COMMUTATIVE ALGEBRA, FALL 2013

ASSIGNMENT 2

Due **Friday September 18** in class.

(1) Rowen Appendix1A #23 (p92)
(2) Rowen Appendix1A #24 (p92)
(3) Rowen Appendix1A #25 (p92)
(4) Rowen Appendix1A #26 (p92)
(5) (Joy of Cats definition 6.9 and example 6.11.1b) A functor $F : \mathcal{A} \to Set$ is called *representable* (by an $\mathcal{A}$-object A) provided that F is naturally isomorphic to the hom-functor $Hom(A, -) : \mathcal{A} \to Set$, i.e. provided that there is a natural transformation $\tau : F \to Hom(A, -)$ where each τ_A is an isomorphism. Show that the forgetful functor from groups to sets is represented by $\mathbb{Z}$.
(6) Rowen ch2 #5 (p95)
(7) Rowen ch2 #13 (p95)
(8) We observed in class that the Jordan Hölder theorem holds whenever we have the 3 isomorphism theorems. So write down what the correct statement for the Jordan Hölder theorem should be for groups. (Yes this is in the book but try to do it without looking).
(9) Give an example of a module that doesn't have a composition series.