MAT347Y1 HW18 Marking Scheme

Friday, March 28

Total: 42 points.

Handout #1: 13 points.

(a) 4 points (2 per claim)

(b) 2 points.

(c) 3 points.

(d) 4 points. Remember that "the" semidirect product of H and K is not uniquely defined, so identifying the group as a semidirect product is not enough to prove it's a holomorph.

Handout #2: 11 points.

(a) 5 points. Here's the lemma you need: Given a group G with $|G| = 2^n$, and some $H \leq G$, there exists a sequence of subgroups

$$H = H_0 \leq H_1 \leq \cdots \leq H_k = G$$

such that $|H_{i+1} : H_i| = 2$ for all i.

(b) 3 points. It's best to do this using elements; trying to work in terms of the degrees of extensions alone led a lot of people to make mistakes.

(c) 3 points.

Handout #3: 7 points.

- (2) Defining the correct periods (cf. discussion on pages 598 and 602)
- (3) Getting the right quadratic equations (by computing the sum and product of pairs of periods)
- (2) Solving for actual values

14.2.17: 11 points.

(a) 3 points. Note that applying an automorphism to a set of coset representatives will give you a *possibly different* set of coset representatives; why will this give you the same norm?

(b) 2 points.

(c) 2 points.

(d) 4 points.