This quiz has 3 problems

Code 1 [8%]

Write a Fortran program that reads a real kind=8 number ***z*** from the user's keyboard entry and out put the value of ***g***;

$$g = \frac{(z^2-1)^{4\sin z}}{\ln(z-1)-a}$$

Where ***a*** is the expression:

$$a = \frac{1}{1+15z^3}$$

Note that `ln` refers to the *natural* logarithm

Code 2 [11%]

Write a Fortran program to:

1- take three 5–element (in the form of real kind=4 numbers) vectors from keyboard entry. Note that each of the vectors must have exactly 5 elements (For example: if a 7-element vector is entered, your code should read the first 5 elements, and if less than five elements entered, your code should assign zero to the rest of the elements. Note that if read command spouse to read 5 elements and you enter less, it will not proceed till you enter the fifth comma. See the hint below). Prior to each vector entry, your code should print the following text on the screen:
`input a vector with exactly 5 elements of numbers (comma separated)`

2- Make a matrix which columns are the vectors entered respectively in the above step (Now, you should have a 5x3 matrix).

3- Display your matrix following the below massage on the screen:
`The entered vectors make the below 5x3 matrix:`

4- Calculate the average value of each raw of the above matrix respectively, and print the values on the screen following the below message:
`The average values of each raw of the matrix respectively are`

Hint: the screen snapshot for an example is provided below as your reference:

```
input a vector with exactly 5 elements of numbers (comma separated)
1,2,3,,,
 input a vector with exactly 5 elements of numbers (comma separated)
6,7,8,9,10,10.2,10.3
 input a vector with exactly 5 elements of numbers (comma separated)
11,12,13,14,15
 The entered vectors make the below 5x3 matrix:
   1.00000000       6.00000000       11.0000000
   2.00000000       7.00000000       12.0000000
   3.00000000       8.00000000       13.0000000
   0.00000000       9.00000000       14.0000000
   0.00000000       10.0000000       15.0000000
 The average values of each entered vector respectively are:
6.00000000       7.00000000       8.00000000       7.66666651       8.33333302
```

Code 3 [11%]

Write a Fortran program to:

1- Reads an integer kind=4 number from the user's keyboard entry, checks if the number is in $0< z < 6$ range, then proceeds if the number is in the range or stops if it is out of range.

2- Creates a 10x10 matrix, ***M***, which elements expression is

$$M_{i,j} = (i + j)^z$$

3- Checks if any elements of the matrix is more than 10^6, if so change that element to 99999.

4- Print the matrix following the below message on the screen

`The below 10x10 matrix is created based on your entry`

Hint: the screen snapshot for an example is provided below as your reference:

```
input an integer entry

4

 The below 10x10 matrix is created based on your entry
          16          81         256         625        1296        2401        4096        6561       10000       14641
          81         256         625        1296        2401        4096        6561       10000       14641       20736
         256         625        1296        2401        4096        6561       10000       14641       20736       28561
         625        1296        2401        4096        6561       10000       14641       20736       28561       38416
        1296        2401        4096        6561       10000       14641       20736       28561       38416       50625
        2401        4096        6561       10000       14641       20736       28561       38416       50625       65536
        4096        6561       10000       14641       20736       28561       38416       50625       65536       83521
        6561       10000       14641       20736       28561       38416       50625       65536       83521      104976
       10000       14641       20736       28561       38416       50625       65536       83521      104976      130321
       14641       20736       28561       38416       50625       65536       83521      104976      130321      160000
```