TI-86 Programmed for Sight Reduction Using Law of Cosines Method

Program Listing

PROGRAM:NAVSR
:Degree
:sin-1((cos(LHA)*cos(LAT)*cos(DE)) +(sin(LAT)*sin(DE)))->HC
:Disp "HC"
:Disp HC
:cos-1((sin(DE) – (sin(LAT)*sin(HC)))/(cos(LAT)*cos(HC)))->Z
:Disp "Z"
:Disp Z
:Stop
:End

INSTRUCTIONS: Key in latitude (**LAT**), local hour angle (**LHA**), & declination (**DE**) of the body converted to 5 place rounded decimal degrees (per USPS ED SR 96a Form). Enter latitude as a positive number. **If latitude and declination have contrary names enter the declination as a negative number.** Execute the **NAVSR** program to calculate the altitude of the body (**HC**) and the azimuth angle (**Z**).

EXAMPLE: DR latitude = **47.59667 <u>N</u>**, local hour angle of the body = **302.19500** and the declination of the body = **3.29500 <u>S</u>**

- ❑ First turn on the calculator and clear the display by pressing the **ON** key then press the **CLEAR** key. You are now ready to enter the data for declination of the body, local hour angle of the body, and the DR latitude.
- ❑ Enter the declination of the body: Press the minus (**-**) key, then key in **3.29500** and pres the **STO**-> key followed by the **D** key and the **E** key. Now press the **ENTER** key.
- ❑ Enter the local hour angle: Key in **302.19500** and pres the **STO**-> key followed by the **L** key, the **H** key, and the **A** key. Now press the **ENTER** key.
- ❑ Enter the latitude of your DR: Key in **47.59667** then pres the **STO**-> key followed by the **L** key, the **A** key and the **T** key. Now press the **ENTER** key.

The calculator display should appear as follows:
-**3.29500->DE**
                -**3.29500**
302.19500->LHA
                302.19500
47.59667->LAT
                47.59667

You are now ready to calculate the computed altitude of the body by executing the **NAVSR** program. Press the **ALPHA** key twice to set alpha lock mode. Now press the **N** key then the **A** key then the **V** key then the **S** key and then the **R** key. Now press the

ENTER key. The value of **HC** will be displayed as **18.4367127481** and the value of **Z** will be displayed as **117.057631619**.

The calculator display should appear as follows:

> 47.59667

NAVSR
HC
> 18.4367127481

Z
> 117.057631619
>> **Done**

An alternate way to execute the program:
- First turn on the calculator and clear the display by pressing the **ON** key then press the **CLEAR** key. You are now ready to enter the data for declination of the body, local hour angle of the body, and the DR latitude.
- Enter the declination of the body: Press the minus (-) key, then key in **3.29500** and pres the **STO**-> key followed by the **D** key and the **E** key. Now press the **ENTER** key.
- Enter the local hour angle: Key in **302.19500** and pres the **STO**-> key followed by the **L** key, the **H** key, and the **A** key. Now press the **ENTER** key.
- Enter the latitude of your DR: Key in **47.59667** then pres the **STO**-> key followed by the **L** key, the **A** key and the **T** key. Now press the **ENTER** key.

The calculator display should appear as follows:

-**3.29500->DE**
> -**3.29500**

302.19500->LHA
> **302.19500**

47.59667->LAT
> **47.59667**

You are now ready to calculate **HC** & **Z** by executing the **NAVSR** program. Press the **PRGM** key. Now press the **F1** key then press the **F1** key for a second time. Now press the **ENTER** key. The calculator display should appear as follows:

> 47.59667

NAVSR
HC
> 18.4367127481

Z
> 117.057631619
>> **Done**