Lebesgue defined the measure of an interval to be its length. He defined the measure of the union of infinitely many disjoint intervals in [0,1] to be the sum of the intervals' lengths. For a general set, such as the rationals in [0,1], he listed all the rationals in a sequence

\[ \{ r_1, r_2, r_3, \ldots \} \]

and covered them by the intervals

\[
(r_1 - \frac{1}{7^k} \varepsilon, r_1 + \frac{1}{7^k} \varepsilon),
\]
\[
(r_2 - \frac{1}{8^k} \varepsilon, r_2 + \frac{1}{8^k} \varepsilon),
\]

....................

of lengths

\[
\frac{1}{2^k} \varepsilon, \frac{1}{2^2^k} \varepsilon, \frac{1}{2^3^k} \varepsilon, \ldots
\]

Then,

\[ m(E) \leq \frac{1}{2} \varepsilon + \frac{1}{2^2} \varepsilon + \frac{1}{2^3} \varepsilon + \ldots = \varepsilon. \]

Taking the infimum on \( \varepsilon > 0 \), he effectively set \( \varepsilon \) to zero, and concluded that \( m(E) = 0 \). We have reservations about this procedure. posted to www.gauge-institute.org (Received September 08, 2007)