MathPath 2025 Qualifying Test
Instructions

Do NOT start work on the problems until you have read the full instructions, viewable at
https://www.mathpath.org/apply/applynow/instructions#qualifyingtest

Encouragement
This Qualifying Test (QT) is intended to include problems and parts that vary significantly in difficulty level and that vary in the background knowledge necessary to solve them. We do not expect anyone to completely solve every problem! In fact, we regularly admit applicants who write down interesting ideas and partial answers, but who don't get that many problems completely correct.

Electronic calculations
Except where explicitly disallowed, you may use a calculator or computer to perform calculations you find tedious, but you must say so each time. For instance, if for some reason you decide you need to compute 1.234/2.345, you can write

$$1.234/2.345 = .5262 \text{ (calculator)}.$$

If you use a computer to do most of the work to get an answer (such as by trying every possibility), you won't get much credit, even if the answer is right. This holds true even if you wrote the program yourself.

Expectations for working
More details can be found online at: `http://www.mathpath.org/apply/applynow/instructions#expectations`

- The submission must be entirely your own work.

  - You may not ask for anyone to help you beyond the Author or the Admissions Director. They may authorize an exception, in which case you must indicate this exception on your Certification Form.

  - You may not ask anyone to proofread your solutions.

- External resources (including online resources) are NOT permitted.

  - You may not use AI, search engines, mathematical resources (including but not limited to textbooks, previous math assignments, online resources, Chat-GPT, AoPS, etc)

- Plagiarism is strictly prohibited.

Rules for writing up your answers
More details can be found online at: `http://www.mathpath.org/apply/applynow/instructions#formatting`

- Include your first and last name, page number of your solution, and problem number on the top of each sheet.
- You must start your response to each new problem on a new sheet. Many of the problems have several parts, which may be answered on the same sheet, but should be written up in order.
- You do not need to copy the statements of the problems into your solutions.
- **For Hand-Written Solutions:**

  - Write on standard 8.5×11 inch American letter paper (or international A4 paper).
  - You may use unruled (blank) paper, ruled paper, or grid paper. If you use ruled or grid paper, either use wide ruling or double space.
  - Your writing must be large, dark, and legible. For your final submission, use a pen with dark ink or a dark pencil.
  - Do not submit a paper with erasure smudges; instead, cross out mistakes neatly.

- **For Electronically-Written Solutions:**

  - You may write your solutions electronically, say with LaTeX or the mathematics equation editor within Microsoft Word.
  - Do not create a document with one of these mathematical typesetters if this means you will skimp on computation or on figures.

How to write well
More details can be found online at `www.mathpath.org/apply/applynow/instructions#writingwell`

You must justify your answers, even if the problem does not say "prove". Your solutions should show all the steps in your reasoning and in your computations. Do not provide only an outline and do not skip steps in your reasoning or computations.

If you have never written a proof before, don't worry! We don't assume you have written proofs before. Think of proof-writing as trying to convince a skeptical friend - but you only get one chance and they don't get to ask you any questions. You have to convince your friend (on the first try) that your mathematical conclusions are true and that your approach works.

The only time you do not have to provide justification (or proof) for your claims or solutions are if a problem specifically indicates that no proof is required. Make your written solutions visually appealing and easy to understand. Write it out in a sensible way so that the direction of your thoughts are clear.

How and Where to Submit

More details can be found online at `http://www.mathpath.org/apply/applynow/instructions#submit`

- The first page of your submission must be the signed and completed Certification Form.
- Submit a single PDF file with all solutions. Assuming your name is April Verser, name your file `Verser_April_QT.pdf` (last name, followed by first name, and QT separated by underscores). The file should be significantly less than 1GB in size (average solution document sizes are between 100-250 KB).
- If you scan your solutions into a single PDF file, make sure that the scan picks up all of the writing clearly, and has good margins, and no work is cut off during the scanning process.
- All problems should be submitted in order. Each new problem should start on a new page. You do not need to submit solutions for every problem. It is helpful if you include a blank page for those problems you intentionally skip so that we know this was intentional.
- Upload your file to the webform linked on our website at `http://www.mathpath.org/apply/applynow`
- MathPath strongly prefers electronic submission of all application materials. If hardcopies are needed for accessibility, please contact Admissions Director April Verser at april.verser@mathpath.org.