[6.17] Use dd.mmssss format to convert angles faster

Surveyors and civil engineers commonly measure angles in degrees, minutes, seconds and fractions of a second. The 89/92+ can convert these angles to decimal angles: just enter the angle on the command line, and enter it:

12°34'56" [ENTER]

gives the result 12.582222° in the Degree angle mode, and 0.219601 rad in Radian angle mode.

However, to enter this angle requires these keystrokes:

1, 2, [2nd][d], 3, 4, [2nd][b], 5, 6, [2nd][l], [ENTER]

That is an additional six keystrokes to enter the degrees, minutes and seconds characters. This is time-consuming if you need to do it a lot, and you either have to remember the [2nd][d] and [2nd][l] shortcuts, or look them up.

An alternative method to enter angles is the format *dd.mmssss*. The angle is entered as a floating point number, where *dd* is degrees, *mm* is minutes, and *ssss* is seconds. For example,

12.345678 is equivalent to 12° 34' 56.78"

This angle format is used on the HP48/49 series of calculators, among other machines. Since the 89/92+ do not directly support this angle format, you need a conversion routine to convert the entered angle to decimal degrees or radians. The routine, called *dms(),* is:

```
dms(a1)
func
©Convert angle in D.MS format to decimal degrees or radians.
©By Doug Burkett & anonymous poster
©Input angle a1 is in format dd.mmsss, 12.345678 = 12°34'56.78"
©Returns result in degrees in Degree angle mode; in radians in Radian mode.

((100*fpart(100*a1))/3600+(ipart(100*fpart(a1))/60)+ipart(a1))°

Endfunc
```

This routine works for positive and negative angles, regardless of the display exponent mode setting. The correct result is returned depending on the current Angle mode, either radians or degrees. This is accomplished by ending the function equation with the ° symbol. I thank the anonymous poster for pointing this out.

You might think that the inverse conversion, from decimal degrees or radians, to degrees, minutes and seconds, could be done with the ▸DMS instruction. This is true if you only want to *see* the conversion result. For example

12.5▸DMS returns 12°30'

This is not in the required DMS format of 12.30. This routine converts decimal degrees or radians to the DMS format:

```
dmsi(a1)
func
©Convert angle in decimal degrees or radians to D.MS format
©By Doug Burkett & anonymous poster
©Angle a1 is returned in format dd.mmsss, 12.345678 = 12°34'56.78"
©Assumes angle 'a1' is degrees if angle mode is Degree, or radians if the mode
is Radian.
```

```
if getmode("angle")="RADIAN":a1*57.295779513082→a1
ipart(a1)+.01*(ipart(60*fpart(a1)))+.006*fpart(60*fpart(a1))
Endfunc
```

In summary:

dms() converts an angle in DMS format to degrees in Degree mode, or radians in Radian mode.

dmsi() converts an angle to DMS format. The angle is assumed to be degrees in Degree mode, and radians in Radian mode.