Procedure for drawing a nomagram to show the relationship between three variables.

To draw an N or Z chart, the relationship between the three variables (x, y and z) needs to

be in the form $$f(z) = \frac{f(x)}{f(y)}$$

The function by itself (ie f(z)) will form the diagonal. The zero values for functions x and y will lie

at opposite ends of the diagonal so that the values for x will increase from left to right and the

values for y will increase from right to left as shown in Figure 1.

f(y)   0

Figure 1   f(z)

0   f(x)
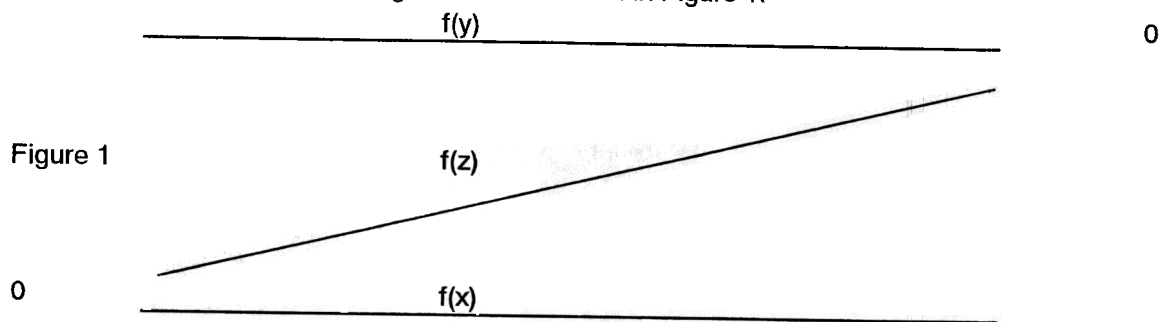
(Alternatively, the diagram could be a mirror image of Figure 1 and this would still be quite valid. Fig 2)
0   f(y)

Figure 2   f(z)

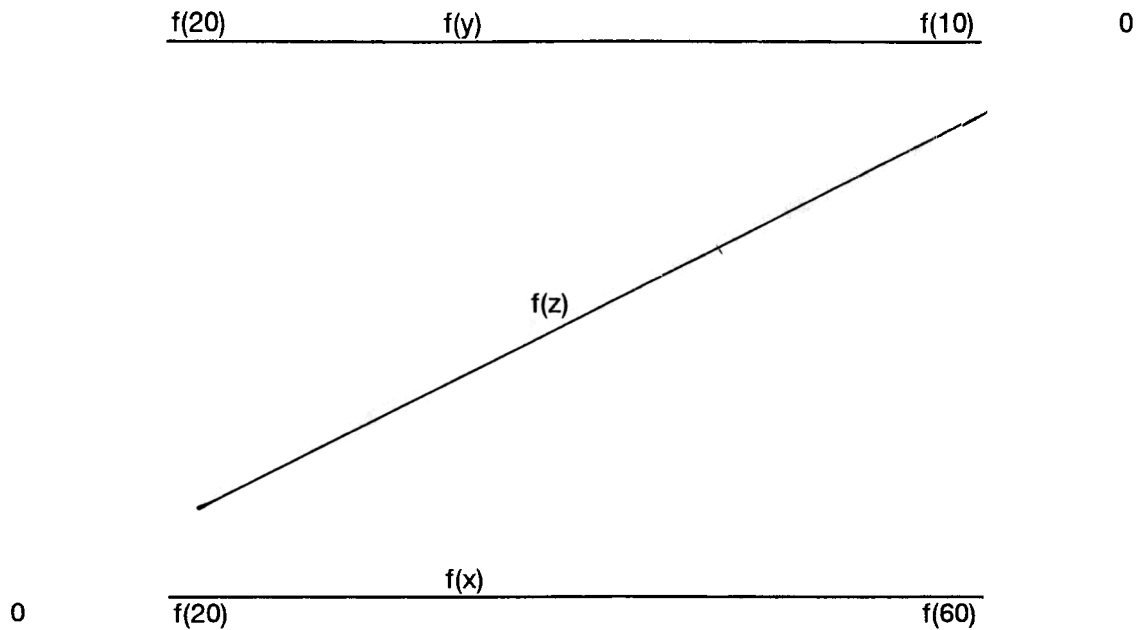f(x)   0
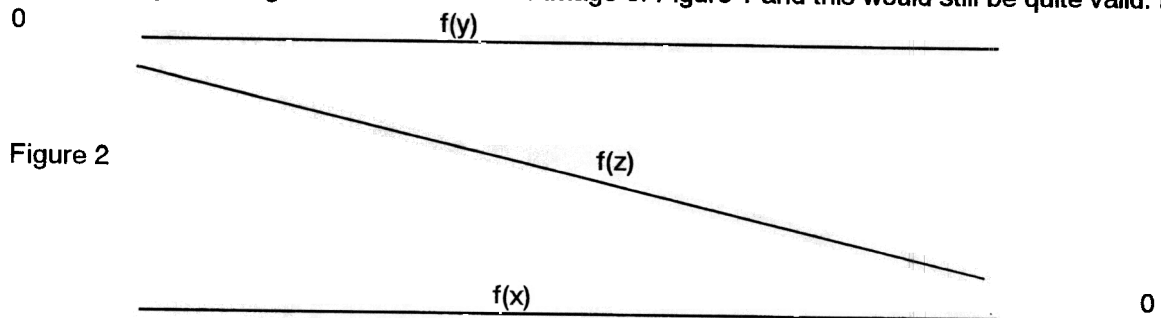
The values for f(z) will be measured from the zero point of which ever function forms the numerator

in the equation ie f(x) in this case. The zero points do not need to be shown on the graph.

The scales for f(x) and f(y) can be any convenient scale and the length of the diagonal can be

any convenient length. The distance between the scales can be any convenient distance.

Procedure

1 Select the range of values for x to be covered eg say x varies from 20 to 60.

2 Calculate the values for f(x) for x = 20,21,...   .....60.

3 Select the range of values for y to be covered eg say y varies from 10 to 20.

4 Calculate f(y) for y = 10, 11,   .20.

5 Plot f(x) and f(y) values on parallel lines to give a conveniently sized diagram (Fig 3). (Don't

plot just the x and y values unless f(x) and x are the same thing or f(y) and y are the same thing.)

Figure 3

Figure 3

f(20)   f(y)   f(10)   0
_____

                                                    f(z)

                              f(x)
                    _____
0   f(20)   f(60)

6 The positions for z can be calculated mathematically but it is simpler to find the position

on the line for a particular value of z by knowing the values of x and y to give the required z.

For example, if x = 32 and the position for z = 20 needs to be determined, calculate the value for y.

Say that the value calculated for y is 12.5. Next , place a ruler to join the points f(x=32) and

f(y=12.5) to determine the intercept on the z axis.

7 Use this procedure for all the values of z required.

8 Calculate some other values for f(y) for different values of x to give desired values of z as

a cross check.

9 Mark the positions of x and y (not f(x) and f(y))on the horizontal scales.

10 Mark the positions of z on the diagonal scale.

(See example under pulp density calculations)