Heuristic Derivation of Black Hole Properties Using Dimensional Analysis KALE OYEDEJI, Morehouse College, RONALD MICKENS, Clark Atlanta University — Black holes have many interesting and non-obvious properties. The precise details of the features of standard black holes (i.e., those without charge or spin) generally requires calculational techniques involving general relativity, quantum mechanics, thermodynamics, etc. [1]. We demonstrate that many, if not all, of the important aspects of black holes may be estimated, up to a pure number proportionality constant, by the appropriate application of the method of dimensional analysis [2]. In particular, for a black hole having mass M, we "calculate" its radius, surface area, density, temperature, and life-time.

[1] M. Blecher, General Relativity (World Scientific, Singapore, 2016) [2] H.E. Huntley, Dimensional Analysis (Dover, New York, 1967).

Kale Oyedeji
Morehouse College

Date submitted: 18 Oct 2016   Electronic form version 1.4