Why

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

Definition

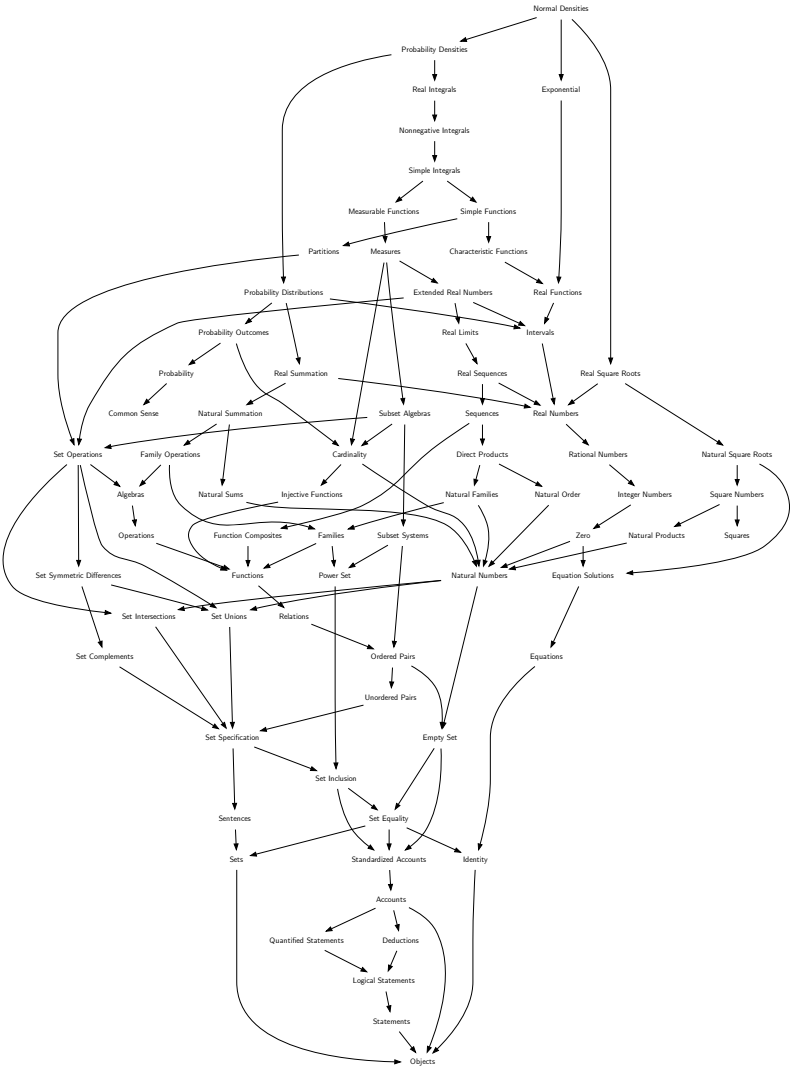
A normal density is one which can be written as a normalized

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