

Name-code: \_\_\_\_\_

3. The Earth has mass  $M_E = 6.0 \times 10^{27} g$  and a radius  $R_E = 6.4 \times 10^8 \text{ cm}$ . (a) Find the escape speed from the surface of the Earth. Find both the analytic formula (in terms of  $M_E$ ,  $R_E$ , etc.) and the numerical value in km/s. (b) Find the escape speed from the center of the planet. Assume that you can cut a small cylindrical hole through the planet that does not affect its mass profile and assume that the density is uniform. Again, find the analytic formula and the numerical value.