More Abuses of Notation

I am horribly lazy, and will write

\[ p(n | I) \equiv \text{Prob}(n | I) = \text{Prob}(N = n | I) \]

for \( N \) being a discrete parameter

\[ p(x | I) \equiv \text{pdf}(x | I) = \text{pdf}(X = x | I) \]

for \( X \) being a continuous parameter

\[ P(n | I) \text{ is a probability} \]

\[ p(x | I) \text{ is a probability density} \]

To get a probability from a probability density you must multiply times the volume:

\[ p(x | I) \, dx \text{ is a probability} \]
Notation

We will take some liberties with notation to simplify our equations.

- $H_1 = \text{"Her pet is a Dog"}$
  
  $\text{Prob}(H_1 | I)$ is the degree to which everything I know implies that "Her pet is a Dog".

- $q = \text{"The number of quarters in my pocket is } q."$
  
  $\text{Prob}(q | I)$ is the degree to which everything I know implies that I have $q$ quarters in my pocket, where $q \in I$ if $q \geq 0$.

  I might write:
  
  $\text{Prob}(q | I) = \frac{1}{\pi} e^{-\frac{q}{\pi}}$ where $\pi$ is a normalization constant.

  Since $\sum_{q=0}^{\infty} \text{Prob}(q | I) = 1$

- $X = \text{"The length of my pen"}$
  
  $x_1 \leq X < x_2 \equiv \text{"The length of my pen is between } x_1 \text{ and } x_2.$

  $\text{Prob}(x_1 \leq X < x_2 | I)$