QUANTITY CALCULUS

You will often come across tables written in the form

m/kg	1	4	7	11
P/N m^{-2}	5	15	64	321

where m and P are the mass and pressure. Similar forms are to be found labelling the axes of graphs.

The form is called "quantity calculus", and the underlying idea is to render dimensionless the values reported. Thus, for the second entry in the table, the mass is 4 kg, and m/kg = 4. The method is neat, saves space and repetition, and is *supposed* to be less ambiguous than other methods.

Quantity calculus is even neater when it comes to displaying values with multipliers. Formerly, you might have found tables of masses like these

m ($\times 10^4$ kg)	5.2	6.3	7.8	

or

m (kg $\times 10^4$)	5.2	6.3	7.8	

or

m	5.2	6.3	7.8	$\times 10^4$ kg

Are you sure what the entries really mean? Is the first one 5.2×10^4 kg, or 5.2×10^{-4} kg? The extended quantity calculus form would be

$m/10^{-4}$kg	5.2	6.3	7.8

It is now (meant to be) clear that, for the first entry, $m/10^{-4}\text{kg} = 5.2$, so that, by simple algebra, $m = 5.2 \times 10^{-4}$kg. Another way of looking at it is that the units themselves are the composite (10^{-4}kg), which is 100mg.

The version that I have just given is the one preferred by most publishers, and by the commissions on units. However, you will quite often find the multiplier attached to the variable, rather than to the unit

$10^4 m$/kg	5.2	6.3	7.8

The first entry now means that 10^4 times the mass is 5.2kg, or $m = 5.2 \times 10^{-4}$kg, as before. Writing it out algebraically, $10^4 m/\text{kg} = 5.2$, so again $m = 5.2 \times 10^{-4}$kg.

Although not 'approved', I have seen this second form in several Oxford examination papers, so beware!

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22 January 2004