

HW 2

Due on Friday 02/09

Exercise 1. Find all the solutions in integers of $71x - 50y = 1$.

Exercise 2. If a and b are any positive integers > 2 , then prove that $2^a + 1$ is not divisible by $2^b - 1$.

Exercise 3. Show that if $G.C.D.(a, b) = 1$ then $G.C.D.(a + b, a^2 - a.b + b^2) = 1$ or 3 .

Exercise 4. Using congruences, show that 7 divides $(3^{2n+1} + 2^{n+2})$ for all $n \geq 1$.

Exercise 5. Find all the solutions of the congruence $x^2 + 4x + 2 \equiv 0 \pmod{7}$.

Exercise 6. Consider a polygon centered on the origin and that is regular with m sides (regular means that all the sides have same length). You can go in the counterclockwise direction and number all the vertices from 1 to m . Consider now a counterclockwise rotation (with center the origin) that brings the vertex 1 to the vertex $1 + k$, where k and m are coprime. Can you show that by iterating this same rotation you will visit all the vertices of the polygon?