

**HOMEWORK II**  
**MATH-UA 0248-001 THEORY OF NUMBERS**

due on September, 22, 2017

1. Prove that the product of any three consecutive integers is divisible by 6.
2. Establish that if  $a$  is an odd integer, then  $24 \mid a(a^2 - 1)$  (Hint: prove that the square of an odd integer is of the form  $8k + 1$ ).
3. Use the Euclidean algorithm to compute  $\gcd(54321, 9876)$ .
4. Find one integer solution of the equation

$$62x + 34y = 2.$$

5. Find all integer solutions of the equation

$$15x + 33y = 7.$$

6. Find all integer solutions of the equation

$$19x + 99y = 3.$$