Math 567: Abstract Algebra I
Homework 6

10 points total. Due Friday, Mar 4 by 11:10 am in class.

Problems

1. (3 points) Consider the action of S_3 on the space of homogeneous degree-3 polynomials in $\mathbb{C}[x_1, x_2, x_3]$, often written $\mathbb{C}[x_1, x_2, x_3]_3$. (The action is by permuting the variables as usual.) Compute the character of this representation, decompose the character into irreducibles, and deduce how the representation decomposes into irreducibles. (You do not need to explicitly find these irreducibles in terms of the polynomials, but if you do, you get a Bonus point - see below.)

2. (2 points) Chapter 10 problem 7.1

3. (1 point each) Chapter 10 problems 5.1, 5.2, 5.5, 7.2, 7.4

Bonus Problem

(+1 point:) Do the Bonus part of problem 1 above.