1003-13-774   **Brent D Strunk*** (`bstrunk@math.purdue.edu`), Purdue University, 150 North University Street, West Lafayette, IN 47907. *Hilbert Functions and Castelnuovo-Mumford Regularity.* Preliminary report.

Suppose G is a standard graded ring over an infinite field. From the minimal free graded resolution of G, it is possible to derive several invariants, among them the multiplicity, the Castelnuovo Mumford regularity, the Hilbert series, and the postulation number. I discuss a sharp lower bound for the regularity of G in terms of the postulation number, depth, and dimension. I present a class of examples in dimension 1 where the postulation number is 0 and the regularity of G can take on any value between 1 and the embedding codimension. If we assume that G is the associated graded ring of a 1 dimensional Cohen Macaualy local ring, then there are constraints on many of the invariants of G due to work by Chardin, Elias, Marley, Moreno-Socias, Rossi, Trung, and Valla. I consider the question of what is possible for the Hilbert Series of a Cohen Macaulay local ring of dimension 1 or 2. (Received September 29, 2004)