FINANCIAL MATHEMATICS

Percentages & Decimals

Converting percentages to decimals involves moving the decimal point two places....

$$7\% = 0.07$$

$$32\% = 0.32$$

$$128\% = 1.28$$

$$3.9\% = 0.039$$

$$0.6\% = 0.006$$

Reciprocals

A number multiplied by its reciprocal equals one...

$$reciprocal\ of\ 5 = \frac{1}{5}$$

$$reciprocal\ of\ \frac{732}{17} = \frac{17}{732}$$

$$reciprocal\ of\ \frac{1}{9} = 9$$

Division & Reciprocals

Division is the same as multiplying the numerator by the reciprocal of the denominator. So....

$$\frac{n}{5} \equiv n \times \frac{1}{5}$$

$$\frac{n}{\frac{732}{17}} \equiv n \times \frac{17}{732}$$

$$\frac{n}{\frac{1}{9}} \equiv n \times 9$$

Decimals & Reciprocals

Reciprocals of fractions are easy – i.e., the reciprocal of $\frac{a}{b} = \frac{b}{a}$. Reciprocals of decimal numbers are easy when the decimal can be readily converted to a fraction...

$$0.25 = \frac{1}{4}\ ergo...$$

$$the\ reciprocal\ of\ 0.25 = 4$$

$$0.333\overline{3} = \frac{1}{3} ergo..$$

$$the\ reciprocal\ of\ 0.333\overline{3} = 3$$

$$0.01 = \frac{1}{100} ergo...$$

$$the\ reciprocal\ of\ 0.01 = 100$$

Changing the Denominator

With division there is an inverse relationship between the denominator and the quotient. That is, the larger the denominator the smaller the quotient, and the smaller the denominator the larger the quotient.   [See Chart]

$$\frac{79}{163} = 0.4847$$

$$\frac{79}{58} = 1.3621$$

$$\frac{79}{1} = 79$$

Denominators < one

When dividing by an amount *less than* one the quotient will be *larger* than the numerator. Further, *the inverse relationship between a denominator and the quotient still holds.* [See Chart]

$$\frac{79}{0.9} = 87.7777\overline{7}$$

$$\frac{79}{0.367} = 215.2589$$

$$\frac{79}{0.01} = 7,900$$

Decimal Division Short-Cuts

When you see that a denominator is
- less than one, and
- equates to a simple fraction

you ought to be able to divide by that decimal off the top of your head.

because the reciprocal of $0.5 = 2\ldots$ $$\frac{n}{0.5} \equiv n \times 2$$
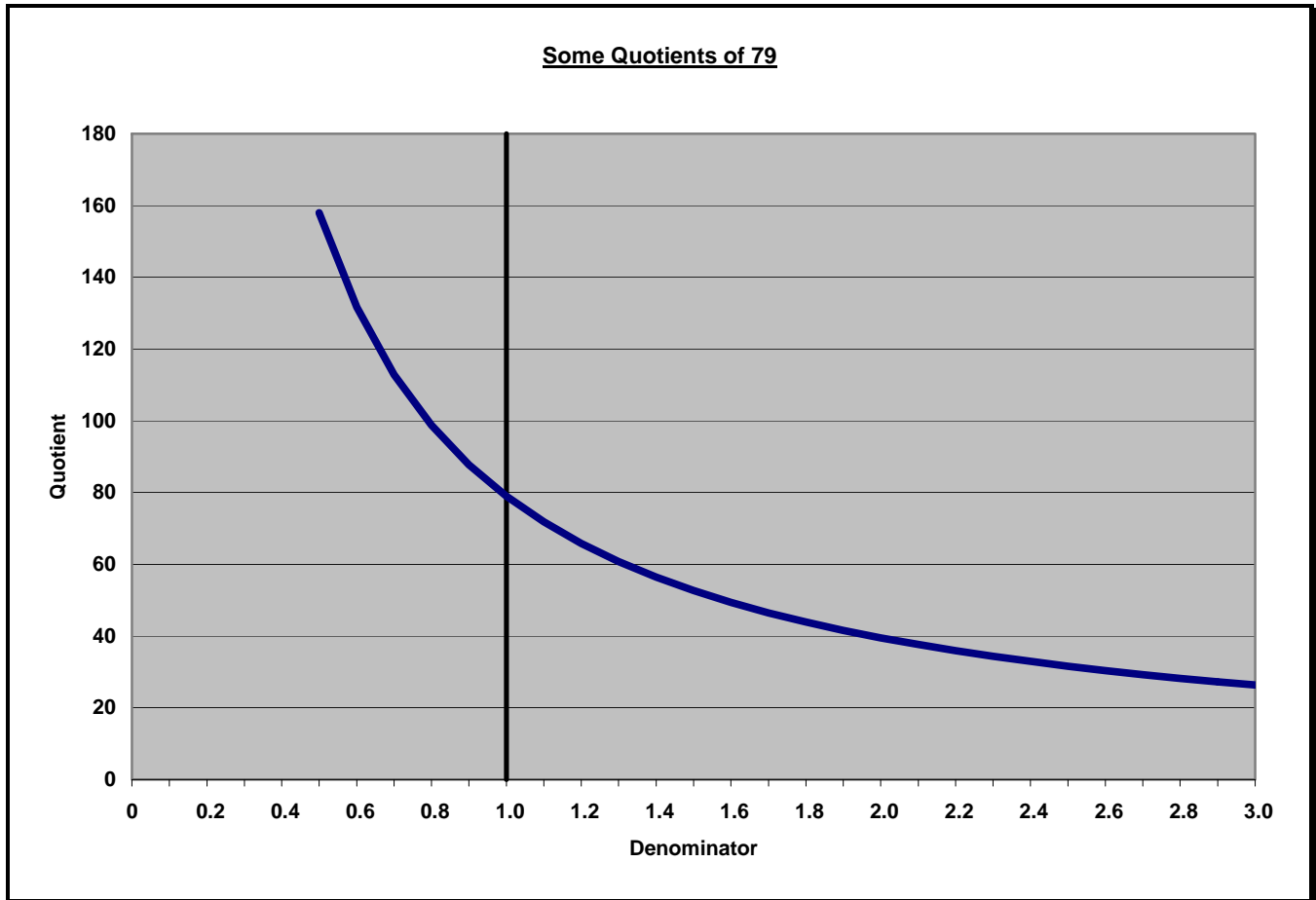
because the reciprocal of $0.25 = 4\ldots$ $$\frac{n}{0.25} \equiv n \times 4$$

because the reciprocal of $0.1 = 10\ldots$ $$\frac{n}{0.1} \equiv n \times 10$$

Chart

Here is a graph showing the quotients of 79 for denominators between 0.5 and 3.0

Some Quotients of 79

(Chart: x-axis "Denominator" from 0 to 3.0; y-axis "Quotient" from 0 to 180; a decreasing curve passing through approximately (1.0, 79), with a vertical line at Denominator = 1.0)

Exponents

Exponents are encountered quite frequently in financial equations. As a reminder, here are two easily-forgotten conventions regarding exponents:

$$x^{1/n} \equiv \sqrt[n]{x} \equiv the\ n^{th}\ root\ of\ x$$

$$x^{-n} \equiv \frac{1}{x^n}$$