Department of Mathematics and Natural Sciences

MAT120

Assignment 01

Total Marks: 20

Instructions:

1. Please rename your .ipynb file as Section_studentID_firstname. For instance, a student named Md Zahidul Islam Laku from section 08 with student ID 1612020 would rename his file as 08_1612020_zahidul.ipynb
2. It is advised, whatever IDE is used -be it Google Colab or Jupyter Notebook, to save the submission file as .ipynb to upload that accordingly.
3. Students should write their own script. If any indication of copying other's script is found, both the submission will be rejected.
4. Submission deadline is **August 12, 2023**.
5. Any submission after the deadline will **NOT** be graded.

Questions:

1. Plot the function $y = x^4 - 100x^2 + 10x - 2$ within the interval $[-8, 8]$ and make a comment on how many maxima and minima of the function may have within the given interval.
2. Find the minima and maxima of the same function within the following interval:
   $y = x^4 - 100x^2 + 10x - 2$ in the interval [-1,1].
   Hints: Solution of the first derivative may appear as complex roots though they are actually not. This is due to the limitation of using a symbolic library. Ignore imaginary part lower than 1×10^{-15} and take the absolute value of roots to make it real.
3. Find the minima maxima of the function $y = \sin(x)$ in the interval $[2\pi, 4\pi]$. Plot the function within the interval and identify the maxima and minima with a red star marker.