FANSHAWE
School of Applied
Science & Technology

NUMBER ANALYZER

PURPOSE

In this exercise, the Math library is explored and used. The user is prompted for a number group to analyze. The numbers in the number group are then analyzed one by one, and printed to the user in a formatted manner.

OBJECTIVES

After completing this exercise, you should be able to:

- Use the Math library to perform mathematical operations
- Iterate through a dictionary with values of type 'list'
- Format numbers when printed

PROCEDURE

PREPARE SUBMISSION FILE

1. Create a copy of the submission template called COMP6060**INIT**Lab9.docx where **INIT** is replaced with your own initials. So if your name is John Smith, the document will be called COMP6060**JS**Lab9.docx

PREPARE PYTHON FILE

1. Create a Python file called COMP6060**INIT**Lab9.py where **INIT** is replaced with your own initials. So if your name is John Smith, the document will be called COMP6060**JS**Lab9.py
2. Import the Math library
3. Print out the following to the console, replacing NAME with your name:
   ```
   Welcome to NAME's number analyzer!
   ```
4. Create the following dataset:
   ```
   dataset = { "radii": [5.5, 6.3],
               "angles": [56, 180, 320, 15, 90]
             }
   ```

Prompt User For Number

1. Print the following message:
   `Select a set of numbers to analyze:`
2. Create a counter variable to print the number group menu
3. Using a ranged for loop, iterate over the dataset **keys** and print them in a menu as follows (don't forget to increment the counter):
   `1: radii`
   `2: angles`
4. Use an empty `input()` function call to read an integer from the user (we will not worry about validating the input). Store this integer in a variable called `keyNum`

Calculate Circle and Sphere Area

1. If `keyNum` is 1:
   a. Iterate through every number in the array of `dataset["radii"]`. For every element in the array
      i. Calculate the circle area, and print to the console (see screenshots below). Ensure to format accordingly. Use the following formula:
      $$A = \pi r^2$$
      ii. Calculate the sphere volume, and print to the console (see screenshots below). Ensure to format accordingly. Use the following formula:
      $$V = \frac{4}{3}\pi r^3$$

Calculate Angle Sine and Cosine

1. Otherwise, if `keyNum` is 2:
   a. Iterate through every number in the array of `dataset["angles"]`. For every element in the array:
      i. Calculate the sin value, and print to the console (see screenshots below). Ensure to format accordingly.
      ii. Calculate the cos value, and print to the console (see screenshots below). Ensure to format accordingly.

Handle Incorrect Number

1. Otherwise, if the number is not 1 or 2, print the following message and exit:
   `Invalid number… exiting`

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EXPECTED RESULTS

RADII

```
Welcome to Lynn's number analyzer!
Select a set of numbers to analyze:
1: radii
2: angles
1
5.5 radius circle area = 95.033
5.5 radius sphere volume = 696.910

6.3 radius circle area = 124.690
6.3 radius sphere volume = 1047.394
```

ANGLES

```
Welcome to Lynn's number analyzer!
Select a set of numbers to analyze:
1: radii
2: angles
2
56° sin = -0.52
56° cosine = 0.85

180° sin = -0.80
180° cosine = -0.60

320° sin = -0.43
320° cosine = 0.90

15° sin = 0.65
15° cosine = -0.76

90° sin = 0.89
90° cosine = -0.45
```

INVALID NUMBER

```
Welcome to Lynn's number analyzer!
Select a set of numbers to analyze:
1: radii
2: angles
3
Invalid number.. exiting
```

Note: Copy this symbol: ° to use when printing the angles

Show results to Instructor.

Student Name: _____ Instructor: _____

Date: _____