

## Chapter 4 Worksheet

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Answer the following questions on a separate sheet. Make sure to follow all rules for setting up a question, sig figs, and scientific notation when appropriate.

1. There is a 250mL water bottle sitting on your desk. **Determine**...
  - a) the water's mass ( $0.250\text{kg}$ )
  - b) the water's weight ( $2.45\text{N}$ )
  - c) the water's mass on the moon, where the gravitational field strength is  $1.67\text{N/kg}$ . ( $0.250\text{kg}$ )
2. The gravitational force between our galaxy and another galaxy is  $1.84\text{e-}7\text{N}$ . If the other galaxy had been twice the mass and four times further away, **determine** what the gravitational attraction would have been. ( $2.3\text{e-}8\text{N}$ )
3. Other than the ability to actually do calculations using the universal law of gravitation, **explain** the interesting side benefit of Cavendish's calculation of "G".
4. **Explain** what is meant by the term "inertial mass."
5. I am on the International Space Station in orbit 420km above the surface of the earth. A grade five student asks me what I think of being some place that has no gravity. I explain that although there is less gravity, there is almost  $9.81\text{N/kg}$ .
  - a) **Determine** the acceleration due to gravity where I am. ( $8.65\text{m/s}^2$ )
  - b) My mass is 71 kg. **Determine** what my weight would be in this location if I was not in free fall. ( $6.1\text{e}2\text{N}$ )
6. A 135kg box of used socks is sitting in a freight elevator. The elevator begins to rise with an acceleration of  $4.31\text{m/s}^2$ . **Determine** the apparent mass of the socks. ( $194\text{kg}$ )
7. Two young people are standing near each other. The 77.8 kg boy looks at the 51.9kg girls and says "I feel  $7.156\text{e-}10\text{ N}$  of attraction to you!" **Determine** how far apart they are from each other.