Math 30820 Honors Algebra 4
Homework 4

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Due Wednesday, 2/15/2017

Do 6 of the following questions. Some questions may be obligatory. Artin a.b.c means chapter a, section b, exercise c. You may use any problem to solve any other problem.

Throughout this problem set R is an **integral domain**, unless otherwise specified.

1. (You must do this problem) Suppose R is a commutative ring such that every ideal of R is finitely generated. Suppose M is an R-submodule of a finite rank free module R^n. Show that M is also finitely generated. [Hint: Consider the image and kernel of M under the homomorphism $R^n \to R^{n-1}$ which is given by $(x_1, \ldots, x_n) \mapsto (x_1, \ldots, x_{n-1})$ and then argue by induction.]
2. Artin 14.7.7 on page 439.
3. Artin 14.7.8 on page 439.
4. Artin 14.8.6 on page 440.
5. Artin 15.2.3 on page 472.
6. Artin 15.3.2 on page 472.
7. Artin 15.3.9 on page 473.
8. Artin 15.4.1 on page 473.