```
ogram
mport math
mport random
mport os.
mport os
import sys
import statistics as stats
from pathlib import Path
print("\n --- MATH & RANDOM ---")
print("sqrt(5) =", math.sqrt(5))
print("radians(30) =", math.radians(30))
print("random() in [0,1) =", random.random())
print("randint(2,6) =", random.randint(2,6)) # inclusive
print("pi =", math.pi)
print("ceil(2.3) =", math.ceil(2.3))
print("floor(2.3) =", math.floor(2.3))
print("factorial(5) =", math.factorial(5))
print("[redacted]c gcd(5,15) =", math.gcd(5,15))
print("abs(-10) =", abs(-10))
print("pow(3,5) =", pow(3,5))
print("log base 3 of 2 =", math.log(2,3))
a_val = 100
print(f"log10({a_val}) =", math.log10(a_val))
inf_val = float('inf')
nan_val = float('nan')
```

20-8-25

Task 3 : Importing and creating Python modules and packages in Python program

Aim: To implement and demonstrate the process of importing built-in modules, creating user-defined modules, and organizing code into package in Python, thereby promoting code

3.1

1) perform common math and random operations
2) compute basic statistics.

Algorithm

1) Import required modules: math, random, os, sys, statistics, pathlib
2) math and random
compute sqrt(5) radians (30), a random float in [0,0,1.0];
a random integer in [2,6] (inclusive), π; ceil(2,3)
floor (2.3),
factorial (5), gcd (8,15), abs(-10), pow(3,5), log 3of2.
3) os & sys:
-create c: pythonlab If not present and print the current working directory
-create c: pythonslot 5224 If not present and change the current working directory to it.
→ Print python interpreter version.

```
int (f" isinf (∞) = {math.isinf (inf_val)}, isnan
(NaN) = {math.isnan (nan_val)}").
print ("\n ---os & sys---")
path_pythonlab = path (r"c:\pythonlab")
path_pythonlab.mkdir (parents = True, exist_ok =
                                        True)
print (f"created/ensured: {path_pythonlab}")
print ("current working directory:", os.getcwd())
target_dir = path (r"c:\pythonslot 5214")
target_dir.mkdir (parents = True, exist_ok = True)
os.chdir (target_dir)
print (f"changed into: {target_dir}")
print ("Directory contents:", os.listdir()).
print ("python version:", sys.version)
print ("\n -- STATISTICS ---")
data1 = [5, 6, 8, 10]
data 2 = [2, 5, 3, 2, 8, 3, 9, 4, 2, 5, 6]
print (f'mean ({data 1}) =", stats, mean (data 1))
print (f'median ({data 1}) =", stats.median (data 1))
print (f' mode ({data 2}) =", stats. mode (data 2))
print (f"stdev ({data 2}) =", stats.stdv (data 2))
```

4. Statistics.

- on lists [8,6,8,10] and [2,8,3,2,8,3,9,4,2,5,6]
compute mean, median, mode, stdev

5. Print neatly formatted result.

Expected sample output

--- Math & Random ---

sqrt(9) = 2.23606797749979

radians(30) = 0.5235987755982988

random() in [0,1) = 0.37444887175646646

randint(2,6) = 6

Pi = 3.14159265

ceil(2.3) = 3

floor(2.3) = 2

factorial(5) = 120

gcd(5,15) = 5

abs(-10) = 10

pow(3,5) = 243

log base 3 of 2 = 0.630929

log10(100) = 2.0

isinf(∞) = True, isnan(NaN) = True

-- OS & SYS --

created/ensured: C:\Pythonlab

current working directory: C:\...

created/ensured & changed into: C:\Pythonslot

Python version: 3.x.x (...details...)

-- STATISTICS --

mean([5,6,8,10]) = 7.25

median([5,6,8,10]) = 7.0

mode([2,5,3,2,8,3,9,4,2,5,6]) = 2

stdev([2,5,3,2,8,3,9,4,2,5,6]) = 2.21563382 20

Result: Hence the implement and Demonstrate of importing built-in modules is done successfully.

output:

RESTART

C:\Users\student.MAT2VC68331\AppData\Programs\Python\Python311\Lib\site-packages\cardpack\mymod.py

[5, 24, 13, 22, 20, 41, 38, 51, 4, 7, 34, 49, 14, 50, 37, 40
15, 17, 18, 33, 39, 36, 42, 12, 6, 16, 19, 48, 29, 2, 27
11, 31, 46, 28, 21, 32, 8, 25, 30, 23, 26, 10, 43, 47, 3
44, 52, 1, 45, 9].

Task 3.2

Aim: To create a python package named cardPack containing a module card Fun that imports the random module

Algorithm:

1. Start
2. To create a package cardPack
3. To create a module cardFun and import random function
4. Assign a cards range
5. call a module function
6. Display the random sample cards Step 7: Stop

Program:

```
import random
def func():
cards = []
for i in range(1,53):
 cards.append(i)
shuffled_cards = random.sample(cards, k=52)
print("\n\n", shuffled_cards, "\n\n").
```

my.mod.py

```
import cardFun
cardFun.func()
```

Result: Hence the python. named card pack containing a module card Fun is Done

Task 3.3

Aim: To get developing a modular calculator application in python. The calculator should support basic arithmetic operations: addition subtraction, multiplication, and Division. each operation should be implemented in a separate module.

Algorithm

1. Define function for addition, subtraction, mult and division
2. Handle Division by zero by raising an error If the divisor is zero
3. Import the module containing these function
4. Initialize two numbers (a=10, b=5).
5. call each function using mymath.<function_name> (a,b).
6. Print the result of all operations.

program

```
def add (a,b):
return a+b
def subtract (a,b):
 return a-b
 def multiply (a,b):
 return a* b
def divide (a,b):
   If b==0;
raise value Error ("cannot divide by zero")
return a/b.
```

output:

Restart: C:

addition : 15

subtraction: 5

multiplication: 50

Division : 2.0

```
import mymath
    a=10
    b=5
print("Additional:", mymath.add(a,b))
print("subtractor:", mymath.subtract(a,b))
print("multiplication:", mymath.multiply(a,b))
print("Division:", mymath.divide(a,b))
```

Result: Thus the Implementation modular calculator application in Python is done successfully.

Task 3.4

2116825

Aim: To work on a python project that requires you to perform various mathematical operation and geometric area calculation.

Algorithm:

1. create mathfunctions.py module.
2. create areafunctions.py module:
3. create main.py:
4. print the output as expected.

Program

1. create the mathfunction.py module

```
def add(a,b):
return a+b
def subtract(a,b):
return a-b
def multiply(a,b):
return a*b
def divided(a,b):
if b==0:
return "Error! Division by zero."
return a/b
```

2. create the areafunctions.py modult

```
import math
def circle_area(radius):
return math.pi * radius* radius.
```

output:

```
Restart: C:/Users/91979/Desktop
addition: 15
subtraction: 5
multiplication: 50
Division: 2.0
circle area: 153.93804002589985
Rectangle area (5*10): 50
Triangle Area (base=6, height=8): 24.0
```

```
def rectangle_area(length, width):
    return length * width

def triangle_area(base, height):
    return 0.5 * base * height
```

3. create the main.py file

```
import mathfunctions
import areafunctions
# using math function
print("Addition:", mathfunctions.add(10,5))
print("subtraction:", mathfunctions.subtract(10,5))
print("multiplication:", mathfunction.multiply(10,5))
print("Division:", mathfunctions.divide(10,5))
# using area functions
print("circle Area (radius=7):", areafunctions.circle
                                  _area(7))

print("Rectangle Area (5*10):", areafunction.rectangle_
      area(5,10)).
print("Triangle area (base=6, height=7):" areafunctions.
circle_area(7))
print("Rectangle Area (5*10):", areafunction.rectangle_
area(5,10))
print("Triangle area (b=6, h=8):" areafunction.triangle_area(6,8)
```

Result: Thus, the program for importing Python modules and packages was successfully executed and the output was verified

VEL TECH	
EX.NO.	3
PERFORMANCE (5)	5
RESULT AND ANALYSIS (5)	5
VIVA VOCE (5)	5
RECORD (5)	
TOTAL (20)	
SIGNATURE	5