

(updated: May 15, 2019) This is our first lab to introduce Matlab/ Octave.

1. Evaluate the following math expressions in Matlab/Octave

- $\tanh(e)$
- $\log_{10}(2)$
- $\text{Arg}(1 + i\sqrt{2})$
- $\arcsin(-1/2)$
- $123456 \bmod 789$
- $|i + 1|$

2. Find the built in functions in Matlab/Octave, and do the following

- Compute a Bessel function of the second kind
- Test the primality of 482023487
- Plot a vector field (Note: do not copy and paste examples you find online, but make your own based on the examples.)
- Report current date and time

3. (Generate vectors) Type in `vec = 1:8`, `vec1 = 1:2:8`, `v2 = 3:-0.5:1` respectively and see what you get. Find a command that gives you the row vector `5.6 5.4 5.2 ... 3.8 3.6 3.4`.

4. (Generate matrices) Generate some special matrices, find the built in functions in Matlab/Octave.

- a zero matrix of dimension 2×3 ;
- a matrix whose elements are all 1's, of dimension 100×30 ;
- a diagonal matrix of dimension 100×100 , whose diagonal elements are 1,2,..., 100;
- find the command for identity matrices, make an identity matrix of size 50000000×50000000 and record the time elapsed for your computer to output the result (mine was simply stuck);
- type in `magic(5)` and see what you get; type in `help magic` and paste what you see here.
- It would be wrong not to talk about sparse matrices when learning Matlab/Octave¹. Type in `A = sparse(1:4,8:-2:2,[2 3 5 7])` and `AA = full(A)`, copy and paste your results here. Then type `spy(A)` and `spy(AA)`. Include your images here.

¹before sparse matrices were introduced in 1993, Matlab was not quite considered a serious computing language