

MTH 140: Study Guide for Exam 1



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 during a few days window. **You will have one try and a two hour window.** You will be allowed to use your own formula sheet 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 as you study.
- 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 own formula sheet only
- Absolutely no make-ups or retakes - plan accordingly (however, your final exam score may replace your lowest or missed exam)
- One attempt only - once the proctor enters the password you begin and that's your final submission
- You will turn in the formula sheet and the work for the exam. I will be giving partial credit. So turn in work on the scratch paper the proctor will give you. Make sure to write the question number and the work corresponding to it. No partial credit will be given if there is no organized, legible work turned in for the problem.

Exam 1 will cover all of Chapter 1.

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