Name: _____

Date: _____

Collaborators:

(If applicable, the collaborators submit their individually written assignments together)

Question:	1	2	Total
Points:	40	25	65
Score:			

Instructor/grader comments:

1. Chebyshev polynomials is a particular form of *special functions* that are important in approximation theory and in numerical analysis in general.

Chebyshev polynomials (of the first kind) are defined as follows:

$$T_n(x) \equiv \cos\left(n \arccos x\right), \quad -1 \le x \le 1. \tag{1}$$

The polynomials are named after a mathematician Chebyshev. The letter T is used because of the alternative transliterations of the name Chebyshev as Tchebycheff or Tchebyshev.

Chebyshev polynomial $T_n(x)$ satisfy the following recurrence relations:

$$T_{n+1}(x) = 2x T_n(x) - T_{n-1}(x), \quad n = 1, 2, \dots; \quad T_0(x) = 1, T_1(x) = x.$$
(2)

- (a) (15 points) Use jupyter notebook interface to write a function mycheb(n,x) that uses recurrence relations (2) to calculate the value of Chebyshev polynomial $T_n(x)$
- (b) (10 points) In the same notebook, use your function to plot, in one figure, the graphs of $T_1(x)$, $T_3(x)$, and $T_5(x)$. Provide the legend, grid, title, axes labels
- (c) (5 points) Clean the cells of your jupyter notebook. Save your jupyter notebook as a file named **chebplot.ipynb**. (Do not save your plot as a separate file.)
- (d) (10 points) Create a git repository for hw02. Check your notebook into the repository. Provide a meaningful commit message.

Gitlab

2. (25 points)

Create a gitlab project called **hw02** (name it exactly as shown).

Push the content of git repository you created in Problem 1 to gitlab hw02 project

On the gitlab side Create README.md file. Use markdown to write an inline and a displayed equations as well as some text that contains headers and uses regular, italic, and bold fonts.

Pull the README.md file to your local git repository

I have synchronized the contents of my local and remote repositories I created for hw02 assignment

Sign and date here:

Share the project with the instructor and grant him **Reporter** privileges.