# MTH 4422 Final Exam Study Guide
### Spring 2023

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**Instructions.**    Answer the following questions thoroughly.

1. Explain how the derivative of $f(x)$ is computed numerically, using the Forward Difference Method.

2. Explain how the derivative of $f(x)$ is computed numerically, using the Central Difference Method.

3. Explain how Taylor's Series can be used to approximate derivatives of higher order. In particular, explain how the second derivative of a function $f(x)$ can be approximated.

4. Describe and explain Euler's Method (the "Bow and Arrow Method"), for solving a first order linear differential equation, using a geometric approach.

5. Describe and explain Euler's Method (the "Bow and Arrow Method"), for solving a first order linear differential equation, using the Taylor's Series approach.

6. Explain how a system of $n$ equations in $n$ variables is solved using forward elimination, maximal pivoting, and back substitution.