Numpy Cheat Sheet

- "Numpy" is a package which is a set of tools
- to import numpy:

```
import numpy as np
```

- 'np' is an alias, meaning that when you call the numpy package, you can just use "np" instead of typing "numpy" out
- a numpy array is an object
  - stores a grid of numbers
  - there can be 1D arrays or multi-dimensional arrays
  - 1D arrays look very similar to lists
- the reason why numpy arrays are different than lists is because in a numpy array, all of the elements must be the same data type (a float or an int)
  - this allows us to perform math on the entire numpy array
- numpy has built in functions that let you perform specific actions (like the one below)

```
np.mean(flow[0:4])
```

- how to make a numpy array:
  - you can just type one out
  - use np.ones
  - use np.zeros

```
# Typing out an array:
array = np.array([1, 2, 3]) # 1D array
array2 = np.array([1, 2, 3], [4, 5, 6]) # 2D array

# np.ones
array3 = np.ones(5) # 1D
array4 = np.ones((3, 4)) # 2D array with 3 rows and 4 columns of just ones

# np.zeros
array5 = np.zeros(4) # 1D
array6 = np.zeros((3, 4)) # 2D array with 3 rows and 4 columns of ones
```

- indexing np arrays:
  - same indexing [start:stop:step]
    - [row_start:row_start:row_step, col_start:col_stop:col_step]
  - the indexing is the same (start at 0)
- commonly used methods:
  - np.append() → add to an "empty" array (that's comprised of either ones or zeros)
  - np.mean() → find the mean
  - np.min() → find the minimum value in the array
  - np.max() → find the maximum value in the array
  - np.median() → find the median
- commonly used attributes:
  - array_name.shape → size in every dimension
  - array_name.ndim → number of dimensions
  - array_name.size → total number of elements
  - array_name.type → the data type of the array (int, float, etc)