Why

We want a density that is symmetric about some central value with some spread.

Definition

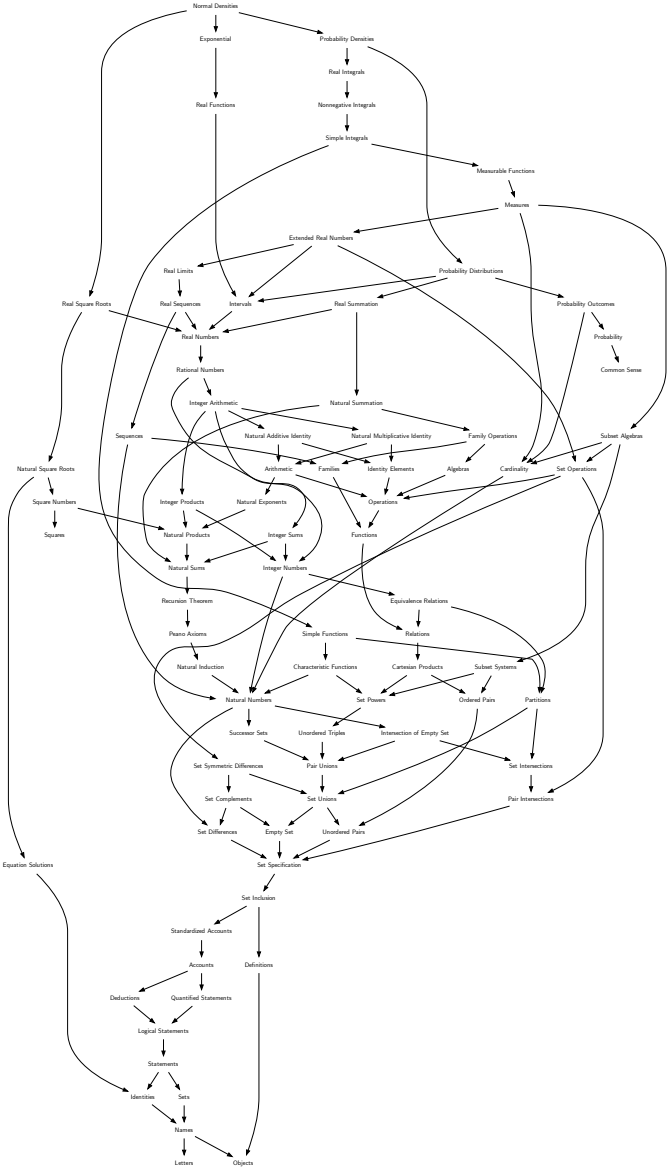
A normal density is one which can be written as a normalized

Let $f : \mathbf{R} \to \mathbf{R}$ be a density. If there exists $\mu \in \mathbf{R}$ and $\sigma \in \mathbf{R}$ with $\sigma > 0$ so that for each $x \in \mathbf{R}$

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} \exp\left(-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2\right)$$

then f is a *normal density*. Some call a normal density a *Gaussian density*. We often drop the word density and use refer to these as *normals* or *Gaussians*, using these words as substantives.

We call the special case when $\mu = 0$ and $\sigma = 1$ the *standard normal density*.


Normal Densities
Exponential
Probability Densities
Real Integrals
Real Functions
Nonnegative Integrals
Simple Integrals
Measurable Functions
Measures
Extended Real Numbers
Real Limits
Probability Distributions
Real Square Roots
Real Sequences
Intervals
Real Summation
Probability Outcomes
Real Numbers
Probability
Common Sense
Rational Numbers
Integer Arithmetic
Natural Summation
Natural Additive Identity
Natural Multiplicative Identity
Family Operations
Subset Algebras
Sequences
Natural Square Roots
Arithmetic
Families
Identity Elements
Algebras
Cardinality
Set Operations
Square Numbers
Integer Products
Natural Exponents
Operations
Squares
Natural Products
Integer Sums
Functions
Natural Sums
Integer Numbers
Recursion Theorem
Equivalence Relations
Simple Functions
Relations
Peano Axioms
Natural Induction
Characteristic Functions
Cartesian Products
Subset Systems
Natural Numbers
Set Powers
Ordered Pairs
Partitions
Successor Sets
Unordered Triples
Intersection of Empty Set
Set Symmetric Differences
Pair Unions
Set Intersections
Set Complements
Set Unions
Pair Intersections
Set Differences
Empty Set
Unordered Pairs
Equation Solutions
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Definitions
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects