MATHEMATICS

Homework 5. Number Theory

In the questions 1, 2, 3 and 4 you have to choose one correct answer from the list, in the questions 5, 6 and 7 you have to give an answer.

Question 1. Find the residue of the number $4444^{7777} + 7777^{4444}$ modulo 5.

A 0

B 1

C 2

D 3

E 4

Question 2. Find the last digit of the number $1 \cdot 3 + 2 \cdot 4 + 3 \cdot 5 + ... + 2021 \cdot 2023$.

A 1

B 3

C 5

D 7

E 9

Question 3. Find the number of positive integers which are smaller than 96000 and are relatively prime to it.

A 9600;

B 12800;

C 19200;

D 25600;

E 30000.

Question 4. Find the residue of the number 19^{2023} modulo 12.

A 1

B 3

C 5

D 7

E 9

F 11

Question 5. Find the smallest natural x such that $29x \equiv 35 \pmod{53}$.

Question 6. Find the smallest natural number which gives remainder 2 modulo 3, remainder 1 modulo 5, remainder 3 modulo 7 and remainder 7 modulo 11.

Question 7. Find the smallest natural n such that the number $n^2 + 3n + 2$ gives remainder 30 modulo 45.