Test 2 study guide

Part 1 – Computations

- Verifying if a subgroup of G is a normal subgroup
  (Lecture on 9/24 the first example on slide 1 and slide 2 of the online notes.)

- Calculating the elements of G/H where H is a normal subgroup. Computing in G/H and calculating the orders of the elements of G/H.
  (See HW 3.1 - #3(b), 20, A, B, C; Math 4550 HW 6 - #1; Math 4550 HW 9 #1,2;
  Lecture on 9/24 - the example on slide 3 and slide 4 of the online notes.
  Lecture on 9/24 – the example on slide 9 and slide 10 of the online notes.)

- Computing in G/H and using the first isomorphism theorem to classify G/H.
  (See HW 3.3 - A, B; Math 4550 HW 9 #3,4,5)

- Calculations involving the kernel of a homomorphism
  (See Math 4550 HW 8 - #1,2,3)

Part 2 – Proofs

I'm not sure yet exactly how many proofs there will be on the test, but there will definitely be these below.

- There will be at least one proof directly from the HW.

- There will be at least one proof directly from one of these proofs:

  - Theorem from Thursday 9/19 notes on slide 3.
    The one that says "subgroup normality theorem" right next to it. There are three conditions that imply each other. If I asked this then I would ask for one of the steps, like 1 –> 2. The proof is on slides 4 and 5.

  - Theorem from Thursday 9/24 notes on slide 3.

  - Theorem from 9/24 notes on slide 5.
    The one that says corollary to lagrange's theorem. The proof is on slide 6.

  - Theorem from 9/24 notes on slide 6.
    This is the theorem that a group of size p is cyclic if p is prime.

  - 9/24 notes on slide 7: The kernel of a homomorphism is a normal subgroup.
    (This is one half of the theorem from slide 7. This proof is located on slide 7.)

  - The Lemma from 9/26 notes on slide 5.
    (This is the lemma that shows that plugging a subgroup or pulling back a subgroup with a homomorphism yields a subgroup. The proof of part 2 is on slide 7. We will do part 1 of this proof in class on Tuesday, 9/29 at the very beginning of class.)