

MTH 140: Study Guide for Exam 1 Summer 2025



Instructions: Exam 1 is going to contain a mix of free response questions, fill in the blank and multiple choice questions. It will be given on Canvas and will be available for you to take any time from *Saturday June 21st 8am to Wednesday June 25th 11:59pm*. **You will have one try and a two hour window since entering the password.** You will be allowed to use your own filled in notes and your calculator.

In preparation for the exam, you may wish to do the following:

- Review the concepts learned in each section and as you go, **make a summary, formula sheet**. This will help you have all the things you need to remember in one place so you don't have to flip through your notes.
- Review the exercises used as examples during the lectures.
- Review problems from the homeworks.
- Go over this Study Guide and make sure all the concepts/formulas look familiar and you know when/how to use them.
- Finally, after you have studied, take the practice exam. This assignment is not required. It is there for you to use as practice after you have studied. Do not use the Practice as your only preparation for the Exam; use it as a study tool.

Please read the info posted in the Syllabus: Important exam policies:

- AI tools are strictly prohibited - any use of artificial intelligence assistance will result in academic dishonesty charges
- You may use your notes and course materials only
Two hours is not sufficient if you haven't studied and are trying to learn material during the exam - this is review time for concepts you should already understand
- Absolutely no make-ups or retakes - plan accordingly (however, your final exam score may replace your lowest or missed exam)
- Ensure you have a reliable internet connection before starting
- One attempt only - once you begin, that's your final submission

- You have a 5-day window to take each exam, but once you start, you cannot save and return later - you must complete it in one sitting
- Set aside dedicated time when you can focus for the full two hours without interruption. These exams are designed to assess your mastery of material you've already learned, not to teach you new concepts under time pressure.

Exam 1 will cover all of Chapter 1, the first two weeks of class material.

1. Section 1.1 - Graphs Basics and Definitions

- Know basic facts about graphs: list of vertices, edges, degree of vertices, connected graph, bridge, adjacent vertices/edges, paths, circuits. etc.
- Know how to convert a real world problem into a graph.

2. Section 1.2 - Euler Circuits and Paths

- Know what Euler circuit and Euler path are
- Know when a graph has an Euler circuit or Euler path (the two results about the degree of the vertices)
- Know how to find Euler circuit or path (either try and error or using Fleury's Algorithm)
- Euler's Sum of Degrees Theorem
- Eulerization and Semi-Eulerization (Know what are they and how to use them)

3. Section 1.3 - Hamiltonian Circuits and Paths

- Know what is a Hamilton circuit and Hamilton path and how to find them
- Complete graphs - what are they and their properties
- Brute Force Algorithm
- Nearest Neighbour Algorithm
- Repeated Nearest Neighbour Algorithm

4. Section 1.4 - Networks and Spanning Trees

- Know what a network and a tree is (including the 3 properties of a tree).
- Spanning Trees - what are they and how many spanning trees does a graph have.
- Kruskal's Algorithm - know how to apply it and get the minimum spanning trees