The coordinates, along any fixed direction(s), of points on the sphere $S^{n-1}(\sqrt{n})$ (equipped with the uniform surface measure $\bar{\sigma}_n$), roughly follow a standard Gaussian distribution as $n$ approaches infinity. We revisit this classical result from the point of view of a nonstandard analyst. Fixing a “good” real-valued function $f$ on $\mathbb{R}^k$ (and extending it canonically to $\mathbb{R}^n$ for any $n \geq k$), the classical result says that $\lim_{n \to \infty} \int_{S^{n-1}(\sqrt{n})} f \, d\bar{\sigma}_n = \int_{\mathbb{R}^k} f \, d\mu$, where $\mu$ is the standard $k$-dimensional Gaussian measure. A difficulty in working with such a limit is that the measure spaces are changing with $n$. Nonstandard analysis allows access to the “hyperfinite-dimensional sphere” $S^{N-1}(\sqrt{N})$ (where $N > \infty$), which, when equipped with the correct “surface measure”, is expected to capture the large-$n$ behavior of $S^{n-1}(\sqrt{n})$. We define the appropriate measure on $S^{N-1}(\sqrt{N})$ and show that the above limit is equal to an integral on this sphere for all $\mu$-integrable functions $f$, thereby proving the classical result for the largest class of functions possible. Some background in nonstandard analysis will be provided. (Received September 25, 2018)