Problem set 1

1. Store the value 1 as a real number in a variable x, and the value 2 as a real number in a variable y. Calculate $x + y$ and store the result in z. Print the value of z in scientific notation and display the first 8 digits after the decimal point.

2. Print the value of $\sqrt{\pi}$ to 4 digits after the decimal point. Use `math.pi` for π.

3. Consider the following mathematical function

$$f(x) = \frac{\exp(x)}{(\cos(x))^3 + (\sin(x))^3}$$

   - Write a Python script which assigns as a value of $\pi/4$ to variable z, and then evaluates $f(z)$. Use `math.pi` for π.

4. Write a python script which computes the factorial of a number N. Compare the answer from your code using `math.factorial()`. Test your code using

   - $N = 7$
   - $N = 0$
   - $N = -2$

5. Given an integer $n > 0$, we wish to compute the value of z given by

$$z = \sum_{i=1}^{n} i^2.$$

   - Use an `if-else` conditional to check the value of n. If $n > 0$ and n is an integer, compute z, otherwise report an error using `raise` with either `TypeError()` if n is not an integer and `ValueError()` if n is an integer but it is $<= 0$.
   - Test your code using
     - n = 1 ($z = 1$)
     - n = 3 ($z = 1 + 4 + 9 = 14$)
     - n = 3.3 (Error)
     - n = -3 (Error)