Assignment 1: Due Wednesday the 31st. Note that these problems should be typed.

1) Prove the first half of 25.1.c. Type up your solution and turn it in.

2) Find a chain of 1000 subgroups (similar to the slide earlier in this presentation)

3) Prove the uniqueness of the identity (or inverses if you like) without using cancelation.

Assignment 2: Due Monday the 26th.

1) Is this a group? The set of all functions from $\{A, B, C\}$ to $\{A, B\}$ under composition. Why or why not?

2) Find all the subgroups of $\mathbb{Z}_{16}$ and draw a diagram illustrating their containment.

Assignment 3: Mini-project. Presentations on Wednesday the 28th.

Tell us everything you can about your group. (5-10 minute presentation using the whiteboards)

- $D_{2\cdot 6}$
- $GL_2(\mathbb{R})$
- $GL_2(\mathbb{Z}_2)$
- $\mathbb{Z}_{15}$
- $\mathbb{Q}_{=8} \coloneqq \{\pm 1, \pm i, \pm j, \pm k\}$ such that $i^2 = j^2 = k^2 = -1, ij = -ji = k, jk = -kj = i$, and $ik = -ki = j$
- They set $\mathbb{Z}_6 \times \mathbb{Z}_2$ under addition such that the first component is computed mod 6, and the second component is computed mod 2. For example (2,1) + (3,1) = (5,0).
- The set of all bijective functions on $\{A, B, C\}$ under composition.

Assignment 4: Note that this problem should be typed.

Let G be a group of order 15. Let H be a proper subgroup of G. Prove that H is cyclic.