An Introduction to Mathcad

by S.E. Van Bramer (9/6/96)

I Perform most mathematical calculations using a program called Mathcad. Solutions to problems will often be posted as output of a Mathcad document. This introduction will show you how to read these. As new Mathcad techniques are developed, I will include further explinations.

Different types of Equations and their use:

$x := 5$

This defines the variable x as equal to 5. Notice the equals sign starts with a colon.

$x = 5$

The regular equals sign returns the current value of a variable. Here I am asking what x is equal to. The value (5) was set above.

$x \cdot 5 = 25$

Here I am asking what x times 5 is equal to. The small dot means multiply

$y := x + 10$

Notice the equals sign. I am defining a new variable (y) as equal to x plus 10.

$y = 15$

And this is asking what y is equal to.

Symbolic Calculations:

$x + y = 15$

has solution(s)

$-x + 15$

To help you follow the algebra required for many claculations I will use "symbolic" calculations. Notice the equals sign is **bold** here. This means that I am just setting up an equation. Mathcad can then manipluate this relationship (to rearrange the variables). In this example, the book may give the first equation. But now I want to rearrange it in terms of y. This would give the following solution (-x+15). Check out the algebra and verify this.

Units:

$distance := 10 \cdot mi$

$time := 20 \cdot min$

$speed := \dfrac{distance}{time}$

Mathcad also includes unit calculations. It knows most units and the appropriate conversiion factors. Here I have defined the distance as 10 miles and the time as 20 minutes. Finally I define the speed as distance divided by time.

$speed = 13.411 \cdot m \cdot sec^{-1}$

Here I have asked what the speed is equal to. The default is to provide the answer in SI units. Meters per second (Mathcad took care of converting miles to meters and minutes to seconds). Also note that the sec-1 (where -1 is a superscript) means per second. The negative one exponent is the same as divided by. If you do not remember this you need to review some math notation.

$speed = 30 \cdot \dfrac{mi}{hr}$

Here I just told mathcad to use different units and the numerical value is changed (using appropriate conversion factors). These two speeds are equivilent, just different units.

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