Assignment 1

Your Name

26 January 2023

`DELETE The instructions in the following block before submitting the assignment.`

NOTE: Please follow these instructions to create and submit your assignment. These instructions apply to all future assignments.

1. Make sure that you insert your name and the date on top of the document.
2. Create sections and subsections as appropriate.
3. Please show all steps in your work.
4. After completing the assignment, kint the document into **pdf**.
5. Use the following convention to name the Rmarkdown and the pdf files of your assignment:
   - **math426_math626_assignment_number_firstname_lastname.Rmd**
   - **math426_math626_assignment_number_firstname_lastname.pdf**
6. For example for the first assignment, the file names should be
   - **math426_math626_assignment_1_kourosh_zarringhalam.Rmd**
   - **math426_math626_assignment_1_kourosh_zarringhalam.pdf**
7. After completing the assignment, upload the assignment (*both Rmd and pdf files*) on blackboard as an attachments.

`END of block`

Question 1: State the fundamental theorem of invertible matrices. Use *Lists* to format the equivalent statements.

Question 2: Generate a code block and plot the function $y = x^2$ is red from -2 to 2. Make sure the code as well as the output are displayed in the pdf.

Question 3: Let $A \in \mathbb{R}^{m \times n}$ be an $m \times n$ matrix. 1. Show that $Range(A)$ is the space spanned by the columns of A. 1. Show that $dim\left(Null(A)\right) + dim\left(Range(A)\right) = n$. This is refered to as *Rank Theorem*.