1145-28-2527 **Irfan Alam*** (irfanalamisi@gmail.com), Department of Mathematics, Louisiana State University, Baton Rouge, LA 70802. *Integration on the infinite sphere.* Preliminary report.

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 μ 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 μ-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)