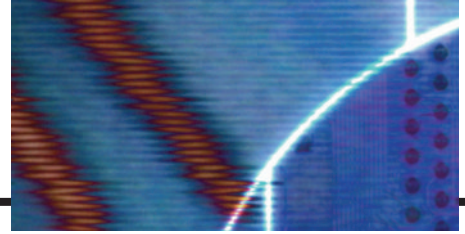


Appendix B



TI-86 CALCULATOR

This appendix provides information for those students who have a TI-86 calculator. The coverage parallels that given for the TI-89 in the text material.

INITIAL SETTINGS

For the TI-86 calculator, pressing the 2nd function (yellow) key followed by the MODE key provides a list of options for the initial settings of the calculator. For each item in the MODE list, use the scroll keys to make a selection and then select the ENTER key.

ORDER OF OPERATIONS

The order of operations is the same as for the TI-89 calculator.

DETERMINANTS

The determinant operator is obtained by the sequence: **2nd FUNCTION-MATRIX-MATH**. The **det** operator appears at the far left of the listing at the bottom of the screen. Select it by pressing the **F1** key. Once selected, enter all the parameters of the matrix within a set of brackets. Enter the first row of the determinant within a second set of brackets with a comma between each entry. Enter the second row in the same manner. After adding the closing bracket, select the **ENTER** key to provide the solution. Always be aware that the number of brackets forming a left enclosure must equal the number forming a right enclosure.

Following are the determinants for the current I_1 and the calculator input required:

$$I_1 = \frac{\begin{vmatrix} 2 & 4 \\ 6 & 5 \end{vmatrix}}{\begin{vmatrix} 6 & 4 \\ 4 & 5 \end{vmatrix}} = \frac{10 - 24}{30 - 16} = \frac{-14}{14} = -1 \text{ A}$$

det[[2,4][6,5]]/det[[6,4][4,5]	ENTER	-1
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Following is a third-order determinant and the calculator input required:

$$I_3 = I_{10\Omega} = \frac{\begin{vmatrix} 11 & -3 & 15 \\ -3 & 10 & 0 \\ -8 & -5 & 0 \end{vmatrix}}{\begin{vmatrix} 11 & -3 & -8 \\ -3 & 10 & -5 \\ -8 & -5 & 23 \end{vmatrix}} = 1.22 \text{ A}$$

det[[11,-3,15][-3,10,0][-8,-5,0]]/det[[11,-3,-8][-3,10,-5][-8,-5,23]]	ENTER	1.22
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EXPONENTIAL FUNCTION

The exponential function e^x is obtained through the sequence 2nd Function e^x .

For the equation

$$v = 20 \text{ V}(1 - e^{-2.5})$$

the calculator sequence would be the following:

20 (1 - 2nd e^x (-) 2.5) ENTER	18.3
---	------

LOGARITHMS

The natural logarithm (\log_e) is obtained using the LN key. That is, $\log_e 2$ is obtained using the following sequence:

LN 2 ENTER	693.15E-3
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The common logarithm (\log_{10}) is obtained using the LOG key. That is, $\log_{10} 2$ is obtained using the following sequence:

LOG 2 ENTER	301.03E-3
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The antilogarithm of a natural logarithm permits working backwards on the above operation. That is, it provides the number we have to take the natural logarithm of to obtain the given number. For instance, the natural logarithm of what number will result in 693.15E-3? This is expressed in equation form as follows:

LN (?) = 693.15E-3

The result is obtained using the exponential function in the following manner:

$$e^{693.15E-3} = 2.00$$

The calculator sequence is:

2nd e^x 693.15EE(-)3 ENTER	2.00
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The common logarithm,

LOG (?) = 301.03E-3

is processed with

2nd 10^x 301.03EE(-)3 ENTER	2.00
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TRIGONOMETRIC FUNCTIONS

Degrees vs. Radians

The choice is made by selecting one or the other from the **MODE** listing. Don't forget the **ENTER** operation before leaving the screen!

Sin, Cos, and Tan

Select the appropriate key followed by the angle in degrees as in the following:

SIN 30	ENTER	0.50
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Sin^{-1} , Cos^{-1} , and Tan^{-1}

The 2nd function must be used to obtain the desired function as shown below:

2nd SIN^{-1} 0.5	ENTER	30
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COMPLEX NUMBERS

To convert complex numbers on the TI-86 calculator, you must first call up the 2nd function **CPLX** from the keyboard, which results in a menu at the bottom of the display including conj, real, imag, abs, and angle. If you choose the key **MORE**, **► Rec** and **► Pol** appear as options (for the conversion process). To convert from one form to another, enter the current form in brackets with a comma between components for the rectangular form and an angle symbol for the polar form. Follow this form with the operation to be performed, and select **ENTER**. The result appears on the screen in the desired format.

To convert $3 - j4$ to polar form:

(3, -4) ► Pol	ENTER	(5.00E0 \angle -53.13E0)
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To convert $0.006^{20.6}$ to rectangular form:

(0.006 \angle 20.6) ► Rec	ENTER	(5.62E-3, 2.11E-3)
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To solve this equation:

$$\frac{(2 \angle 20^\circ)^2 (3 + j4)}{8 - j6} = ?$$

use this sequence:

$((2 \angle 20) ^2 * (3,4))/(8, -6)$ ► Pol	ENTER	(2.00E0 \angle 130.00E0)
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