Homework 3h. Find the GM of each of the following 5 sets of data.
(a) 3.4%, 4.1%, 2.7%, 8.9%, 6.3%  (b) 29.13, 45.72, 81.09, 32.69, 43.91, 89.96, 32.10
(c) 12, 43, 34, 23, 16, 20  (d) 4%, 5%, 2%, 7%, 8%, 4%, 5%, 2%, 1%, 6%  (e) .56, .21, .56, .73, .09, .89, .21, .40

When working with absolute data—that is, with numbers that indicate the number of units of something (e.g., weight of the dogs at a dog show), the appropriate method of calculating the mean is the arithmetic mean. For relative data—pure numbers, like percents—a geometric mean is appropriate. Think of our hierarchy of operations:

Addition and subtraction are at the bottom; they are the "least powerful" operations, as well as the last ones to be performed.

In finding the arithmetic mean, we add the values in the set, then divide the sum by \( n \).

To find the geometric mean, we move the process up a level; we multiply the values together, then take the \( n \)th root.

Below is the formula used for finding the geometric mean of a set of cross-sectional data. Note that the symbol \( \Pi \) is the product operator, just as \( \Sigma \) is the summation operator. Here, the \( \Pi \) simply tells you to multiply the \( n \) values together, that is, to find their product.

\[
GM = \sqrt[n]{\Pi x_i}
\]

Now, this isn't difficult. Say that you have unemployment rates—percents, which are pure numbers—for five different cities. You wish to find the mean value. Here's how it's done:

\[
\begin{array}{c|c}
  i & U \\
  1 & 3.4\% \\
  2 & 7.5 \\
  3 & 4.3 \\
  4 & 6.9 \\
  5 & 5.5 \\
\end{array}
\]

\[
\begin{align*}
GM &= \sqrt[n]{\Pi x_i} \\
&= \sqrt[5]{3.4 \times 7.5 \times 4.3 \times 6.9 \times 5.5} \\
&= 5.295\% 
\end{align*}
\]