1077-VD-547   **Howard I Dwyer** and **William R Green*** (`wrgreen2@eiu.edu`), 600 Lincoln Ave., Charleston, IL 61920. *Integrating factors and repeated roots of the characteristic equation.*

Most texts on elementary differential equations solve homogeneous constant coefficient linear equations by introducing the Characteristic equation; once the roots of the characteristic equation are known the solutions to the differential equation follow immediately, unless there is a repeated root. We show how first order methods, namely an integrating factor, can be used to find all of the solutions in the case of a repeated root without depending on an assumption about the form that these solutions will take. We also show how an integrating factor can be used to explain the "extra" power of t which appears in the trial form of the solution when using the method of undetermined coefficients on a nonhomogeneous equation in the case where the right hand side is a polynomial multiple of the corresponding homogeneous solution. (Received September 07, 2011)