

## MATH 100 Topics

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### *Placing Points Evenly on a Regular Region*

Placing points evenly arises in many contexts, such as numerical approximation of integrals of functions, and of functions, as well as error-correcting codes. How do you place  $n$  points evenly on a regions such as

$$\begin{aligned} & [0, 1] \text{ (interval), } [0, 1]^2 \text{ (square), } [0, 1]^d \text{ (hypercube)} \\ & \{(x, y) : x^2 + y^2 \leq 1\} \text{ (disk), } \{(x, y, z) : x^2 + y^2 + z^2 \leq 1\} \text{ (ball),} \\ & \{(x, y) : x^2 + y^2 = 1\} \text{ (circle), } \{(x, y, z) : x^2 + y^2 + z^2 = 1\} \text{ (sphere), or} \\ & \{0, 1, \dots, 1\}^d \text{ (grid)?} \end{aligned}$$

For simple shapes one may do so analytically. Certain number theoretical methods can be used, or one can use computation. The answer depends on how one defined “evenly”. Some approaches are described in (Hardin and Saff, 2005, Kuo and Sloan, 2005).

### *How Do the Media Mislead with Numbers*

Journalists and editors often are not familiar enough with mathematical and statistics to spot or avoid misleading conclusions. Read some books such as (Huff, 1954, Paulos, 1995, Tufte, 1983) or visit the website <http://www.dartmouth.edu/chance/> to find examples of how the mathematical and statistical ignorance. Then search current news reports to find and analyze examples of your own.

### REFERENCES

1. Hardin, D. P. and Saff, E. B. (2005), Discretizing manifolds via minimum energy points, *Notices Amer. Math. Soc.* **51**, 1186–1194.
2. Huff, D. (1954), *How to Lie with Statistics*, W. W. Norton & Co., New York.
3. Kuo, F. Y. and Sloan, I. H. (2005), Lifting the curse of dimensionality, *Notices Amer. Math. Soc.* **52**(11), 1320–1329.
4. Paulos, J. A. (1995), *A Mathematician Reads the Newspaper*, Basic Books, New York.
5. Tufte, E. R. (1983), *The Visual Display of Quantitative Information*, Graphics Press, Cheshire, Connecticut.