TEST 1

1. The program generates *N* random integers in the range [–10; +10]. All the generated random numbers are multiplied by the constant $\pi = 3.14$. The count of random numbers *N* is given by user via keyboard. If *N* is even, the function sinus is applied to numbers. If *N* is odd, the function tangent is applied. Results are printed as a formatted text.
2. On a keyboard, the user types the times T = "SS:MM:HH" for *N* runners of a marathon. *Exceptions* are used to ensure the validity of inputs. The program should find the best time, the worst time and the average time. Results are printed as a formatted text.
3. In a string A, English sentences terminated by dots are saved. The program should compute the number of sentences and the number of substantives. Before each substantive, there is a term THE, A or AN. Results are printed as a formatted text.
4. In a file, there is a sequence of positive rational numbers separated by semicolons. Each number consists of the integral part, the dot and the decimal part. The file is opened, the string is read and the count of numbers is evaluated. If the count is bigger than 10, an arithmetic average is computed. In the opposite case, a geometric average is computed. Results are printed as a formatted text.
5. You are asked to comment what operations are performed by the following code:

```
import numpy as np

N = 3
A = np.zeros((N,N))
B = np.zeros(N)
for m in range(N):
  B[m] = np.random.randint(10)
  for n in range(N):
    A[m,n] = np.random.randint(-10, 10)
print(A)
print(B)

C = np.zeros(N)
for m in range(N):
  for n in range(N):
    C[m] += A[m,n]*B[n]
print(C)
```

What mathematical operation is performed by this code?