geometric (logarithmic) mean, $\bar{x}_g$

The nth root of the product of the absolute values of the observations, taken with the proper sign. It can be calculated with the formula:

$$\bar{x}_g = \left(\Pi \; | x_i | \right)^{\frac{1}{n}}$$

The Π product is taken from $i = 1$ to n.
Note:
This quantity is often calculated directly from experimental measurements (e.g. determination of concentrations by electrode potential measurements, or pH), although its significance may not always have been recognized. The problem is that the average value of a variable (such as pH) that is a function of concentration is not the same as the value of the function at the average concentration. In the case of electrode potentials, the average potential is equivalent to the geometric mean concentration. The correct procedure is to transform to units of concentration before averaging. There is one notable case where the geometric mean is appropriate, namely, when the analyte itself is distributed in a log-normal fashion, as in certain environmental and geological samples.

Source:
PAC, 1994, *66*, 595 *(Nomenclature for the presentation of results of chemical analysis (IUPAC Recommendations 1994))* on page 602