**Chem 1984 Marathon problem #1**

**Metaphoric Atomic volumes**

**Due Monday 9 September 2013 by 4 PM**

**(no electronic submissions will be accepted)**

**10 points**

Use Google to look up the approximate volume of water in the Pacific Ocean. Assume that volume is occupied by the electronic cloud in a typical atom. If the atom’s nucleus and electronic cloud are both assumed spherical, so that their volumes, **V**, can be computed using equation **1** where r= the radius of either the nucleus or cloud:

1. **V= 4/3 \* π\*r3**

**provide arguments, calculations and reasoning for whether the nuclear volume is best estimated by:**

1. **The volume of a standard basketball:**

**V= 7.5\*103 cm3**

1. **The volume of water in a typical above ground swimming pool:**

**V ~5\*107 cm3**

1. **The volume of water in an Olympic class swimming pool:**

**V~ 1.0\*109 cm3**

1. **Volume occupied by the Hindenburg Zeppelin:**

**V~2\*1011 cm3**

**Assume: r(nucleus) = 10‑15 m r(electron cloud) =10-10 m**