```python
# PYTHON FUNCTIONS :
#! A function is a block of code which only runs when it is called.
#! We can pass data, known as parameters, into a function.
#! A function can return data as a result.

# Creating a Function => In Python a function is defined using the def
keyword.

def abc():                              # Definig a Function
    print("Hello! Coding Ideas")        # Function Body
abc()                                   # Calling a Function

# Output => Hello! Coding Ideas
```

```
Hello! Coding Ideas
```

```python
#Q - Define function named sum and print addition of any 2 numbers.
''' Solution: '''
def sum():
    print(10+20)
sum()

# Output => 30

#! OR
# Creating parameters in a function.
def sum(a,b):
    print(a+b)
sum(10, 20)

# Output => 30
```

```
30
30
```

```python
def sum(a, b):
    print(a+b)
sum(40, 50)
sum(100, 1200)
sum(30, -40)

# Advantages of functions:
#! Reducing duplication of code.
#! Decomposing complex problems into simpler pieces.
#! Improving clarity of the code.
#! Reuse of code.

def sum(a, b):
    print(a+b)
sum(40, 50)
sum(100, 1200)
```

```
sum(30, -40)
sum(100.25,22.8)
'''
Outputs =>
90
1300
-10
123.05
'''


90
1300
-10
123.05

' \nOutputs => \n90\n1300\n-10 \n123.05\n'

#Q - Define function named sub and print subtraction of any 2 numbers.
''' Solution: '''
def sub(a,b):
    print(a-b)
sub(10, 5)
sub(10, -5)
sub(-10,-20)
sub(-20,15)

'''
Outputs :
5
15
10
-35
'''

5
15
10
-35

' \nOutputs :\n5\n15\n10\n-35\n'

#Q - Define a function calculator and calculate all the mathematical
operators inside it.
def calculator(a, b):
    print("Addition: ",a+b)
    print("Subtraction: ",a-b)
    print("Multiplication: ",a*b)
    print("Division: ",a/b)
    print("Remainder: ",a%b)
    print("Floor Division: ",a//b)
```

```
    print("Exponention: ",a**b)
calculator(20,3)
```

```
Addition:  23
Subtraction:  17
Multiplication:  60
Division:  6.666666666666667
Remainder:  2
Floor Division:  6
Exponention:  8000
```

```
#Q - Define a function calculator and calculate all the mathematical
operators inside it in a presentable manner.
''' Solution: '''
def calculator():
    a = int(input("Enter a number: "))
    b = int(input("Enter second number: "))
    print("Addition :", a+b)
    print("Subtraction:", a-b)
    print("Multiplication :", a*b)
    print("Division :", a/b)
    print("Modulus :", a%b)
    print("Floor Division :", a//b)
    print("Power or Exponention :", a**b)
calculator()

'''
Output:
Enter a number: 20
Enter second number: 3
Addition : 23
Subtraction: 17
Multiplication : 60
Division : 6.666666666666667
Modulus : 2
Floor Division : 6
Power or Exponention : 8000
'''
```

```
Addition : 23
Subtraction: 17
Multiplication : 60
Division : 6.666666666666667
Modulus : 2
Floor Division : 6
Power or Exponention : 8000
```

```
' \nOutput:\nEnter a number: 20\nEnter second number: 3\nAddition :
23\nSubtraction: 17\nMultiplication : 60\nDivision :
6.666666666666667\nModulus : 2\nFloor Division : 6\nPower or
Exponention : 8000\n'
```

```python
#Q - Define a function and calculate Pythagoras Theorem.
''' Solution: '''
def pythagoras(base, height):
    hyp = (base**2 + height**2) ** (1/2)
    # hyp = (base*base + height*height) ** (1/2)
    print("Base: ",base)
    print("Height: ",height)
    print("Hypotenuse: ",hyp)
    print("------------------")   # Divider
pythagoras(3, 4)
pythagoras(5,12)
pythagoras(8,15)
```

```
Base:  3
Height:  4
Hypotenuse:  5.0
------------------
Base:  5
Height:  12
Hypotenuse:  13.0
------------------
Base:  8
Height:  15
Hypotenuse:  17.0
------------------
```

```python
#Q - Define a function and calculate the energy using the energy mass
equivalence formula.
''' Solution:
Method 1 :
'''
def energy():
    mass = float(input("Enter the mass (in Kg): "))
    c = 3*(10**8)                          # we can take 'speed of light
(c)' as user input.
    e = (mass*c*c)/1000000
    print("Mass in Kg = ", mass)
    print("Energy = ",e,"MJ")       # 1 MJ = 1000000 J
energy()
```

```
Mass in Kg =  20.0
Energy =  1800000000000.0 MJ
```

```python
# Method 2:
#! Take mass in Kg.
def energy(mass):
    c = 3*(10**8)   # Speed of light.
    e = (mass*c*c)/1000000
    print("Mass in Kg = ", mass)
    print("Energy = ",e,"MJ")
    print("------------------------------")     # Divider
```

```
energy(32)
energy(50)
energy(127)
energy(20)


# call by reference


def add_more(list):
      list.append(50)
      print("Inside Function", list)

# Driver's code
mylist = [10,20,30,40]

add_more(mylist)
print("Outside Function:", mylist)
```

```
Inside Function [10, 20, 30, 40, 50]
Outside Function: [10, 20, 30, 40, 50]
```