```
#1) Print all alphabets in upper case and in lower case.
import string

print("UPPER CASE:")
for letra in string.ascii_uppercase:
    print(letra, end=' ')
print("\n")


print("LOWER CASE:")
for letra in string.ascii_lowercase:
    print(letra, end=' ')
```

```
UPPER CASE:
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

LOWER CASE:
a b c d e f g h i j k l m n o p q r s t u v w x y z
```

```
#2) Print a multiplication table of a given number.

num = int(input("Enter a number to print a multiplication: "))

print(f"\nTable of {num}:")
for i in range(1, 11):
    print(f"{num} x {i} = {num * i}")
```

```
Enter a number to print a multiplication: 4

Table of 4:
4 x 1 = 4
4 x 2 = 8
4 x 3 = 12
4 x 4 = 16
4 x 5 = 20
4 x 6 = 24
4 x 7 = 28
4 x 8 = 32
4 x 9 = 36
4 x 10 = 40
```

```
#3) Count no. of alphabets and no. of digits in any given string.

texto = input("Enter a string: ")

cont_Let = 0
cont_Dig= 0


for caractere in texto:
    if caractere.isalpha():
        cont_Let += 1
    elif caractere.isdigit():
        cont_Dig += 1

print(f"Total Letters: {cont_Let}")
print(f"Total digits: {cont_Dig}")
```

```
Enter a string: celeste 2025
Total Letters: 7
Total digits: 4
```

```
#4) Check whether a given number is prime, is perfect, is Armstrong, is palindrome, is au


print("=== 4) Number Analysis ===")
n = int(input("Enter a number to analyze: "))
print(f"\nAnalysis of the number {n}:\n")


is_prime = True
if n <= 1:
    is_prime = False
else:
    for i in range(2, int(n**0.5) + 1):
        if n % i == 0:
            is_prime = False
            break
if is_prime:
    print("Is prime?        Yes")
else:
    print("Is prime?        No")


sum_divisors = 0
for i in range(1, n):
    if n % i == 0:
        sum_divisors += i
if sum_divisors == n:
    print("Is perfect?      Yes")
else:
    print("Is perfect?      No")


temp = n
sum_armstrong = 0
digit_count = len(str(n))
while temp > 0:
```

```
        digit = temp % 10
        sum_armstrong += digit ** digit_count
        temp //= 10
    if sum_armstrong == n:
        print("Is Armstrong?    Yes")
    else:
        print("Is Armstrong?    No")


    original = str(n)
    reversed_str = original[::-1]
    if original == reversed_str:
        print("Is palindrome?   Yes")
    else:
        print("Is palindrome?   No")


    square = n * n
    if str(square).endswith(str(n)):
        print("Is automorphic?  Yes")
    else:
        print("Is automorphic?  No")
```

```
=== 4) Number Analysis ===
Enter a number to analyze: 555

Analysis of the number 555:

Is prime?        No
Is perfect?      No
Is Armstrong?    No
Is palindrome?   Yes
Is automorphic?  No
```

```
#5) Generate all Pythagorean Triplets with side length <= 30.
print("\n=== 5) Pythagorean Triplets with sides ≤ 30 ===\n")

for a in range(1, 31):
    for b in range(a, 31):  # Avoid duplicates
        c_squared = a**2 + b**2
        c = int(c_squared ** 0.5)
        if c <= 30 and c * c == c_squared:
            print(f"{a}, {b}, {c}")
```

```
=== 5) Pythagorean Triplets with sides ≤ 30 ===

3, 4, 5
5, 12, 13
6, 8, 10
7, 24, 25
8, 15, 17
9, 12, 15
10, 24, 26
12, 16, 20
15, 20, 25
18, 24, 30
20, 21, 29
```

```
#6) Print 24 hours of day with suitable suffixes like AM, PM, Noon and Midnight.

print("===  24 Hours of the Day with Suffixes ===")

for hour in range(24):
    if hour == 0:
        print("12:00 AM - Midnight")
    elif hour == 12:
        print("12:00 PM - Noon")
    elif hour < 12:
        print(f"{hour}:00 AM")
    else:
        print(f"{hour - 12}:00 PM")
```

```
===  24 Hours of the Day with Suffixes ===
12:00 AM - Midnight
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM - Noon
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
```

```
#7) Print nCr and nPr.
import math


n = int(input("Enter value for n: "))
r = int(input("Enter value for r: "))


nCr = math.factorial(n) // (math.factorial(r) * math.factorial(n - r))


nPr = math.factorial(n) // math.factorial(n - r)


print(f"{n}C{r} = {nCr}")
print(f"{n}P{r} = {nPr}")
```

```
Enter value for n: 10
Enter value for r: 8
10C8 = 45
10P8 = 1814400
```

```
#8) Print factorial of a given number.
import math
num = int(input("Enter a number: "))
factorial = math.factorial(num)
print(f"The factorial of {num} is {factorial}")
```

```
Enter a number: 5
The factorial of 5 is 120
```

```
#9) Print N natural nos. in reverse.

N = int(input("Enter a number N: "))
for i in range(N, 0, -1):
    print(i, end=' ')
```

```
Enter a number N: 20
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
```

```
#10) Generate N numbers of Fibonacci series.
N = int(input("Enter a number N: "))
a, b = 0, 1
print("Fibonacci series:")
for _ in range(N):
    print(a, end=' ')
    a, b = b, a + b
```

```
Enter a number N: 10
Fibonacci series:
0 1 1 2 3 5 8 13 21 34
```

```
#11) Calculate sin(x); x is a radian value.
import math
x_deg = float(input("Enter value in degrees: "))
x = x_deg * math.pi / 180
sin_x = 0
terms = 10
for n in range(terms):
    term = ((-1) ** n) * (x ** (2 * n + 1)) / math.factorial(2 * n + 1)
    sin_x += term
print(f"sin({x_deg} degrees) = {sin_x}")
```

```
Enter value in degrees: 90
sin(90.0 degrees) = 1.0
```