Homework #8   MME 529

(1 and 2 are just for fun and nothing to do with Class #8 per se)

1. What is the prime factorization of 1,005,010,010,005,001 ?

2. Simplify $3333^{4444} + 4444^{3333}$ mod 7

   _____

3. For the first two subgroups of Z_{19} ,   Group 1 and Group 2, see if you can find generators for them.

4. Consider the complex number set $\left\{ 1,-1,i,-i,\dfrac{(1+i)}{\sqrt{2}},\dfrac{(1-i)}{\sqrt{2}},\dfrac{(-1+i)}{\sqrt{2}},\dfrac{(-1-i)}{\sqrt{2}} \right\}$ together with

   ordinary multiplication is a group.
   a) Can you identify a subgroup of it?
   b) Can you identify a generator for it?

5. Consider the matrix $\begin{pmatrix} \dfrac{1}{\sqrt{2}} & \dfrac{-1}{\sqrt{2}} \\ \dfrac{1}{\sqrt{2}} & \dfrac{1}{\sqrt{2}} \end{pmatrix}$. I claim you can produce a group using it as a generator. See

   what you can find out.

6. I claim you can use the complex number $e^{i\pi/6}$ as a generator for a group, together with ordinary multiplication. See what you can find out.

7. What size subgroups would you expect Z_{41} to have ?

8. Try Fermat's Factorization method out on **5293**.