Hw 7

Read chapter 16,17,18,19,20 of the textbook.
    You need to know:

- how to compute mod m.

- how to compute in Z_m

- the Euclidean algorithm

- how to solve a linear diophantine equation in two variables

- how to solve a linear congruence

Do the following problems from your textbook:

- p. 206: 16.1

- p. 215: 17.1

- p. 224: 18.1

- p.249 : 20.2 i)

- p. 271: 1,2,4

- p. 272: 7

. Do the following additional problems.

1. Compute (8*102+24) mod 5 , $(-11+6^5+(-1)^{20})$ mod 5, 8^{300} mod 7 and 6^{99} mod 7

2. Write down the addition and multiplication tables for Z_3 and Z_4.

3. Use problem 2 pag 271 to argue that the diophantine equation $x^2 - 7y^2 = 67$ has no solutions.

4. Let u_n be the nth Fibonacci number. Prove that for $n \geq 2$ the Euclidean algorithm takes exactly n-1 steps to compute (u_{n+1}, u_n) . Here a step is just one division with remainder, that is a line in the computation.

5. Is it possible to write 15 as an integer linear combination of 96 and 117? If it is find a and b in Z such that $96a + 117b = 15$. if it is not, explain why not.