Why

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

Definition

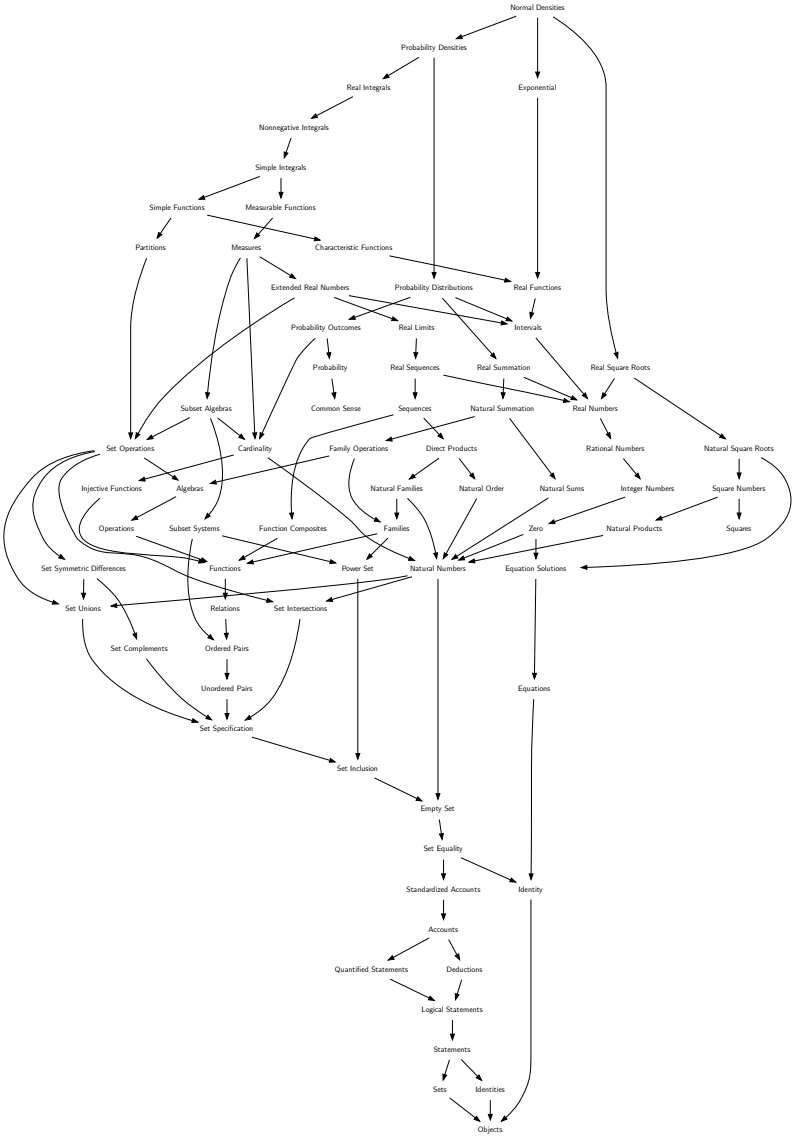
A normal density is one which can be written as a normalized

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
Probability Densities
Real Integrals
Exponential
Nonnegative Integrals
Simple Integrals
Simple Functions
Measurable Functions
Partitions
Measures
Characteristic Functions
Extended Real Numbers
Probability Distributions
Real Functions
Probability Outcomes
Real Limits
Intervals
Probability
Real Sequences
Real Summation
Real Square Roots
Subset Algebras
Common Sense
Sequences
Natural Summation
Real Numbers
Set Operations
Cardinality
Family Operations
Direct Products
Rational Numbers
Natural Square Roots
Injective Functions
Algebras
Natural Families
Natural Order
Natural Sums
Integer Numbers
Square Numbers
Operations
Subset Systems
Function Composites
Families
Zero
Natural Products
Squares
Set Symmetric Differences
Functions
Power Set
Natural Numbers
Equation Solutions
Set Unions
Relations
Set Intersections
Set Complements
Ordered Pairs
Unordered Pairs
Equations
Set Specification
Set Inclusion
Empty Set
Set Equality
Standardized Accounts
Identity
Accounts
Quantified Statements
Deductions
Logical Statements
Statements
Sets
Identities
Objects