

## Equation Typesetting - A Tiny Resource

This is an attempt at a Direct PostScript mark-up resource for setting fractional equations. It relies on the Symbol font for mathematical symbols, but may need its own maths font to make the 8-bit ascii characters available to different o/s users. I felt that the marked-up file should be capable of interpretation to the average eye. Secondly, that vertical measurements must be proportional to any chosen line spacing, so that the equation is always evenly spaced vertically, irrespective of font size. Thirdly, I felt that horizontal measurements should be proportional to the font size as fixed distances in points could cause linear distortion if the font size were changed at any time.

A fractional equation usually has three main units; the numerator; the division line (?); and a denominator. The numerator and denominator may themselves be similarly divided into the same three components and any character may also have an attached superior or inferior figure. In addition, mathematical symbols are needed for the square root, the Greek operators, braces, etc.

Let's start with an easy one;  $2x / y = 24$ . The longer of the numerator or denominator is set first with an N or D code, in this case the numerator  $2x$ . The length of the bar is calculated and drawn by MB and the denominator is centred by a space on either side and set by D. The central characters are set by the in-line s code.

(2x) N MB ( y ) D ( = 24 ) s becomes  $\frac{2x}{y} = 24$

If the longer unit is broken by superior or inferior figures or by inline fractions, then the despised word processing method of formatting with spaces is used either side of the shorter unit and that is set first. A superior figure needs an extra lift with up and back again with dn codes, or it will be set relative to the bar, not the associated upper or lower character.

( y ) D MB (2x) N up (2) sup dn ( = 24 ) s becomes  $\frac{2x^2}{y} = 24$

The expression:  $3x \text{ sqd} / 4y + 5x = 24$  is set with the longer denominator first, then the bar, and the numerator.

(4y + 5x) D MB ( 3x) N up (2) sup dn ( = 24 ) s becomes  $\frac{3x^2}{4y + 5x} = 24$

The current body font size/style (in this instance 10 point roman) must be reset after using the Symbol font. The proportional bar PB which sets the overall numerator square root is relative to the length of the last D or N and may need fine-tuning after proofing. The T tabbing value moves the equation across the page.

200 T (4y + 5x) D MB up ( ) s 12 sqrt dn 10 rom (3x) N up (2) sup dn up up 1.2 PB dn dn ( = 24 ) s

$$\frac{\sqrt{3x^2}}{4y + 5x} = 24$$

Sometimes left and right handed curved double braces are needed to span both the numerator and denominator. As they aren't in the Symbol font, we have to make our own LB and RB. They look jagged on-screen in PDF but print properly. The superior <sup>2</sup> following RB is spaced away from the right double brace.

150 T (4.25) D MB ( 1 ) N ( x ) s LB 2 k (273) N MB ( 183 ) D RB up ( 2) sup dn ( x ) s (5) N MB (6) D ( = ) s (5.5) D MB ( 1 ) N ( or nearly. ) P

$$\frac{1}{4.25} \times \left( \frac{273}{183} \right)^2 \times \frac{5}{6} = \frac{1}{5.5} \text{ or nearly.}$$

Setting text is quite easy:

180 T (mitre length) N MB ( line width ) D ( = ) s ( 1 ) N MB dn dn ( sin ) s LB 10 sym ( j ) N 10 rom RB MB ( 2 ) D up up

$$\frac{\text{mitre length}}{\text{line width}} = \frac{1}{\sin \left( \frac{\phi}{2} \right)}$$

This is a beta resource and needs correct characters for minus and multiplication signs and perioddecimals but I would be grateful for observations from mathematicians and PC and Unix users. In particular, how best to make the 8 bit Symbol characters appear using those operating systems.

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