Math 724
Spring 2014
Homework Set 4

Exercise 1 $(7.5.2+\epsilon)$**.** Set $R = A[X,Y]$ and $\underline{e} = (2,3)$ and $J = (X^3, X^2Y, Y^3)R$.

(a) Find an irredundant m-irreducible decomposition of J.
(b) Find an irredundant monomial generating sequence for $J^{[\underline{e}]}$.
(c) Use Exercise 7.5.1 to find an irredundant m-irreducible decomposition of the ideal $J^{[\underline{e}]}$.
(d) Verify that your decomposition from part (c) is correct as in Exercise 5.3.13(d).

Justify your answers.

Exercise 2. Set $R = A[X_1, \ldots, X_4]$ and find an irredundant m-irreducible decomposition of the ideal $J = (X_1^2X_2^2X_3^2, X_1^3X_2^3X_4^3, X_1^2X_3^2X_4^2, X_2^4X_3^4X_4^4)R$ using our decomposition result for weighted face ideals. Verify that your decomposition is correct as in Exercise 5.3.13(d). Justify your answers.