HOMEWORK 6
MATH-UA 0248-001 THEORY OF NUMBERS
due on Nov, 2, 2020

1. Determine all the primitive roots of the prime 17.

2. If $ab \equiv r \pmod{p}$, where r is a quadratic residue of the odd prime p, prove that a and b are both quadratic residues of p or both nonresidues mod p.

3. If a and b are both quadratic residues of the odd prime p or both nonresidues, show that the congruence $ax^2 \equiv b \pmod{p}$ has a solution. (Hint: multiply by a' with $aa' \equiv 1 \bmod p$).

4. Evaluate the following Legendre symbols:

   (a) $(\frac{71}{73})$;

   (b) $(\frac{3658}{12703})$ (Hint: $3658 = 2 \cdot 31 \cdot 39$ and 12703 is prime).