MATH 101B: HOMEWORK

6. Homework 06

The following problems are due Thursday (3/22/7). The strict deadline is 1:30pm Friday.

Assume R, M are both Noetherian.

(1) Show that for any ideal I in R there are only finitely many minimal primes containing I. [Take a maximal counterexample.]

(2) Suppose that $\mathfrak{p}$ is a prime and $n > 0$. Let

$$\mathfrak{p}^{(n)}M := \mathfrak{p}^n M_{\mathfrak{p}}|M$$

Show that this is a $\mathfrak{p}$-primary submodule of M.

(3) If $\phi : R \to S$ is a homomorphism of Noetherian rings and M is an S-module then show that

$$\mathrm{ass}_R(M) = \phi^*(\mathrm{ass}_S(M))$$

where $\phi^* : Spec(S) \to Spec(R)$ is the map induced by ϕ.

Date: March 15, 2007.