PYTHON WORKING QUESTIONS

The document below may help you to solve these questions:
https://numpy.org/devdocs/user/absolute_beginners.html

1 . Check if "Python" is in "Python is great!". *(with the help of "in" operator)*

2 . Check if "123" is in the given list (21, 33, 123, -45, 1, 14, 18)". *(with the help of "in" operator)*

3 . Get the last word "great" from "Python is great!"

4 . Do the following calculation at the Python command prompt:

$e^2 \sin(\pi/6) + \log_e(3) \cos(\pi/9) - 5^3$

5 . Verify that $\sin^2(x)+\cos^2(x) = 1$ for $x = \pi, \pi/2, \pi/4, \pi/6$

6 . Create an array of angles between (and including) 0 and 2π radians in increments of π/2 radians.

(a) Calculate the sine of each angle in the array
(b) Calculate the cosine of each angle in the array
(c) Convert each angle in the array to degrees

7 . Create a NumPy array called A and store the values 5, 8, -8, 99, and 0 in array A in a single row, five columns. Reshape A to an array with one column and 5 rows.

8 . Create the two arrays below and perform each calculation.

```
a =[2 4 6], b =[-1 0 1]
```

(a) 1.5a−2b
(b) 0.5ab

9 . The 1D NumPy array B is defined below.

```
G = np.array([5, -4.7, 99, 50, 6, -1, 0, 50, -78, 27, 10])
```

(a) Select all of the positive numbers in `G` and store them in `x`.
(b) Select all the numbers in `G` between `0` and `30` and store them in `y`.
(c) Select all of the numbers in `G` that are either less than `-50` or greater than `50` and store them in `z`.

10 . Define an integer `c` which is a random integer between `100` and `999` (including `100` and `999`)

(a) pull the first digit out of `c` and assign it to the variable `x`
(b) pull the second digit out of `c` and assign it to the variable `y`

11 . Convert the given list (data type) to an array data type.

```
l = [12.23, 13.32, 100, 36.32] #data type is list
```

12 . Write a NumPy program to create a 3x3 matrix with values ranging from 2 to 10.

13 . Write a NumPy program to create a null vector of size 10 and update the sixth value to 11. (*with the help Numpy "zero" function)*

[0. 0. 0. 0. 0. 0. 0. 0. 0. 0.]

Update sixth value to 11

[0. 0. 0. 0. 0. 0. 11. 0. 0. 0.]

14 . Write a NumPy program to reverse an array (the first element becomes the last).

Original array:
[12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37]

Reverse array:

[37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12]

15 . Write a NumPy program to create a 2D array with 1 on the border and 0 inside.

16 . Write a NumPy program to create an 8x8 matrix and fill it with a checkerboard pattern.

```
Checkerboard pattern:
[[0 1 0 1 0 1 0 1]
 [1 0 1 0 1 0 1 0]
 [0 1 0 1 0 1 0 1]
 [1 0 1 0 1 0 1 0]
 [0 1 0 1 0 1 0 1]
 [1 0 1 0 1 0 1 0]
 [0 1 0 1 0 1 0 1]
 [1 0 1 0 1 0 1 0]]
```

17 . Use the system of linear equations below to calculate the values of x and y. *(with the help of the "inv" and "dot" functions of Numpy)*

$4x-2y=-42$

$-6x+y=31$

18 . By using Python functions solve the following equations: *(with the help of the "solve" function of Numpy)*

$$\begin{aligned} 3x_1 - x_2 + 4x_3 &= 2, \\ 17x_1 + 2x_2 + x_3 &= 14, \\ x_1 + 12x_2 - 7z &= 54. \end{aligned}$$

19 . Plot the following three functions on the same set of axes. Use a different color line for each function.

x=cos(t)
y=cos(t/2)
z=12cos(t)
Set values of t=−4π to 4π

20 . Use a for loop to print out all the numbers 1 to 30, but leave out any number that is divisible by 5, such as 5, 10, and 15.

21 . Write a program that requests a word from a user and then counts the number of vowels in the word. The English vowels are a, e, i, o, u, y. Hint: the code 'a' in ['a','e','i','o','u','y'] and 'a' in 'aeiouy' both return True.

22 . Create a for loop to print out all the letters in the word `'love'`