Math 172 - HW 3
due April 14

April 7, 2015

1. Exercise 2 from Section 2.2. In class today we defined the a "graded lexicographic" order on the set of monomials in $F[x_1, \ldots, x_n]$. Given a polynomial $f \in F[x_1, \ldots, x_n]$, we say that its leading term (denoted $LT(f)$) is the "largest" nonzero term of f, where "large" is with respect to the order on monomials. This exercise proves a useful property of leading terms that we will need to prove the Fundamental Theorem of Symmetric Polynomials.

2. Exercise 7 from Section 2.2. To clarify, $\sigma \cdot f \in F[x_1, \ldots, x_n]$ is the polynomial defined by $\sigma \cdot f = f(x_{\sigma(1)}, \ldots, x_{\sigma(n)})$.

3. Exercise 8 from Section 2.2. Here a rational function $\phi \in F(x_1, \ldots, x_n)$ is symmetric if $\sigma \cdot \phi = \phi$ for any $\sigma \in S_n$, where $\sigma \cdot \phi$ is defined by permuting the variables according to σ.