

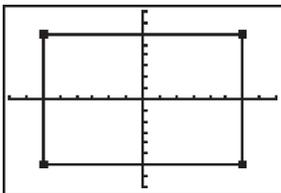
## CHAPTER 11 Calculator Notes for the TI-83 and TI-83/84 Plus

### Note 11A • Square Windows

In a square window, the horizontal and vertical scales in the screen are equal in size. A square window is sometimes preferred because it displays no visual distortion.

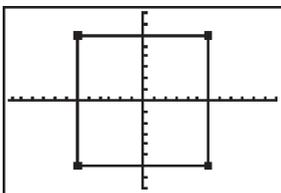
See **Note 7D** to learn about friendly square windows. To create a window that is square, but not necessarily friendly, begin by entering a window range that shows what you want to see of the graph. Below, the square with vertices  $(-6, -6)$ ,  $(6, -6)$ ,  $(6, 6)$ , and  $(-6, 6)$  is shown. Notice that it does not look like a square—it is distorted. You can see that the scales on the horizontal and vertical axes are not the same size.

```
WINDOW
Xmin=-8
Xmax=8
Xscl=1
Ymin=-8
Ymax=8
Yscl=1
Xres=1
```



Now press **ZOOM** and select 5:ZSquare. The window is adjusted so that it is square. Notice that the square is no longer distorted.

```
ZOOM MEMORY
1:ZBox
2:Zoom In
3:Zoom Out
4:ZDecimal
5:ZSquare
6:ZStandard
7:ZTrig
```



```
WINDOW
Xmin=-12.12903...
Xmax=12.129032...
Xscl=1
Ymin=-8
Ymax=8
Yscl=1
Xres=1
```

### Note 11B • Trigonometric Functions

The trigonometric functions in this calculator work with angles that are measured either in degrees or in units called radians. In this course, all angles will be measured in degrees. Press **MODE** and check that your calculator is set to DEGREE mode.

```
NORMAL SCI ENG
FLOAT 0 1 2 3 4 5 6 7 8 9
RADIAN DEGREE
FUNC PAR POL SEQ
CONNECTED DOT
SEQUENTIAL SIMUL
REAL a+bi re^θi
FULL HORIZ G-T
SET CLOCK 07:07:07 7:07AM
```

The keys for the three trigonometric functions—sine, cosine, and tangent—are **SIN**, **COS**, and **TAN**. (If you look around you might find a calculator menu with **sinh**, **cosh**, and **tanh**. These are not the trigonometric functions you want to use.) Press the key with the function you need and enter an angle measure. Close the parentheses and press **ENTER**. The output is the trigonometric ratio expressed as a decimal number.

```
sin(23)
.3907311285
cos(63)
.4539904997
tan(47)
1.07236871
```

### Note 11C • Inverse Trigonometric Functions

Press **MODE** and check that your calculator is set to Degree mode.

```
NORMAL SCI ENG
FLOAT 0 1 2 3 4 5 6 7 8 9
RADIAN DEGREE
FUNC PAR POL SEQ
CONNECTED DOT
SEQUENTIAL SIMUL
REAL a+bi re^θi
FULL HORIZ G-T
SET CLOCK 07:07:07 7:07AM
```

(continued)

To convert a trigonometric ratio back to an angle measure, use the inverse function found above the same key as the function. Press  $\boxed{2nd}$ , select the inverse function, either  $[\text{SIN}^{-1}]$ ,  $[\text{COS}^{-1}]$ , or  $[\text{TAN}^{-1}]$ , and enter the ratio. Then, close the parentheses and press  $\boxed{\text{ENTER}}$ . The output is an angle measured in degrees.

```
sin(23)
.3907311285
sin-1(.3907311285)
)
23
```

```
cos(63)
.4539904997
cos-1(Ans)
63
```

```
tan(47)
1.07236871
tan-1(1.07236871)
47
```

When using an inverse trigonometric function, the ratio can be entered either as a decimal number or as a fraction.

```
sin-1(1/2)    30
cos-1(√(3)/2) 30
tan-1(1/√(3)) 30
```

Often, when using an inverse trigonometric function, the degree measure of the output angle is not a whole number.

```
tan-1(4/3)
53.13010235
cos-1(.3241)
71.08894232
```