Programming

Python code: In programming, there are two kinds of errors: syntax and logical errors. Syntax errors are typos that make your code un-runnable. Logical errors are when the program runs, but does not produce the expected output.

1) Please review the Python 3 code snippet below. In this snippet, there are two syntax errors and two logical errors. For your answer, please describe all four issues you found and submit a fixed code snippet that will make running the program run as expected. Print out the correct average of the two numbers that are inputted by the user.

```
### average.py

def find_average(a, b)
    ''' find_average will return the average of both a and b, which are floats '''
    return x + y / 2

x = float( input("Please enter a number: ") )
y = float( input("Please enter another number: ") )
average = find_average(x y)
print(average)
```

Math

1) Probability: Given a standard deck of cards, you draw a single card. What is the probability of drawing a 6 or a diamond?

2) Linear Algebra: What is the determinant of the following matrix?

A = [[1,4,3],
[3,7,1],
[2,0,3]]

3) Find a solution to the following linear equation using any method you feel most comfortable with and show all of your work.

4x - 4y + 5z = -34
6x - y = -6
-2x + 2y - 3z = 19

4) Calculus: Integrate x / (x^2 + 1) dx using substitution. Please show all of your work.

SQL

1) What are the different types of SQL statements? Explain and provide one example.

2) Use the Employee Table below to answer questions a and b.

Employee Table

Employee ID	Employee Name	Department	Salary
1	Mary	Support	50000
2	John	Sales	70000
3	Mark	Operations	65000
4	Susanne	Support	50000
5	Michelle	Support	55000
6	Ed	Sales	75000
7	George	Operations	68000
8	Charlotte	Operations	78000
9	Patrick	Sales	76000
10	Bryan	Sales	80000

a) Write a SQL query to fetch the record with second highest salary.

b) Write a SQL query to fetch the average salary of each department.

3) Explain the different types of joins and provide an example of at least one join type.

R

1) Use the Student Data table below to answer questions a and b.

Student Data

Name	Courses
Adam	Math, Physics, Chemistry
Peter	English, History, Sociology
Julia	Physics, Botany, Chemistry
Ron	Chemistry, Physics, Biology

a) Create a name list for the student data. Add a new row with the data given below:

Name	Courses
Stephanie	Math, Geography, Chemistry

b) Add a new column with these values:
Total_Score < - c(90, 65, 80, 75, 85)

2) Write a function in R that takes a word and checks whether the word is a palindrome or not. Returning True if the input word is a palindrome and returning False if it is not.
(Note: Palindromes are words that read the same backwards as they do forward, e.g. civic, level)

3) Write an R function that will take two words to check whether they are the same word or not. The checking is case insensitive. So “Hello” and “hello” will return true.