Examples of Variety in Math Notation

From http://en.wikipedia.org/wiki/Volume:

Shape	Equation	Variables
A cube	a^3	*a* = length of any side (or edge)
A rectangular prism:	$l \cdot w \cdot h$	l = length, w = width, h = height
A cylinder:	$\pi r^2 h$	*r* = radius of circular face, *h* = height
A general prism:	$B \cdot h$	*B* = area of the base, *h* = height
A sphere:	$\frac{4}{3}\pi r^3$	*r* = radius of sphere which is the integral of the Surface Area of a sphere
An ellipsoid:	$\frac{4}{3}\pi abc$	*a*, *b*, *c* = semi-axes of ellipsoid
A pyramid:	$\frac{1}{3}Bh$	*B* = area of the base, *h* = height of pyramid
A cone (circular-based pyramid):	$\frac{1}{3}\pi r^2 h$	*r* = radius of circle at base, *h* = distance from base to tip
Any figure (calculus required)	$\int A(h)\,dh$	*h* = any dimension of the figure, *A*(*h*) = area of the cross-sections perpendicular to *h* described as a function of the position along *h*. This will work for any figure if its cross-sectional area can be determined from h (no matter if the prism is slanted or the cross-sections change shape).

Notice the inconsistent use of centered dot versus implied multiplication, even on this one page. You're expected to figure out that *bc* means *b* times *c* in the sixth equation, but the apparently similar *dh* in the last equation is really a completely different symbolism that means "delta h". You're also expected to figure out that *A(h)* in that last equation does <u>not</u> mean a value *A* times some value *h*, but rather that *A* is a function that turns some value *h* into a completely different value "*A of h*", whose meaning in this case is that *h* is a position and *A(h)* is a cross-sectional area at that position. The *A(h)* functional notation is sometimes used in ordinary algebra also, but it really becomes important in higher math such as trig and calculus. Nonetheless, there's a common concept: both *h* and *A(h)* represent ordinary numbers, we just don't happen to know their values yet.

As a further example, consider http://en.wikipedia.org/wiki/Fahrenheit :

	from Fahrenheit	to Fahrenheit
Celsius	[°C] = ([°F] − 32) × 5⁄9	[°F] = [°C] × 9⁄5 + 32

Here, the notation "[°C]" denotes a single variable whose meaning is "temperature in degrees Celsius". So, the notation [°C] = ([°F] − 32) × 5⁄9 in this context means exactly same thing as the notation C = (F-32)*5/9 that we encountered earlier in class.

Not to harp on the point, but...

There is no such thing as <u>The</u> Language of Mathematics. There are a bunch of dialects. Be sure you know what those symbols mean, at the place they're being used!