MAT347Y1 HW10 Marking Scheme

Friday, January 16

Total: 30 points.

7.4.15: 6 points. (2 per item)

7.4.36: 8 points. The marking of this question will mainly reflect whether you addressed all the required facts needed in order to apply Zorn's Lemma.

- (1) Let S be the partially ordered set of prime ideals ordered by reverse inclusion (I was ok with people ordering by inclusion and then talking about lower bounds and minimal elements, but you must be clear about the direction of your order).
- (1) S is nonempty because (1) communities have maximal ideals and (1) these maximal ideals are prime (note that (0) isn't necessarily prime, and R is by definition not prime)
- (1) Given a chain in S (point lost if you treated S itself as a chain, because it usually isn't), (2) prove that the intersection is a prime ideal.
- (1) Boom, Zorn's Lemma (proof's not complete without it!)

7.6.5(c)(ii): 4 points.

Handout #1: 12 points.

- (a) 2 points: (1) $n_1 = \ldots = n_{|X|} = 2$, and (1) an explicit isomorphism.
- (b) 2 points: (1) the unit and (1) the zero divisors.
- (c) 1 point.
- (d) 2 points.
- (e) 1 points.
- (f) 2 points.
- (g) 2 points.