INFO ON EXAM #1

MATH 435 SPRING 2011

There will be 4 pages of regular questions on the exam and one extra-credit question.

(1) There will be one page of short answer questions (for example, define the term *subgroup* or give an example of an non-Abelian group of order 6).
(2) There will be one proof problem focusing on a specific group (such as S_3 or $GL(2)$ or $U(15)$ etc.)
(3) There will be one abstract proof-based problem.
(4) I will ask you one of the following questions:
    (a) Prove Lagrange's theorem.
    (b) Prove that every finite group is isomorphic to a subgroup of some group S_n.
    (c) Suppose that G is a group and H is a normal subgroup, show that the set of cosets of H form a group (in other words, prove that G/H is a group). This includes proving the well-definedness of the operation.
    (d) Prove that any group with 4 elements must be Abelian.
    (e) Suppose G is a group and $g \in G$ is an element. Show that the function $\phi : G \to G$ defined by $\phi(x) = g^{-1}xg$ is an isomorphism.
    (f) Suppose that $\phi : A \to B$ is a map of groups. Show that there is a well defined injective group homomorphism $A/\ker\phi \to B$ which sends the coset $a(\ker\phi)$ to $\phi(a)$.

I won't give you any details about what will be on the extra credit question.