University of Toronto Mississauga

MAT392H5S: Ideas of Mathematics, winter 2019

First essay

Due dates.

- Be ready to explain the topic of your essay in one paragraph as an in-class assignment on Tuesday, January 22nd.
- Submit a complete draft in good shape on Tuesday Feburary 5th. Prepare 3–5 pages (counting references, not counting diagrams and graphics; about 1000–2000 words). Use LaTeX. Submit three hard copies (one for the TA and two for peer review) at the beginning of class. Also submit the .pdf and .tex files on UTORsubmit.
- Submit the final version on Monday February 25th. Submit one hard copy at the beginning of the tutorial. Also submit the .pdf and .tex files on UTORsubmit.

Topic/partner.

You may work individually or with a partner. Partners receive the same mark.

Bibliography.

- At least one of your sources must be from one of the following books, which are on reserve at the UTM library: "The Princeton Companion to Mathematics"; "What is Mathematics"; and "Mathematics: its Content, Methods, and Meaning".
- You may use at most three additional sources that have been published in print – books or articles, no theses.
- You may also use at most one Wikipedia page, of your choice; you may not use other internet courses. (Wikipedia can be useful for finding published sources.)
- Exceptions are allowed only with the instructor's permission.
- Record every source; see the examples on the LaTeX samplefile on the course website.

The essay.

- Your audience is your fellow students. You are trying to explain "what is [...]".
- Use your own voice. Make several iterations of thinking, rewriting in your own words, reorganizing.
- Include some important aspects of the topic. Include a helpful example.
- Include some rigorous math content: perhaps a precise definition/statement/example that is relevant; perhaps some logical reasoning. Also include some informal discussion, say, background/context/history/importance.
- These topics are wide. Try to grasp some of the big picture.
- When you encounter an unfamiliar concept or terminology, recognize that this is so; if you use it, do so with caution. You must stand behind what you write.
- Your mathematics will be marked according to the following criteria: clarity; correctness; depth; logic.
- Your writing will be marked according to the following criteria: clarity; voice; overall structure; grammar; sources and documentation; typesetting and LaTeX.

MAT392, Winter 2019 – Topics and References for Essay 1.

Main References

[CMM] A. D. Aleksandrov, A. N. Kolmogorov, and M. A. Lavrent'ev (Eds.). *Mathematics: its Content, Methods, and Meaning*. Translation editor S. H. Gould. Dover Publications, Inc., Mineola, NY, 1999. Note: this publication consists of three volumes combined into one book.

[WiM] Richard Courant and Herbert Robbins. *What is Mathematics?*, revised by Ian Stewart. Oxford University Press, Inc., New York, 1996.

[PCM] Timothy Gowers (Ed.), June Barrow-Green and Imre Leader (Assoc. Eds.). *The Princeton Companion to Mathematics*. Princeton University Press, Princeton, NJ, 2008.

Additional references for selected topics

[Cox] H. S. M. Coxeter. *Regular Polytopes*. Methuen & Co. Ltd., London, 1948.

[Crom] P. Cromwell. *Knots and Links*. Cambridge University Press, 2004.

[GV] W. J. Gilbert, and S. A. Vanstone. *An Introduction to Mathematical Thinking: Algebra and Number Systems*. Pearson Prentice Hall, 2005.

[Ste1] J. Stewart. *Calculus: Early Transcendentals*. 7th ed. Cengage Learning, 2012.

[Ste2] J. Stewart. *Multivariable Calculus*. 7th ed. Cengage Learning, 2012.