Unit Conversions

A 12 ounce box of Greenies costs $12.99. A 30 ounce box costs $26.99

(a) What is the cost in dollars per ounce in each box? Which size should you buy?

(b) Suppose you have a coupon worth $5 toward the price of any box of Greenies. If you use the coupon, which size should you buy? Is it always better to buy the large economy size?

(c) Answer the previous question if your coupon gives you a 10% discount rather than $5 off.

According to the United States Department of the Treasury, the national debt on January 1, 2013 was \$16,432,730,050,569.12 $\approx$ \$16.5 trillion.

(a) Estimate the average share of the debt for each person in the United States on January 1, 2013.

(b) By some estimates, the debt increases an average of just over \$2.5 billion per day. Use the web to find the current national debt of the United States and comment on the accuracy of those estimates.

(c) Find the current population of the United States and update the average share of the debt for each person.

(d) Choose a different country and use the web to find its current national debt. Estimate the average share of the debt for each person in that country and compare this to what you calculated for the United States.

On February 23, 2011 the Green Blog in *The New York Times* reported that

A car buyer who lays out an extra $6,200 to buy the hybrid version of the Lexus RX will get the money back in gas savings within five years, according to Consumer Reports magazine, but only if gasoline averages $8.77 a gallon. Otherwise, the nonhybrid RX 350 is a better buy than the Hybrid 450h, the magazine says. The hybrid gets 26 miles per gallon, and the nonhybrid, 21, in the magazine's calculation.

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The researchers use a five-year payback period because that is a typical duration for car ownership. It assumed that the driver would log 12,000 miles a year and pay $2.80 a gallon, a price that now looks a bit on the low side.

(a) Show that the computation is wrong - that at $8.77 per gallon of gas you can't save $6,200 in 60,000 miles of driving.

(b) Show that you can save that much with that much driving if gas costs $8.77 per gallon more than $2.80 per gallon.

(c) The *Times* blogger was reporting on a study from *Consumer Reports* magazine. Do you think the error was the blogger's, or the magazine's? What would you have to do to find out which?