Hard

1) Check if a number is an Armstrong number

```
num = 153
sum = 0
temp = num
while temp > 0:
    digit = temp % 10
    sum += digit ** 3
    temp //= 10
if num == sum:
    print(num, "is an armstrong number.")
else:
    print(num, "is not an armstrong number.")
```

2) Find the greatest common divisor (GCD) of two numbers ?

```
def gcd(a, b):
    while b:
        a, b = b, a % b
    return a

num1 = 48
num2 = 18
print("GCD of", num1, "and", num2, "is:", gcd(num1, num2))
```

3) Check if a number is a perfect number ?

```
def is_perfect(n):
    sum = 0
    for i in range(1, n):
        if n % i == 0:
            sum += i
    return sum == n
```

```
num = 6
if is_perfect(num):
    print(num, "is a perfect number")
else:
    print(num, "is a not a perfect number")
```

4) Find the sum of the first n natural numbers ?

```
n = 10
sum = n * (n+1) // 2
print("Sum of first", n, "natural number is:", sum)
```

5) Generate prime numbers between 1 and 100 ?

```
for num in range(2, 101):
    is_prime = True
    for i in range(2, int(num ** 0.5)+1):
        if num % i == 0:
            is_prime = False
            break
    if is_prime:
        print(num)
```

6) Print a right-angled triangle pattern using stars (*) ?

```
n=5
for i in range(1, n+1):
    print("* " * i)
```

7) Reverse a string without using built-in functions ?

```
s = "hello"
reversed_s = ""
for char in s:
    reversed_s = char + reversed_s
print("Reversed string:", reversed_s)
```

8) Check if a number is a palindrome?

```
num = 121
temp = num
reversed_num = 0
while temp > 0:
    digit = temp % 10
    reversed_num = reversed_num * 10 + digit
    temp //= 10
if num == reversed_num:
    print(num, "is a palindrome")
else:
    print(num, "is not a palindrome")
```

9) Print numbers in ascending and descending order?

```
n = 10
print("Ascending order:")
for i in range(1, n+1):
    print(i)
print("Descending order:")
for i in range(n, 0, -1):
    print(i)
```

10) Calculate the sum of squares of the first n natural numbers?

```
n = 10
sum = n * (n+1) * (2*n+1) // 6
print("Sum of squares of first", n, "natural numbers is:", sum)
```