CS21 Assignment #2
Due Monday September 14th, by noon

Each script will go in a separate file. Please use the indicated filename for each program.

Be sure to include comments at the top of the program that include your name, class and a short description of the program. Use only the concepts covered in the class in all your assignments.

1. (cylinder.py) Prompt the user for the height and radius of the base of a cylinder. Your program will calculate and display the cylinder's surface area and volume. I am providing a sample run. Your program should display exactly the same output (for the same provided input).
   - Look at the number of digits after the decimal point.
   - Observe that the radius and height are not necessarily a whole number.
   - Declare PI as a named constant.
   - If you do not remember the formulas, a quick google search will help!

   ```
   What is the radius of the base of the cylinder? 2.5
   What is the height of the cylinder? 2.75
   The surface area of the cylinder is: 82.47
   The volume of the cylinder is: 54.00
   ```

2. (loans.py) Write a simple program that will ask the user for details for their loan and then report what their monthly payment will be, as well as the total amount paid for the loan and the total interest paid for the loan. The program should prompt the user for:
   - **Principal** – The amount of the loan
   - **APR -** The annual percentage interest rate for the loan
   - **Years -** The number of years it will take to pay off the loan (whole numbers only)

   The program will then calculate the monthly payments for the loan according to this calculation

   $$Monthly\ Payment = \frac{rate * principal}{1 - (1 + rate)^{-N}}$$

   Where:

   - rate – The interest rate per payment period. Please note that the rate is per monthly payment period, where we asked the user for the Annual Percentage Rate. Also note that percent means "per hundred."
     - Example: 6% APR => .06 annually => (.04 / 12) = .005 monthly rate
   - N – The total number of payments that will be made for the loan. Note: We asked the user for the length of the loan in years, but they are making payments every month.

   Additionally, the program should also display the total amount the user will end paying by the end of the loan period, and the total amount of interest that will be paid to the bank for the loan.

   Example output:

   ```
   How much would you like to borrow? 150000
   What is the interest rate (APR) of the loan? 3.4
   How many years will it take to pay off the loan? 30
   The monthly payments are $665.22
   The total amount paid is $239479.87
   ```

```
The total interest paid to the bank is $ 89479.87
```

For both programs:

It is expected that you will complete the same process of development that we walked through in class with the iPhone resale program. When you reach the point of having an algorithm (pseudocode), these steps will become the comments of your program as a starting point for writing code. Comment first, then code!

Any work you submit for this assignment should be authored entirely by yourself. Assistance is permitted from the instructor or teaching assistants only. All submitted programming assignments are subject to originality verification through software designed and used for the Measure Of Software Similarity (MOSS).