Problem Set 8
Due: 9:00 a.m. on Wednesday, October 30

Instructions: MATH 7470 students should submit solutions to all of the following problems and MATH 4470 students should submit solutions to only those marked with a "U". A subset of the problems will be graded. Be sure to adhere to the expectations outlined on the sheet *Guidelines for Problem Sets.* You may submit your solutions either in-class or to the Department of Mathematics (*with date and time of submission noted*).

Exercises: For this Problem Set, let R be a commutative ring with identity and let $S \subset R$ be a multiplicatively closed subset of R.

1U. Let M be an R-module and N and P be submodules of M.

   (a) Prove that $S^{-1}(N \cap P) = S^{-1}N \cap S^{-1}P$.

   (b) Prove that $S^{-1}(M/N)$ and $(S^{-1}M)/(S^{-1}N)$ are isomorphic as $S^{-1}R$-modules.

2. (Dummit and Foote §11.5 #1) Let M be a cyclic R-module. Prove that the tensor algebra of M is commutative.