

Back of the Envelope Estimation

QRG Meeting, Friday, April 16, 2004

A Back-of-the-Envelope problem asks you to make a rough numeric estimate. For example, consider the following –

How many dentists are there in US?

Assume 1 person makes two visits per year.

Assume a dentist sees 10 people a day, or 3650 visits per year

Number of visits required per year = number of people in the US * 2 = 300 million * 2

Number of dentists = Total visits required/ Number of visits a dentist can handle = 600 million/3650 = 164,000

[The actual number of dentists was 160,000 in 2002 according to Statistical Abstracts of the United States]

In the following pages, there are seven more questions. The goal is to find the **ballpark**, not the exact answer. It helps to know if it is tens of millions or thousands or billions. Please explain your process, and why/how you estimated a particular quantity. You are encouraged to **guesstimate**, but feel free to look up for some number (like the population), and cite the source. **Please attempt at least three of these.**

These are the questions on the following pages –

1. How many K-8 elementary school teachers are in the USA?
2. How much money is spent on newspapers in USA per year?
3. How much time would be saved per year nationwide by increasing the speed limit from 55 to 65 mph?
4. What is the annual cost of healthcare in USA?
5. How much tea (weight) is there in China?
6. Last summer, the US Army bought Microsoft Windows/Office/Server software for 500,000 computers. The deal included the software and six years of support. How much did the army pay for this?

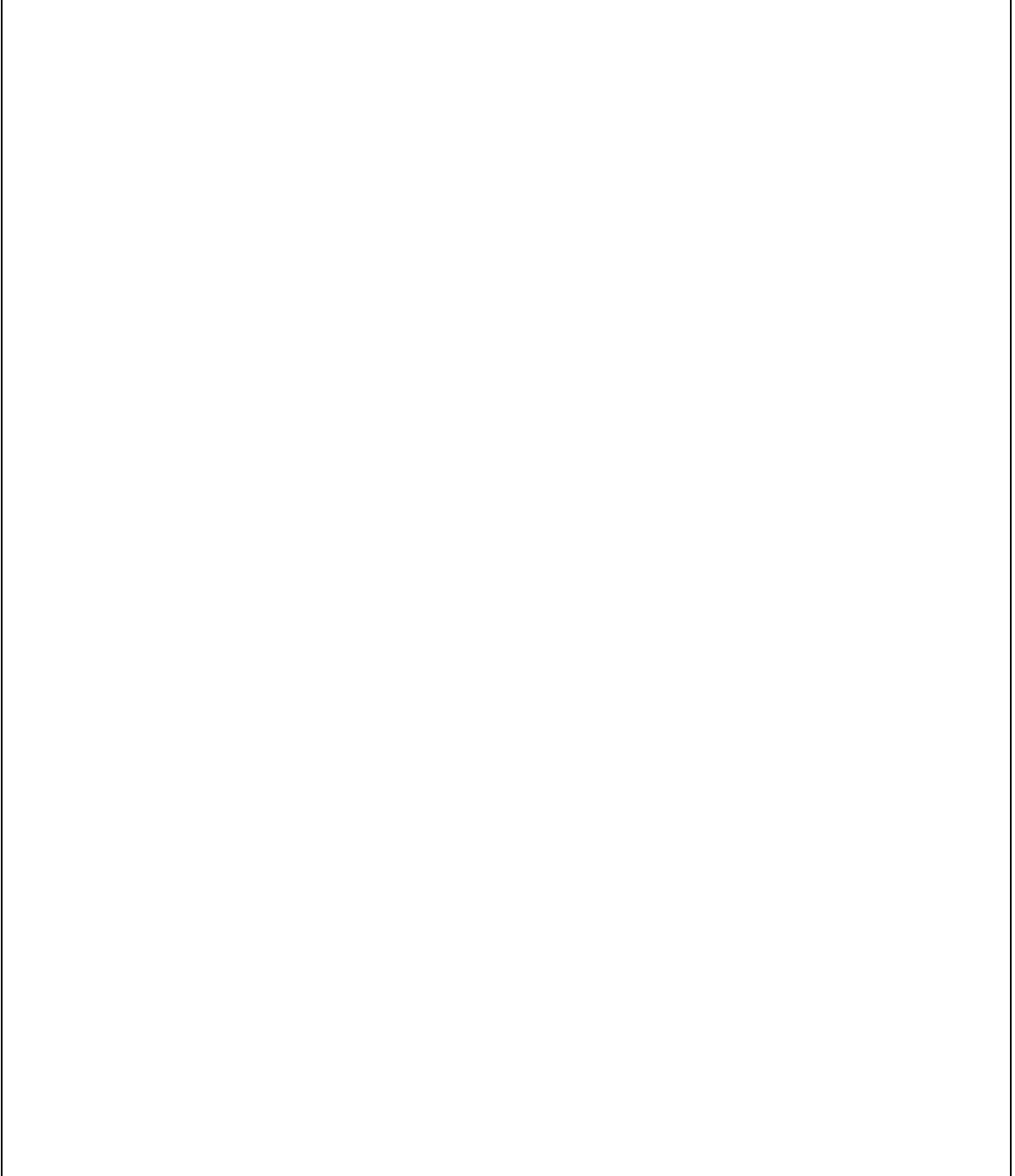
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