These exercises are meant to develop your intuition about moderately large numbers. Express your answers in practical units when possible. For example, 1000 seconds (16 min and 40 s) is about 17 min. If you have a gut feeling about a question, write down an off-the-cuff estimate before you calculate anything.

1. About how long is a million seconds? A billion seconds? What is your age in seconds?

2. A ream of paper containing 500 sheets is about 2 inches thick. How tall would a stack of 1 billion sheets be? Assuming US currency is about the same thickness, how tall would a $1 billion stack of $20 bills be?

3. In this question, assume the current population is 6 billion people.

   (a) If you can shake one person's hand every 2 seconds (24/7), how long would it take you to shake the hand of everyone alive today?

   (b) Estimate the total mass of human beings, and the total volume. If possible, cross-check your estimates. You may assume your mass is "typical".

   (c) Massachusetts has an area of 7838 square miles. If this space were divided into 6 billion squares, how large would each square be?

4. Federal minimum wage is currently $5.15/hr. Working 40 hours per week, 50 weeks per year, and assuming there are no taxes or expenses (or interest on savings, etc.), how many years would it take to earn $1 million? $1 billion?

5. In 1978, Bill Gates was valued at roughly $2 billion. Twenty years later, his estimated worth was $60 billion. (This figure has since dropped to about $40 billion.) For the period 1978–1998, what was Gates' average rate of income in dollars per second? Per hour? Per day? On the average, how long did it take for Gates' wealth to increase by $50 million?

6. If $40 billion were divided evenly among the 2600 students at Holy Cross, how must would each of you receive?