Assignment 1 - numpy

Submit a Jupyter notebook with answers to the following questions. Avoid loops as much as possible. Use markdown cells when appropriate.

1. Find the sum of all numbers from 1 to 500
2. Find the sum of squares of all numbers from 1 to 10
3. Find the median of squares of all numbers from 1 to 100
4. Find the standard deviation of squares of all numbers from 1 to 100
5. Write a function to calculate the standard deviation of an array **without using** np.std.

   Reminder: this is the formula for standard deviation: $std = \sqrt{\dfrac{\sum\limits_{x}(x - mean(x))^2}{N}}$

6. Read this numpy article on broadcasting, and briefly explain broadcasting in your own words.
7. Let x = np.ones((10, 20, 30)). What is the shape of x.sum(axis=0), x.sum(axis=1) and x.sum(axis=2)?
8. Suppose y.shape is (a, b, c, …, z). What is the shape of y.sum(axis=i) for $0 \le i < 26$?
9. Suppose x is an array of shape (100, 10). Each row represents a student and each column represents an exam. Write numpy expressions that represent:
   a. The average grade of each student
   b. The average grade in each exam
10. The following table describes the grades of several students in several assignments in a course, as well as their final grade in the course. Find the weight of each assignment in the final grade (some grades are rounded).

	Grade 1	Grade 2	Grade 3	Final grade
Student 1	89	93	83	88
Student 2	100	86	78	86
Student 3	97	90	88	91
Student 4	83	99	100	96
Student 5	100	81	75	83