Corrections to Baker's *Algebraic Number Theory*

April 3, 2017

Here I list some corrections to the course notes *Algebraic Number Theory* by Matthew Baker. I have not yet verified with the author that these are indeed errors; I take full responsibility for being wrong!

1. In the proof of Proposition 1.4, don't we need to check, toward the end, that π and $\bar{\pi}$ are not themselves associate?

2. In the proof of Lemma 2.35, you need to say something about the degrees; there are in fact infinitely many roots of unity if the degree is not bounded. In other words, I believe we should point out that the minimal polynomial of α^j is of degree at most n.

3. I don't think the display in the proof of Theorem 2.45 is correct. What is true is that the two sets generate the same $\mathbb{Z}$-span. But they are not equal.

4. Example 3.21 includes the expression $\mathcal{O}_K^* = \{\pm 1\} \times \mathbb{Z}$. This is a bit confusing; it should at least have an isomorphism, not equality, but it also mixes multiplicative and additive notation.

5. In the definition of π coming after Lemma 3.29, I think the domain should be
$$(\mathbb{R} \setminus \{0\})^{r_1} \times (\mathbb{C} \setminus \{0\})^{r_2}.$$

6. In Exercise 3.32, the dimensions of M' are incorrect; they should be $(r_1 + r_2 - 1) \times (r_1 + r_2 - 1)$.

7. In Section 4, you define localization only for an integral domain. I think one can infer from this that R will be taken to be an integral domain throughout the chapter, but it might be nice to make this remark upfront (i.e. will it apply for all of Chapter 4?).

8. To prove Lemma 4.5, can't you more simply use the fact that s is a unit to conclude that it is still a unit after application of a homomorphism? It seems like induction can be avoided.