HW 02 - turn in one week from today in Canvas

Turn in the 5 questions as a single .py file onto canvas. Use comments to clearly indicate which question you are working on. Your filename should end as _py2.py if you use Python2 and _py3.py if you use Python3.

1. The Fibonacci sequence is defined as

$$F_n = F_{n-1} + F_{n-2} \tag{1}$$

where n denotes the n^{th} item of the Fibonacci sequence. You are given the first three numbers of the Fibonacci sequence as F = [0, 1, 1]. Create a for loop to determine the next 20 numbers of the Fibonacci sequence. Print F with the final 23 numbers. Hint: use F.append() to add a new Fibonacci value to the end of the list F.

HW 02 - turn in one week from today in Canvas

2. Parentheses are used to preserve order of operations in Python. The following code will add x+y first, then raise to the power z. This value is assigned g.

   ```
   g = (x+y)**z
   ```

   Given the list x = [2.0,3.0,5.0,7.0,9.0], create a list $Y(x)$ for each float in x. Print the list Y.

$$Y(x) = \frac{(3.0x)^2}{(99x - x^3)} - \frac{1}{x} \tag{2}$$

HW 02 - turn in one week from today in Canvas

3. The general equation for the quadratic equation is

$$ax^2 + bx + c = 0 \tag{3}$$

where the solution is

$$x_0 = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \tag{4}$$

$$x_1 = \frac{-b - \sqrt{b^2 - 4ac}}{2a} \tag{5}$$

Create a function to solve the quadratic formula given a, b, c. Return x_0, x_1 with your function. Use your function to print the solution when $a = 3.3, b = 1.7, c = -9.4$.

HW 02 - turn in one week from today in Canvas

4. Use a loop to find the largest integer that when squared is less than 2000. Print the integer.
5. Create three separate functions. One function should calculate the volume (v), another to calculate the surface area (A), and another function to calculate the density (ρ) of a sphere. The input variable for these functions should be the radius r. With the density function, allow the mass m to be an optional variable that defaults to $m = 0.35$. Print the volume of a sphere with radius $r = 0.69$. Print the surface area of a sphere with radius $r = 0.4$. Print the density of a sphere with $r = 0.3$ and the default mass. Print the density of a sphere with $r = 0.25$ and $m = 2.0$.

$$v = \frac{4}{3}\pi r^3 \tag{6}$$

$$A = 4\pi r^2 \tag{7}$$

$$\rho = \frac{m}{v} \tag{8}$$