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We study a function that arises naturally in the estimation of unobserved probability in random sampling. To define it, let $\mu = (\mu_1, \mu_2, \dots)$ be an infinite discrete probability measure, with $\mu(i) = \mu_i$. Let $\mu_i > 0$ and $\mu_i \geq \mu_{i+1} \forall i$. Given $s \in [0, 1]$, let $\sigma(s) = \inf\{\mu(A) : \mu(A) \geq s\}$. Several questions arise: what are the measures μ for which σ is continuous? What are the measures for which $\sigma(s) = s$ for all s ? When σ is not continuous, can one say more about its discontinuities? Work by Rényi yields complete answers to the first two questions, and surprisingly the two classes of measures turn out to be the same. The last question is more complex, and we answer it by considering different cases. In that process, we discover a class of measures which have the interesting property that, for them, events are uniquely determined by their probabilities. We call such measures sharp. (Received September 28, 2005)