and then ask for a *small* hint that does not trivialise the problem. Never submit a bare problem to AI; state what has been tried and where the difficulty lies.
- What is the importance of this result or technique, and in what other contexts might it be useful?

4.3 Stretching beyond the course

Another potential use of AI is in helping you to explore material beyond your current courses. Good extensions grow from material you already understand, so it's important that you don't view such explorations as a replacement for understanding the foundations. For example, you could ask AI to:

- weaken a theorem's hypotheses and search for counterexamples;
- investigate converses and extremal cases;
- compute or visualise illuminating examples; or
- suggest a short reading project ending in a proof, calculation or exposition to be done yourself.

The output of your interactions with AI should be mathematics you're able to do for yourself, not merely an interesting conversation with a computer.

5 Safeguards against over-reliance

The responsibility for ensuring that any uses you make of AI are constructive, ultimately comes down to your own honesty and self-discipline. No guidance, suggested AI prompt or technical restriction can replace your own judgement. You should also not let the pressures of the Tripos impair that judgement. It may frequently be useful to check:

Is interaction with AI helping me recall, explain, write and test more mathematics when I'm *not* using it? Or is it simply helping me get through the work faster?

The former may be a sign that AI is helping you develop your own thinking, while the latter is probably a sign you are allowing the AI to do too much. You remain responsible for stepping back when the AI tool begins to do the mathematics for you.

Above all else, **the Faculty expects that students should be regularly solving unseen problems and explaining mathematics *without* any AI access.**

Further resources

1. University of Cambridge, [Artificial Intelligence: plagiarism and academic misconduct](#).
2. Faculty of Mathematics, [Guidelines on plagiarism and academic misconduct](#).
3. Faculty of Mathematics, [Study Skills in Mathematics](#).