

Scientific Series

Scientific Calculator CalcPAL<sup>®</sup> EAI-350



User's manual

### **Safety Precautions**

Be sure to read the following safety precautions before using this calculator. Keep this manual handy for later reference.

# Caution

This symbol is used to indicate information that can result in personal injury or material damage if ignored.

#### Batteries

- After removing the battery from the calculator, put it in a safe place where it will not get into the hands of small children and accidentally swallowed. · Keep batteries out of the reach of small children. If
- accidentally swallowed, consult with a physician immediately. Never charge batteries, try to take batteries apart, or
- allow batteries to become shorted. Never expose batteries to direct heat or dispose of them by incineration.
- Misuse of batteries can cause them to leak and damage nearby items, and can create the risk of fire and personal injury.
- Always make sure that the battery's positive  $\oplus$  and negative  $\Theta$  ends are facing correctly when you load
- it into the calculator. · Remove the battery if you do not plan to use the calculator for a long time
- Use only the type of battery specified for this calculator in this manual.

**Disposing of the Calculator** • Never dispose of the calculator by burning it. Doing so can cause certain components to suddenly burst, creating the risk of fire and personal injury.

- The displays and illustrations (such as key markings) shown in this User's Guide are for illustrative purposes only, and may differ somewhat from the actual items they represent.
- The contents of this manual are subject to change without notice.

• Pressing the MORE key more than twice displays additional • Example 3:  $\frac{2}{4} = \frac{1}{2}$ setup screens. Setup screens are described in the sections of this manual where they are actually used to • Example 4:  $\frac{1}{2}$  +1.6 = 2.1

perform.

Conversion

greater than one

below

20%

5.

20.

● Decimal ↔ Fraction Conversion

Use the operation shown below to convert calculation

• Note that conversion can take as long as two seconds to

2 75 🗖

SHIFT d/c

1 🌆 2 🗖

1 🌆 2 🖓 3 🗖

the display format when a fraction calculation result is

• To change the fraction display format press the MODE key

a number of times until you reach the setup screen shown

• Press the number key (1 or 2) that corresponds to

• An error occurs if you try to input a mixed fraction while

• Example 2: To calculate what percentage of 880 is 660

\* As shown here, if you want to use the current Answer

Memory value in a mark up or discount calculation, you

need to assign the Answer Memory value into a variable

and then use the variable in the mark up/discount

calculation. This is because the calculation performed

when <sup>(%)</sup> is pressed stores a result to Answer Memory

• Example 6: If 300 grams are added to a test sample

• Example 7: What is the percentage change when a value

is increased from 40 to 46? How about to 48?

Degrees, Minutes, Seconds

originally weighing 500 grams, what is the percentage

before the 🗖 key is pressed.

increase in weight?

Disp

1 🕨

the setting you want to use

1 (a<sup>b</sup>/<sub>k</sub>): Mixed fraction

2(d/c): Improper fraction

the d/c display format is selected.

Percentage Calculations

• Example 1: To calculate 12% of 1500 (180)

• Example 3: To add 15% onto 2500 (2875)

• Example 4: To discount 3500 by 25% (2625)

SHIFT d/c

SHIFT d/c

 $a_{k}^{b}$ 

 $a_{k}^{b_{k}}$ 

results between decimal values and fraction values.

• Example 1: 2.75 =  $2\frac{3}{4}$  (Decimal  $\rightarrow$  Fraction)

· In this manual, the name of the mode you need to enter in order to perform the calculations being described is Results of calculations that mix fraction and decimal valindicated in the main title of each section. ues are always decimal.



• To return the calculation mode and setup to the initial

change the calculator setup.

defaults shown below, press SHFT CLR 2 (Mode) Calculation Mode: COMP Angle Unit: Deq Exponential Display Format: Norm 1 Fraction Display Format: ab/c Decimal Point Character: Dot

 Mode indicators appear in the upper part of the display Be sure to check the current calculation mode (SD BEG • Example 2:  $\frac{1}{2} \leftrightarrow 0.5$  (Fraction  $\leftrightarrow$  Decimal) COMP) and angle unit setting (Deg, Rad, Gra) before beginning a calculation.

#### Input Capacity

Note!

• The memory area used for calculation input can hold 79 "steps." One step is taken up each time vou press a number key or arithmetic operator key ( 🛨 , 🚍 , 🔀 ). ● Mixed Fraction ↔ Improper Fraction A step, so inputting IT, for example, takes up only one step. • You can input up to 79 steps for a single calculation. • Example:  $1 \frac{2}{3} \leftrightarrow \frac{5}{3}$ Whenever you input the 73rd step of any calculation, the cursor changes from "\_" to "■" to let you know memory is running low. If you need to input more than 79 steps, you should divide your calculation into two or more parts. Pressing the Ans key recalls the last result obtained, which you can use in a subsequent calculation. See "Answer Memory" for more information about using the Ans key. • You can use the display setup (Disp) screen to specify

#### Making Corrections During Input

• Use <a>Image</a> and <a>Image</a> to move the cursor to the location you want. • Press 🕮 to delete the number or function at the current

cursor position. • Press III INS to change to an insert cursor []. Inputting

something while the insert cursor is on the display inserts the input at the insert cursor position • Pressing INS, or returns to the normal cursor from • Display the selection screen. the insert cursor.

#### Replay Function

 Every time you perform a calculation, the replay function stores the calculation formula and its result in replay memory. Pressing the key displays the formula and result of the calculation you last performed. Pressing 🔺 again back steps sequentially (new-to-old) through past calculations.

• Pressing the d or key while a replay memory calculation is on the display changes to the editing screen. • Pressing the <a>Image</a> or <a>Image</a> key immediately after you finish a calculation displays the editing screen for that calcula-

• Pressing C does not clear replay memory, so you can recall the last calculation even after you press

 Replay memory capacity is 128 bytes for storage of both expressions and results. · Replay memory is cleared by any of the following ac-

tions. When you press the ON kev

When you initialize modes and settings by pressing sur CLR 2 (or 3) 🔳

- When you change from one calculation mode to another When you turn off the calculator.

## Error Locator

• Pressing or after an error occurs displays the calculation with the cursor positioned at the location where the error occurred.

#### Multi-statements

- A multi-statement is an expression that is made up of two or more smaller expressions, which are joined using a colon
- Example: To add 2 + 3 and then multiply the result by 4
  - 2 + 3 APPA : Ans 🗙 4 🚍 2+3

8

Ans×4

2.0	3 [11774]	4 🖿	

# Exponential Display Formats

This calculator can display up to 10 digits. Larger values are automatically displayed using exponential notation. In the case of decimal values, you can select between two formats that determine at what point exponential notation is used.

2 <sup>a</sup> <sup>™</sup> 4 <b>E</b> Consecutive Calculations
---

1 🌆 2 🛨 1.6 🗖

2.75

11\_4.

1」2.

0.5

1\_2.

1\_2\_3.

1」2」3.

1500 💌 12 🎟 🛞

660 🖶 880 BHIFT %

2500 🔀 15 🔤 % 🛨

Alpha 🖪 🗙 20 Shift % 🗖

168 🛨 98 🛨 734 🖃 🗛 🕬 🕅 🗛

(75%)

(800)

(160%)

(15%, 20%)

46 🗖 40 Shift %

300 🛨 500 Shift %

5.3.

2\_3\_4.

 You can use the calculation result that is currently on the display (and also stored in Answer Memory) as the first value of your next calculation. Note that pressing an operator key while a result is displayed causes the displayed value to change to Ans, indicating it is the value that is currently stored in Answer Memory. The result of a calculation can also be used with a subsequent Type A function ( $x^2$ ,  $x^3$ ,  $x^{-1}$ , x!, DRG $\triangleright$ ), +, -,

 $^{(x^{y})}$ ,  $x^{(x^{y})}$ ,  $x^{(x$ 

#### Independent Memory

•	Values can be input directly into memory, added to
	memory, or subtracted from memory. Independent
	memory is convenient for calculating cumulative totals.
•	Independent memory uses the same memory area as
	variable M.
•	To clear independent memory (M), input 0 SHET STO M
	(M+).
•	Example:

23 + 9 = <b>32</b>	23 🛨 9 Shift (M+)
53 - 6 = <b>47</b>	53 🗖 6 M+
−) 45 × 2 = <i>90</i>	45 💌 2 🖭 M-
(Total) –11	RCL M (M+)

#### Variables

•	There are nine variables (A through F, M, X and Y), which
	can be used to store data, constants, results, and other
	values.
•	Use the following operation to delete data assigned to a
	particular variable: 0 SHIFT STO A. This operation de-
	letes the data assigned to variable A.
•	Perform the following key operation when you want to
	clear the values assigned to all of the variables.

• Example: 193.2 ÷ 23 = 8.4 193.2 ÷ 28 = **6.9** 

193.2 SHIFT STO 🖪 🖶 23 🚍 alpha 🖪 🛨 28 🚍

#### **Scientific Function** COMP Calculations

Use the me key to enter the COMP Mode when you	L
want to perform basic arithmetic calculations.	

COMP MODE 1 • Certain types of calculations may take a long time to

complete. · Wait for the result to appear on the display before starting the next calculation.

# • $\pi = 3.14159265359$ Trigonometric/Inverse Trigonometric

Functions • To change the default angle unit (degrees, radians, grads), press the me key a number of times until you reach the angle unit setup screen shown below.



• Press the number key (1, 2, or 3) that corresponds

3500 🗙 25 SHIFT % 🗖 to the angle unit you want to use. • Example 5: To discount the sum of 168, 98, and 734 by  $(90^\circ = \frac{\pi}{2} \text{ radians} = 100 \text{ grads})$ 

Example

Example

• Example 1: sin 63°52′41″ = 0.897859012

#### MODE ..... 1 (Deg) sin 63 👓 52 👓 41 👓 🗖

<b>e 2:</b> $\cos\left(\frac{\pi}{3} \text{ rad}\right) = 0.5$
MODE 2 (Rad)
cos ( Shift ( + 3 ) =
<b>e 3</b> : $\cos^{-1} \frac{\sqrt{2}}{2} = 0.25 \pi \text{ (rad)} \left( = \frac{\pi}{4} \text{ (rad)} \right)$
MODE 2 (Rad)
SHIFT [cos <sup>-1</sup> ] ( √ 2 🖶 2 ) 🚍 Ans 🕂 SHIFT ( ) 🚍

• Example 4:  $\tan^{-1} 0.741 = 36.53844577$ 

MODE ..... 1 (Deg) SHIFT [tan<sup>-1]</sup> 0.741 🖃

# Hyperbolic/Inverse Hyperbolic

#### Functions • Example 1: sinh 3.6 = 18.28545536 Mp Sin 3.6

<ul> <li>Press RCL E to display</li> </ul>	the value of $x$ , or <b>RCL F</b> to dis-
play the value of y.	

Always start data input with sum CLR 1 (Scl) = to clear

• Input data is used to calculate values for n,  $\Sigma x$ ,  $\Sigma x^2$ ,  $\bar{x}$ ,

 $\sigma_n$  and  $\sigma_{n-1}$ , which you can recall using the key opera-

To recall this type of value: Perform this key operation:

• **Example:** To calculate  $\sigma_{n-1}$ ,  $\sigma_n$ ,  $\bar{x}$ , n,  $\Sigma x$ , and  $\Sigma x^2$  for

55 DT

the following data : 55, 54, 51, 55, 53, 53, 54, 52

SHIFT S-SUM 1

SHIFT S-SUM 2

SHIFT S-SUM 3

SHIFT S-VAR 1

SHIFT S-VAR 2

SHIFT S-VAR 3

Each time you press DT to register your input.

the number of data input up to that point is indicated on the display (n value)

54 DT 51 DT 55 DT

SHIFT S-VAR 3 😑

SHIFT S-VAR 2 =

SHIFT S-VAR 1 \Xi

SHIFT S-SUM 3

SHIFT S-SUM 2 🚍

SHIFT S-SUM 1 🔳

53 DT DT 54 DT 52 DT

1.

Input data using the key sequence shown below.

statistical memory.

tions noted nearby

 $\Sigma r^2$ 

 $\Sigma x$ 

п

x

 $\sigma_n$ 

 $\sigma_{n-1}$ 

SHIFT CLR 1 (Scl) 
(Stat clear)

Sample Standard Deviation  $(\mathbf{O}n-1) = \mathbf{1.407885953}$ 

Population Standard Deviation ( $\sigma_n$ ) = **1.316956719** 

• DT DT inputs the same data twice.

and not necessarily that shown above.

· You can also input multiple entries of the same data us-

ing Imm : To input the data 110 ten times, for example, press 110 Imm : 10 Imm.

You can perform the above key operations in any order.

· While inputting data or after inputting data is complete,

you can use the 🔺 and 💌 keys to scroll through data

you have input. If you input multiple entries of the same

data using I to specify the data frequency (number

of data items) as described above, scrolling through data

shows both the data item and a separate screen for the

• You can then edit the displayed data, if you want. Input

the new value and then press the 🖪 key to replace the

old value with the new one. This also means that if you

want to perform some other operation (calculation, recall

of statistical calculation results, etc.), you should always

Pressing the DI key instead of E after changing a value

on the display registers the value you input as a new

You can delete a data value displayed using and

· Data values you register are normally stored in calcula-

tor memory. The message "Data Full" appears and you

will not be able to input any more data if there is no

memory left for data storage. If this happens, press the

Press 2 to exit data input without registering the value

Press 🔟 if you want to register the value you just input,

without saving it in memory. If you do this, however, you

will not be able to display or edit any of the data you

After inputting statistical data in the SD Mode or REG

Mode, you will be unable to display or edit individual data

items any longer after perform either the following

Changing the regression type (Lin, Log, Exp, Pwr, Inv,

Use the more key to enter the REG Mode when you want

• Entering the REG Mode displays screens like the ones

Lin Log Exp → 1 2 3

MODE MODE 2

to perform statistical calculations using regression.

• To delete data you have just input, press sur CL.

EditOFF ESC

by pressing BHFT CL. Deleting a data value causes all

press the AC key first to exit data display.

data item, and leaves the old value as it is.

E key to display the screen shown below.

values following it to be shifted up.

you just input.

have input.

operations.

Quad)

REG

shown below

Changing to another mode

**Regression Calculations** 

1

In the SD Mode:

Arithmetic Mean ( $\bar{x}$ ) = **53.375** 

Number of Data  $(n) = \mathbf{8}$ 

Sum of Values  $(\Sigma x) = 427$ 

Sum of Squares of Values ( $\Sigma x^2$ ) = **22805** 

**Data Input Precautions** 

data frequency (Freq).

<x-data> DT

• Example 2: To convert rectangular coordinates  $(1,\sqrt{3})$ to polar coordinates  $(r, \theta)$  (Rad) r = **2** 

 $\theta = 1.047197551$ RCL F

• Press  $\mathbb{R}$  **E** to display the value of r, or  $\mathbb{R}$  **E** to display the value of  $\theta$ .

#### Engineering Notation Calculations

• Example 1: To convert 56,088	meters to kilometers
→ <i>56.088</i> ×10³	56088 🔳 ENG
(km)	

• Example 2: To convert 0.08125 grams to milligrams 0.08125 🗖 ENG → **81.25** × 10<sup>-3</sup> (mg)

#### Equation Calculations

The EQN Mode lets you solve equations up to three degrees and simultaneous linear equations with up to three unknowns.

Use the MORE key to enter the EQN Mode when you want to solve an equation EQN MODE MODE MODE 1

# ■ Quadratic and Cubic Equations

Quadratic Equation:  $ax^2 + bx + c = 0$ Cubic Equation:  $ax^3 + bx^2 + cx + d = 0$ Entering the EQN Mode and pressing D displays the initial quadratic/cubic equation screen.

•Degree? 2<sup>°</sup> 3

Use this screen to specify 2 (quadratic) or 3 (cubic) as the degree of the equation, and input values for each of the coefficients.

Coefficient na	me			<ul> <li>Arrow indicates direction you</li> </ul>
	1?	C	• ).	should scroll to view other elements.
		Elemer	nt value	

 Any time until you input a value for the final coefficient (c for a quadratic equation, d for a cubic equation), you can use the 🔺 and 💌 keys to move between coefficients on the screen and make changes, if you want. · Note that you cannot input complex numbers for coefficients.

Calculation starts and one of the solutions appears as soon as you input a value for the final coefficient.

e name	Г	<ul> <li>Arrow indicates direction you</li> </ul>
x1=	<u> </u>	should scroll to view other solutions.
	Solution	

Press the  $\blacksquare$  key to view other solutions. Use  $\blacktriangle$  and  $\blacksquare$ to scroll between all of the solutions for the equation. Pressing the AG key at this point returns to the coefficient input screen · Certain coefficients can cause calculation to take more time. • Example 1: To solve the equation  $x^3 - 2x^2 - x + 2 = 0$  (x = 2, -1, 1)

(Degree?)	3
(a?)	1 🖪
(b?)	() 2 =
(c?)	() 1 <b>=</b>
(d?)	2 🖃
(x1 = 2)	$\blacksquare$

 $(x^2 = -1)$ 

Variabl

(x3 = 1)

• If a result is a complex number, the real part of the first solution appears first. This is indicated by the " $R \leftrightarrow I$ " symbol on the display. Press I Re-In to toggle the display between the real part and imaginary part of a solution.

0.25

x1=

	<ul> <li>To change the exponential display format, press the more</li> </ul>	Degrees, Minutes, Seconds Calculations	• Example 1: sinh 3.6 = 18.28545536		
	key a number of times until you reach the exponential display format setup screen shown below.	You can perform sexagesimal calculations using degrees	• Example 2: sinh <sup>-1</sup> 30 = 4.094622224	↓↑ (SHUFT) (Rgim)	+Pwr Inv Quad
		(hours), minutes, and seconds, and convert between			1 2 3
Handling Precautions	Fix Sci Norm 1 2 3	sexagesimal and decimal values.	Common and Natural Logarithms/	<b>0.75</b> <i>i</i>	• Press the number key (1, 2, or 3) that corresponds
		• Example 1: To convert the decimal value 2.258 to a sexagesimal value and then back to a decimal value	Antilogarithms	• Example 2: To solve the equation	to the type of regression you want to use.
• Be sure to press the ON key before using the calcu- lator for the first time.	<ul> <li>Press 3. On the format selection screen that appears, press 1 to select Norm 1 or 2 for Norm 2.</li> </ul>	2.258 🖬 2.258	• Example 1: log 1.23 = 0.089905111	$8x^2 - 4x + 5 = 0$ (x = 0.25 ± 0.75i) (Degree 2)	(Lin): Linear regression     (Log): Logarithmic regression
• Even if the calculator is operating normally, replace the battery at least once every three years.	• Norm 1	التتن 2°15°28.8	• Example 2: In 90 (= log, 90) = <i>4.49980967</i>	(Degree?) 2 (a?) 8	3 (Exp): Exponential regression
the battery at least once every three years.	With Norm 1, exponential notation is automatically used				<ul> <li>I (Pwr): Power regression</li> <li>Inverse regression</li> </ul>
A dead battery can leak, causing damage to and mal-	for integer values with more than 10 digits and decimal			(c?) 5 <b>=</b>	▶ 3 (Quad): Quadratic regression
function of the calculator. Never leave a dead battery in	values with more than two decimal places.	<ul> <li>Example 2: To perform the following calculation: 12°34'56" × 3.45</li> </ul>	• Example 3: $e^{10} = 22026.46579$ [SHF] $e^x$ 10	(x1 = 0.25 + 0.75i)	• Always start data input with Imm CLR 1 (Scl) To clear statistical memory.
the calculator.  • The battery that comes with this unit discharges	• Norm 2 With Norm 2, exponential notation is automatically used	12 ···· 34 ···· 56 ··· ▲ 3.45 🖬 43°24°31.2	• Example 4: 10 <sup>1.5</sup> = <i>31.6227766</i> BHIFT 10 <sup>1</sup> 1.5	$(x^2 = 0.25 - 0.75i)$	<ul> <li>Input data using the key sequence shown below.</li> </ul>
slightly during shipment and storage. Because of	for integer values with more than 10 digits and decimal		• Example 5: $2^4 = 16$ $2 \land 4 \blacksquare$	Simultaneous Equations Simultaneous Linear Equations with Two Unknowns:	<ul> <li><x-data> • <y-data> •</y-data></x-data></li> <li>The values produced by a regression calculation depend</li> </ul>
this, it may require replacement sooner than the normal expected battery life.	values with more than nine decimal places. • All of the examples in this manual show calculation re-	■ FIX, SCI, RND	■ Square Roots, Cube Roots, Roots,	$a_1x + b_1y = c_1$	on the values input, and results can be recalled using
• Low battery power can cause memory contents to	sults using the Norm 1 format.	• To change the settings for the number of decimal places,	Squares, Cubes, Reciprocals,	$a_2x + b_2y = c_2$	the key operations shown in the table below.           To recall this type of value:         Perform this key operation:
become corrupted or lost completely. Always keep written records of all important data.	Decimal Point and Separator Symbols	the number of significant digits, or the exponential dis- play format, press the meet key a number of times until	Factorials, Random Numbers, $\pi$ , and	Simultaneous Linear Equations with Three Unknowns: $a_1x + b_1y + c_1z = d_1$	$\frac{\Sigma \chi^2}{\Sigma \chi^2} \qquad (support of the set of$
<ul> <li>Avoid use and storage in areas subjected to tem- perature extremes.</li> </ul>	You can use the display setup (Disp) screen to specify the	you reach the setup screen shown below.	Permutation/Combination	$a_{2x} + b_{2y} + c_{2z} = d_2$ $a_{3x} + b_{3y} + c_{3z} = d_3$	$\Sigma \chi$ (Shift S-SUM 2
Very low temperatures can cause slow display response,	symbols you want for the decimal point and 3-digit sepa- rator.	Fix Sai Narm	• Example 1: $\sqrt{2} + \sqrt{3} \times \sqrt{5} = 5.287196909$	$a_{3x} + b_{3y} + c_{3z} = a_3$ Entering the EQN Mode displays the initial simultaneous	$n \qquad \qquad$
total failure of the display, and shortening of battery life. Also avoid leaving the calculator in direct sunlight, near	<ul> <li>To change the decimal point and separator symbol set- ting, press the meet key a number of times until you reach</li> </ul>	Fix Sci Norm 1 2 3	<ul> <li>✓ 2 ➡ ✓ 3 ➡ ✓ 5 ➡</li> <li>• Example 2: <sup>3</sup>√5 + <sup>3</sup>√-27 = -1.290024053</li> </ul>	equation screen.	Σy Shift SSUM ► 2
a window, near a heater or anywhere else it might be	the setup screen shown below.		• Example 2: \5 + \-2/ = -1.290024053	Unknowns? +	$ \begin{array}{c} \Sigma_{XY} \\ \overline{x} \\ \overline{x} \end{array} \qquad \begin{array}{c} \text{seurr}  \text{(s-sum)}  \blacktriangleright  \textbf{(3)} \\ \text{(s-sum)}  \textbf{(s-sum)}  \textbf{(1)} \end{array} $
exposed to very high temperatures. Heat can cause dis- coloration or deformation of the calculator's case, and		<ul> <li>Press the number key (1, 2, or 3) that corresponds to the setup item you want to change.</li> </ul>	1	2 3	$\chi$ (SHIFT) (S-VAR) (1) $\chi \sigma_n$ (SHIFT) (S-VAR) (2)
damage to internal circuitry.	Disp 1	1 (Fix): Number of decimal places	• Example 3: <sup>7</sup> √123 (= 123 <sup>7</sup> ) = <i>1.988647795</i> 7 ₪ √ 123 ■	Use this screen to specify 2 or 3 as the number of un-	XOn-1 SHIFT S-VAR 3
<ul> <li>Avoid use and storage in areas subjected to large amounts of humidity and dust.</li> </ul>		<ul> <li>Sci): Number of significant digits</li> <li>(Norm): Exponential display format</li> </ul>	• Example 4: 123 + 30 <sup>2</sup> = <i>1023</i> 123 • 30 x =	knowns, and input values for each of the coefficients.	ȳ         SHIFT         S-MAR         1           VOT <sub>II</sub> SHIFT         S-WAR         2
Take care never to leave the calculator where it might be	<ul> <li>Display the selection screen.</li> <li>fx-95MS: 1 </li> </ul>		• Example 4: $123 + 30 = 1023$ 125 $\odot$ 30 $\odot$ $\odot$ • Example 5: $12^3 = 1728$ 12 $\odot$	direction you	yon-1 SHIFT S-VAR ► 3
splashed by water or exposed to large amounts of hu- midity or dust. Such conditions can damage internal cir-	Other Models: 1 🕨 🕨	• Example 1: 200 ÷ 7 × 14 = 200 🖶 7 🗙 14 = 400	• Example 5: $12^{\circ} = 1728$ 12 mm $x^{\circ}$	a1? view other elements.	Regression coefficient A       Image: Sum Image:
cuitry.  • Never drop the calculator or otherwise subject it to	• Press the number key (1 or 2) that corresponds to the setting you want to use.	100.	• Example 6: $\frac{1}{1} = 12$	Element value	Regression coefficient B BURE SWARD E 2 Regression calculation other than guadratic regression
strong impact.	(Dot): Period decimal point, comma separator	(Specifies three decimal places.) HODE 1 (Fix) 3 400.000	• Example 6: $\frac{1}{\frac{1}{3} - \frac{1}{4}} = 12$	Any time until you input a value for the final coefficient	Correlation coefficient r SUR <b>) 3</b>
<ul> <li>Never twist or bend the calculator.</li> <li>Avoid carrying the calculator in the pocket of your trou-</li> </ul>	Comma): Comma decimal point, period separator	(Internal calculation continues 200 🖶 7 🗉 28,571	(3 ☞ 4 ☞ ) ☞ =	( $c_2$ for two unknowns, $d_3$ for three unknowns), you can	
sers or other tight-fitting clothing where it might be sub-	Initializing the Calculator	using 12 digits.) 200 ₩ 7 ■ <u>28.571</u>	• Example 7: 8! = 40320 8 SHIFT x!	use the 🛋 and 💌 keys to move between coefficients on the screen and make changes, if you want.	ŷ (S-VAR ) (C )
jected to twisting or bending. <ul> <li>Never try to take the calculator apart.</li> </ul>	Perform the following key operation when you want to	× 14	• Example 8: To generate a random number between	Note that you cannot input complex numbers for coeffi-	• The following table shows the key operations you should use to recall results in the case of quadratic regression.
Never press the keys of the calculator with a ball- point pen or other pointed object.	initialize the calculation mode and setup, and clear re-	The following performs the same calculation using the	0.000 and 0.999	cients.	To recall this type of value: Perform this key operation:
• Use a soft, dry cloth to clean the exterior of the cal-	play memory and variables.	specified number of decimal places.	(The above value is a sample only. Results differ each time.)	Calculation starts and one of the solutions appears as soon as you input a value for the final coefficient.	$\Sigma x^3$ Shift S-SUM $\blacktriangleright$ $1$
culator. If the calculator becomes very dirty, wipe it off with a		200 🔁 7 🚍28.571	• Example 9: $3\pi = 9.424777961$ 3 SMPT $\pi$		$\sum x^2 y \qquad \text{sent}  \text{(ssum)}  \text{(b)}  \text{(c)}  (c)$
cloth moistened in a weak solution of water and a mild		(Internal rounding) Internal Rnd 28.571	• Example 10: To determine how many different 4-digit	Variable name Arrow indicates direction you	Regression coefficient C Burn S-WAR $\blacktriangleright$ $\bigcirc$ 3
neutral household detergent. Wring out all excess mois- ture before wiping the calculator. Never use thinner, ben-	<b>Basic Calculations</b>	▶ 14   399.994	values can be produced using the numbers 1 through 7	x=	
zene or other volatile agents to clean the calculator. Do- ing so can remove printed markings and can damage	Arithmetic Calculations		<ul> <li>Numbers cannot be duplicated within the same 4-digit value (1234 is allowed, but 1123 is not). (840)</li> </ul>	O. view other solutions.	$\hat{x}_2$ and \$ van ▶ ▶ ≥ 2 $\hat{y}$ and \$ van ▶ ▶ ≥ 3
the case.	Use the MORE key to enter the COMP Mode when you	• Press Immer 3 (Norm) 1 to clear the Fix specifica- tion.	7 BHFT (PP) 4	Solution	
	want to perform basic calculations.	• Example 2: 1 ÷ 3, displaying result with two significant	• Example 11: To determine how many different 4-mem-	Press the V key to view other solutions. Use A and V	• The values in the above tables can be used inside of
	COMP More 1		ber groups can be organized in a group of 10 individuals (210)	to scroll between all of the solutions for the equation. Pressing the I key at this point returns to the coefficient	expressions the same way you use variables.
Two-line Display	<ul> <li>Negative values inside of calculations must be enclosed within parentheses.</li> </ul>	<sup>₩000</sup> ······ 2 (Sci) 2 1 🛱 3 🖨 3.3 <sup>-01</sup>	10 SHIFT <i>InCr</i> 4	input screen.	• Linear Regression
a	$\sin -1.23 \rightarrow \sin (1)$ 1.23 )	• Press 1000 ····· 3 (Norm) 1 to clear the Sci specifica-		• Example: To solve the following simultaneous equations	• The regression formula for linear regression is: y = A + Bx.
34^5+647	• It is not necessary to enclose a negative exponent within	tion.		2x + 3y - z = 15 3x - 2y + 2z = 4	• Example: Atmospheric Pressure vs. Temperature
4 <u>5</u> 4 <u>35</u> 4 <u>39</u> 87	parentheses. sin 2.34 $ imes$ 10 <sup>-5</sup> $\rightarrow$ sin 2.34 EVP (-) 5		Angle Unit Conversion	5x + 3y - 4z = 9 (x = 2, y = 5, z = 4)	Temperature Atmospheric Perform linear regression to de-
	• Example 1: 3×(5×10 <sup>-9</sup> ) = 1.5×10 <sup>-8</sup>		• Press ENT Into the following menu.	(Unknowns?) 3	10°C 1003 hPa terms and correlation coefficient
The two-line display makes it possible to view	3 × 5 EP (-) 9 =	Memory Calculations <u>COMP</u>	DRG	(a1?) (d1?) 2 <b>B</b> 3 <b>B</b> (m) 1 <b>B</b> 15 <b>B</b>	15°C 1005 hPa for the data nearby. Next, use the
both the calculation formula and its result at the same time.	• Example 2: 5×(9+7) = 80 5 🗙 ( 9 + 7 ) =	Use the more key to enter the COMP Mode when you	1 2 3	(a <sub>2</sub> ?) (d <sub>2</sub> ?) 3 <b>B (</b> ) 2 <b>B</b> 2 <b>B</b> 4 <b>B</b> (a <sub>3</sub> ?) (d <sub>3</sub> ?) 5 <b>B</b> 3 <b>B</b> ( <b></b> ) 4 <b>B</b> 9 <b>B</b>	25°C 1011 hPa regression formula to estimate atmospheric pressure at 18°C
	• You can skip all 🖸 operations before 🖪.	want to perform a calculation using memory.	• Pressing 1, 2, or 3 converts the displayed value to	$\begin{array}{c} (a_3?) \dots \dots (d_3?) \\ (x = 2) \end{array} 5 \bigcirc 3 \bigcirc (-) 4 \bigcirc 9 \bigcirc 3 \bigcirc (x = 2) \\ \hline \blacksquare \end{array}$	30°C 1014 hPa and temperature at 1000 hPa. Fi- nally, calculate the coefficient of
The lower line shows the result.	■ Fraction Operations	COMP	the corresponding angle unit.	(y = 5)	determination $(r^2)$ and sample
A separator symbol is displayed every three digits when the integer part of the mantissa has more than three dig-	Fraction Calculations	Answer Memory	• Example: To convert 4.25 radians to degrees	(z = 4)	covariance $\left(\frac{\sum xy - n \cdot \bar{x} \cdot \bar{y}}{n \cdot \bar{x}}\right)$ .
its.	Values are displayed in decimal format automatically	• Whenever you press 🖨 after inputting values or an ex-	$\frac{1}{1} (\text{Deg}) = \frac{4 \cdot 2^{5^{r}}}{2^{5^{r}}}$		$\langle n-1 \rangle$
	whenever the total number of digits of a fractional value (integer + numerator + denominator + separator marks)	pression, the calculated result automatically updates An- swer Memory contents by storing the result.	4.25 (m) 2(R) 243.5070629	Statistical <u>SD</u>	In the REG Mode:
Before getting started	exceeds 10.	• In addition to 🖪, Answer Memory contents are also up-			1(Lin)
Before getting starteum	• Example 1: $\frac{2}{3} + \frac{1}{5} = \frac{13}{15}$	dated with result whenever you press  ∞, M+, M−, or  ㎝ followed by a letter (A through F, or M, X,	Coordinate Conversion (Pol $(x, y)$ ,		Burn CLR 1 (Scl) (Stat clear)
Modes		or Y).	<b>Rec</b> $(r, \theta)$ ) • Calculation results are automatically assigned to vari-	Standard Deviation	10 • 1003 DT = REG 1.
Users should refer to the "User's Guide 2 (Additional Functions)" for information about	2 <u>a</u> № 3 <b>+</b> 1 <u>a</u> № 5 <b>=</b> 13_15.	<ul> <li>You can recall Answer Memory contents by pressing Ans.</li> <li>Answer Memory can store up to 12 digits for the mantissa</li> </ul>	ables E and F.	Use the More key to enter the SD Mode when you want	Each time you press <b>I</b> to register your input,
modes and their selection.	• Example 2: $3\frac{1}{4} + 1\frac{2}{3} = 4\frac{11}{12}$	and two digits for the exponent. • Answer Memory contents are not updated if the opera-	• <b>Example 1:</b> To convert polar coordinates ( $r=2, \theta=60^{\circ}$ )	to perform statistical calculations using standard de- viation.	the number of data input up to that point is indicated on the display ( <i>n</i> value).
	$3 \frac{a}{2}$ 3 $\frac{12}{4}$	tion performed by any of the above key operations re-	to rectangular coordinates $(x, y)$ (Deg) x = 1	SD	15 • 1005 ₪ 20 • 1010 ₪ 25 • 1011 ₪
	1 @% 2 @% 3 🖬 4_11_12.	sults in an error.	y = 1.732050808 REL F	MODE MODE 1	20 • 1010 @ 25 • 1011 @ 30 • 1014 @T



## The two-line disp both the calculation

### Before ge

#### Modes

#### 

() SHIFT (S-SUM) (3 🗖 1 )) 🗖

SHIFT S-VAR 🕨 🕨 2 日 Regression Coefficient B = 0.56 Correlation Coefficient r = 0.982607368 SHIFT S-VAR 🕨 🏲 3 🔳

Regression Coefficient A = 997 4

Atmospheric Pressure at 18°C = 1007.48

18 SHIFT S-VAR 🕨 🕨 🕨 2 日 Temperature at 1000 hPa = 4.642857143

1000 Shift (S-VAR) 🕨 🕨 🕨 🔳 🔳

Coefficient of Determination = 0.302	517241
	SHIFT S-VAR 🕨 🍽 3 🗶 🚍
Sample Covariance = 35	( SHIFT S-SUM 🕨 3 🗖
	SHIFT S-SUM 3 🗙 SHIFT S-VAR 1 🗙
	SHIFT S-VAR 🕨 1 🕽 🗧

• Logarithmic, Exponential, Power, and Inverse Rearession

- · Use the same key operations as linear regression to recall results for these types of regression.
- The following shows the regression formulas for each type of regression.

31 0	
Logarithmic Regression	$y = A + B \cdot \ln x$
Exponential Regression	$y = \mathbf{A} \cdot e^{\mathbf{B} \cdot x}$ (In $y = $ In $\mathbf{A} + $ B $x$ )
Power Regression	$y = \mathbf{A} \cdot x^{\mathbf{B}} (\ln y = \ln \mathbf{A} + \mathbf{B} \ln x)$
Inverse Regression	$y = \mathbf{A} + \mathbf{B} \cdot 1 / x$

#### Quadratic Regression

 The regression formula for guadratic regression is:  $y = A + Bx + Cx^2$ .

• Example:

xi	<i>yi</i>	Perform quadratic regression to de-
29	1.6	termine the regression formula terms for the data nearby. Next, use the
50	23.5	regression formula to estimate the
74	38.0	values for $\hat{y}$ (estimated value of y) for
103	46.4	$x_i = 16$ and $\hat{x}$ (estimated value of $x$ )
118	48.0	for $y_i = 20$ .

In the BEG Mode

► 3(Quad)

SHIFT CLR 1 (Scl) 🖬 (Stat clear)	
29 💽	] 1.6 DT 50 • 23.5 DT
74 💌 3	8.0 DT 103 • 46.4 DT
	118 🕩 48.0 DT
Regression Coefficient A = -35.59856934	SHIFT S-VAR 🕨 🕨 1 🖪
Regression Coefficient B = 1.495939413	SHIFT S-VAR 🕨 🏲 2 🗖
Regression Coefficient C = -6.71629667 × 10	)-3
	SHIFT S-VAR 🕨 🕨 🔳 🔳
$\hat{y}$ when $xi$ is $16 = -13.38291067$ 16 SHIFT	S-VAR 🕨 🏲 🕨 🔳 🔳

*x̂*1 when *yi* is 20 = **47.14556728** 20 SHIFT S-VAR ▶ ▶ ▶ 1 ■ *x̂*<sup>2</sup> when *yi* is 20 = **175.5872105** 20 SHIFT S-VAR ► ► **2** 

## Data Input Precautions

- DT DT inputs the same data twice.
- You can also input multiple entries of the same data using III :. To input the data "20 and 30" five times, for example, press 20 • 30 SHIFT ; 5 DT
- The above results can be obtained in any order, and not necessarily that shown above.
- Precautions when editing data input for standard deviation also apply for regression calculations

#### **Technical Information**

#### When you have a problem.....

- If calculation results are not what you expect or if an error occurs, perform the following steps.
- 1. Press III CLR 2 (Mode) E to initialize all modes and settings
- 2. Check the formula you are working with to confirm it is correct.
- 3. Enter the correct mode and try performing the calculation again.

If the above steps do not correct the problem, press the (IN) key. The calculator performs a self-check operation and deletes all data stored in memory if any abnormality is detected. Make sure you always keep written copies of all important data.

#### Error Messages

Math ERROR

The calculator is locked up while an error message is on the display. Press 🚾 to clear the error, or press 🛋 or 🕨 to display the calculation and correct the problem. See "Error Locator" for details.

This calculator uses memory areas, called "stacks," to temporarily store values (numeric stack) and commands (command stack) according to their precedence during calculations. The numeric stack has 10 levels and the command stack has 24 levels. A stack error (Stack ERROR) occurs whenever you try to perform a calculation that is so complex that the capacity of a stack is exceeded. Matrix calculations use up to two levels of the matrix stack. Squaring a matrix, cubing a matrix, or inverting a matrix uses one stack level. • Example

Example.
$2 \times ((3 + 4 \times (5 + 4) \div 3) \div 5) + 8 =$
Numeric Stack Command Stack
1 2 1 ×

U U	2	1	×	
2	3	2	(	
3	4	3	(	
4	5	4	+	
5	4	5	×	
:		6	(	
		7	+	
		:		

Mathematical Expression Calculations and Editing <u>COMP</u> Functions
Use the Immediate key to enter the COMP Mode when you want to perform mathematical expression calculations

or edit expressions. MODE 1 COMP

#### Replay Copy

4 + 4

Replay copy lets you recall multiple expressions from replay so they are connected as a multi-statement on the screen. · Example:

Replay memory contents 1 + 12 + 2 3 + 3

#### 5 + 5 6 + 6

Multi-statement: 4 + 4:5 + 5:6 + 6 Use  $\blacktriangle$  and  $\bigtriangledown$  to display the expression 4 + 4.

#### Press SHIFT (COPY).

· You can also edit expressions on the display and perform other multi-statement operations. For more details about using multi-statements. see "Multi-statements" in the separate "User's Guide." • Only the expressions in replay memory starting from the

currently displayed expression and continuing to the last expression are copied. Anything before the displayed expression is not copied.

#### CALC Memory (COMP) (CMPLX)

• CALC memory lets you temporarily store a mathematical expression that you need to perform a number of times using different values. Once you store an expression, you can recall it, input values for its variables, and calculate a result quickly and easily. You can store a single mathematical expression, with up to 79 steps. Note that CALC memory can be used in the COMP Mode and CMPLX Mode only. • The variable input screen shows the values currently assigned to the variables. • **Example:** Calculate the result for  $Y = X^2 + 3X - 12$ 

when X = 7 (Result: 58), and when X = 8 (Result: 76)

(Inpu	it the function.)	
	Alpha (Y) Alpha (=) Alpha (X) $x^2$ + 3 Alpha	🗏 🗖 12
(Stor	e the expression.)	CALC
(Inpu	tt 7 for X? prompt.)	7 🔳
(Inpu	t 8 for X? prompt.)	CALC 8 🔳
<ul> <li>Note</li> </ul>	e that the expression you store is cleare	d whenever

you start another operation, change to another mode, or turn off the calculator

#### SOLVE Function

The SOLVE function lets you solve an expression using variable values you want, without the need to transform or simply the expression.

• Example: C is the time it would take for an object thrown straight up with initial velocity A to reach height B. Use the formula below to calculate initial velocity A for a height of B = 14 meters and a time of C = 2 seconds. Gravitational acceleration is  $D = 9.8 \text{ m/s}^2$ . (Result: A - 168)

Use the week key to enter the CMPLX Mode when you want to perform calculations that include complex numbers.	_
CMPLX Mode 2	•
• The current angle unit setting (Deg, Rad, Gra) affects	

CMPLX Mode calculations. You can store an expression in CALC memory while in the CMPLX Mode. Note that you can use variables A. B. C. and M only in the CMPLX Mode. Variables D. E. F. X. and Y are used by the calculator, which frequently changes their values. You should not use these variables in your expressions. • The indicator "R  $\leftrightarrow$  I" in the upper right corner of a calculation result display indicates a complex number result. Press ster Re-Im to toggle the display between the real part and imaginary part of the result. • You can use the replay function in the CMPLX Mode. Since complex numbers are stored in replay memory in the CMPLX Mode, however, more memory than normal is used up.

• Example: (2+3i)+(4+5i) = 6+8i

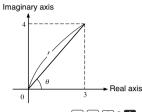
Complex Number

2 **+** 3 *i* **+** 4 **+** 5 *i* **=** (Real part 6) SHIFT Re↔lm (Imaginary part 8 i)

#### Absolute Value and Argument Calculation

Supposing the imaginary number expressed by the rectangular form z = a + bi is represented as a point in the Gaussian plane, you can determine the absolute value (r)and argument ( $\theta$ ) of the complex number. The polar form is  $r \angle \theta$ . • **Example 1:** To determine the absolute value (*r*) and

argument ( $\theta$ ) of 3+4*i* (Angle unit: Deg)  $(r = 5, \theta = 53.13010235^{\circ})$ 



SHIFT Abs ( 3 🕂 4 i ) 😑 (r = 5)SHIFT arg ( 3 🛨 4 i ) 🗖 (*θ* = **53.13010235**°)

• The complex number can also be input using the polar form  $r \angle \theta$ • Example 2:  $\sqrt{2} \angle 45 = 1 + i$ 

(Angle unit: Deg) 🗹 2 Shift 🖌 45 🗖 SHIFT Re↔lm

#### **Rectangular Form** $\leftrightarrow$ **Polar Form** Display

You can use the operation described below to convert a rectangular form complex number to its polar form, and a polar form complex number to its rectangular form. Press SHIFT Re-Im to toggle the display between the absolute value (r) and argument ( $\theta$ ).

• **Example:**  $1 + i \leftrightarrow 1.414213562 \angle 45$ 

(Angle unit: Deg) 1 🛨 i SHIFT FILD 🖬 SHIFT Re--Im 2 SHIFT Z 45 SHIFT Pa+bi E SHIFT Re-Im

You select rectangular form (a+bi) or polar form  $(r \angle \theta)$ for display of complex number calculation results.

MODE ···· 1 (Disp) ►

(1)(a+bi): Rectangular form

BASE

**2**( $r \angle \theta$ ): Polar form (indicated by " $r \angle \theta$ " on the display)

#### Conjugate of a Complex Number

For any complex number *z* where z = a+bi, its conjugate  $(\overline{z})$  is  $\overline{z} = a - bi$ .

• Example: To determine the conjugate of the complex number 1.23 + 2.34*i* (Result: 1.23 - 2.34*i*)

want to perform calculations using Base-n values.

SHIFT Conjg ( 1 • 23 🖶 2 • 34 *i* ) 🗖

matrices with up to three rows and three columns, and how to add, subtract, multiply, transpose and invert matrices, and how to obtain the scalar product, determinant, and absolute value of a matrix BASE **Base-***n* **Calculations** Use the More key to enter the MAT Mode when you want

SHIFT Re↔Im

MODE MODE 3

Note!

o perform matrix calculations. Use the MORE key to enter the BASE Mode when you MODE MODE MODE 2 MAT .

of partitions entirely, if you want,

calculation is being performed internally.

Matrix Calculations

time to complete.

Note that you must create one or more matrices before you can perform matrix calculations.

Transposing a Matrix

5 8

79

43

Inverting a Matrix

• Example: To invert Matrix C =

(determinant = 0) is specified.

the absolute value of a matrix.

/[\_0.4 1\_0.8<sup>`</sup>

-1.5 0.5 -1.5

-0.8 0 -0.6

transpose a matrix.

(Matrix B 2×3)

(Matrix C 3×3)

(MatC<sup>-1</sup>)

Matrix

(AbsMatAns)

one time.

VCT ..

COMP)

(TrnMatB)

Use the procedure described below when you want to

(Element input) 5 6 7 6 4 6 8 6 9 6 3 6 AG

You can use the procedure below to invert a square matrix

(Element input) (-) 3 🖨 6 🖨 (-) 11 🖨 3 🖨 (-) 4 🖨

• The above procedure results in an error if a non-square

Determining the Absolute Value of a

You can use the procedure described below to determine

• **Example:** To determine the absolute value of the matrix

The procedures in this section describe how to create a

vector with a dimension up to three, and how to add, sub-

tract, and multiply vectors, and how to obtain the scalar

product, inner product, outer product, and absolute value

of a vector. You can have up to three vectors in memory at

Use the more key to enter the VCT Mode when you want

Note that you must create one or more vector before you

• You can have up to three vectors, named A, B, and C, in

• The results of vector calculations are stored automatically

To create a vector, press shirt ver 1 (Dim), specify a vec-

the vector. Next, follow the prompts that appear input val-

tor name (A, B, or C), and then specify the dimensions of

О.

You can use the <a> and <a> keys to move about the vec-</a>

Press EVET 2 (Edit) and then specify the name (A, B,

C) of the vector you want to edit to display a screen for

Use the procedures described below to add and subtract

• **Example:** To add Vector A = (1 - 2 3) to Vector B = (4 5)

Adding and Subtracting Vectors

memory in subsequent vector calculations.

ues that make up the elements of the vector.

tor in order to view or edit its elements

To exit the vector screen, press AC.

Editing Vector Elements

editing the elements of the vector.

into VctAns memory. You can use the matrix in VctAns

produced by the inversion in the previous example.

0.4 1 0.8

1.5 0.5 1.5

0.8 0 0.6

Vector Calculations

to perform vector calculations.

can perform vector calculations.

memory at one time.

VctA1

Element value

vectors.

matrix or a matrix for which there is no inverse

SHIFT MAT 1 (Dim) 2 (B) 2 🖬 3 🗐

[\_3 6 \_11]

4 – 8 13

SHIFT MAT 1 (Dim) 3 (C) 3 🖬 3 🗐

6 **=** 4 **=** (-) 8 **=** 13 **=** AC

[SHIFT [MAT] 3 (Mat) 3 (C) [X<sup>-1</sup>]

SHIFT Abs SHIFT MAT 3 (Mat) 4 (Ans) 🔳

MODE MODE MODE 3

➡ — Arrow indicates

ements.

direction you should

scroll to view other

SHIFT MAT 🕨 2 (Trn)

SHIFT MAT 3 (Mat) 2 (B)

• Example: To transpose Matrix  $B = \begin{bmatrix} 5 & 7 & 4 \\ 8 & 9 & 3 \end{bmatrix}$ 

(VctAns÷Ans)

COMP

units.

(Result: (-0.666666666 0.333333333 -0.6666666666 ))

Use the more key to enter the COMP Mode when you

• A total of 20 different conversion pairs are built-in to

• See the Conversion Pair Table for a complete list of

· When inputting a negative value, enclose it within pa-

• Example: To convert -31 degrees Celsius to Fahrenheit

((-) 31 ) SHIFT CONV 38 ■ (-31)°C→°F -23.8

38 is the Celsius-to-Eabrenheit conversion pair number

To perform

this conversion

 $oz \rightarrow q$ 

 $g \rightarrow oz$ 

 $lb \rightarrow kg$ 

 $kg \rightarrow lb$ 

 $atm \rightarrow Pa$ 

 $Pa \rightarrow atm$ 

 $hp \rightarrow kW$ 

 $kW \rightarrow hp$ 

mmHg  $\rightarrow$  Pa

 $Pa \rightarrow mmHg$ 

kgf/cm<sup>2</sup>→ Pa

 $Pa \rightarrow kgf/cm^2$ 

kgf•m  $\rightarrow$  J

 $J \to kgf \bullet m$ 

 $lbf/in^2 \rightarrow kPa$ 

 $kPa \rightarrow lbf/in^2$ 

 $^{\circ}F \rightarrow ^{\circ}C$ 

 $\mathsf{C}\to{}^\circ\mathsf{F}$ 

 $J \rightarrow cal$ 

 $cal \rightarrow J$ 

Scientific Constants COMP

Use the MORE key to enter the COMP Mode when you

want to perform calculations using scientific constants.

• A total of 40 commonly-used scientific constants, such

as the speed of light in a vacuum and Planck's constant

are built-in for quick and easy lookup whenever you need

Simply input the number that corresponds to the scientific

constant you want to look up and it appears instantly on

• See the Scientific Constant Table for a complete list of

• Example: To determine how much total energy a person

28 is the "speed of light in v

Based on ISO Standard (1992) data and CODATA recom-

65 CONST 28 x<sup>2</sup> = 65Co<sup>2</sup> 5.841908662 <sup>18</sup>

Input this scientific constant number:

01

02

03

04

05

06

07

08

09

10

12

13

14

15

16

18

19

20

weighing 65kg has (E =  $mc^2 = 5.841908662 \times 10^{18}$ )

provide guick and easy conversion to and from metric

Metric Conversions

want to perform metric conversions.

available conversion pairs.

• Conversion Pair Table

Based on NIST Special Publication 811 (1995).

Input this

01

02

03

04

05

06

07

08

09

10

11

12

13

14

15

16

17

18

19

20

pair numbe

rentheses (), ()

To perform

this conversion

in  $\rightarrow$  cm

 $cm \rightarrow in$ 

 $ft \rightarrow m$ 

 $m \rightarrow ft$ 

 $yd \rightarrow m$ 

 $m \rightarrow yd$ 

mile  $\rightarrow$  km

 $km \rightarrow mile$ 

n mile  $\rightarrow$  m

 $m \rightarrow n$  mile

acre  $\rightarrow m^2$ 

 $m^2 \rightarrow acre$ 

gal (US)  $\rightarrow \ell$ 

 $\ell \rightarrow \text{gal}(\text{US})$ 

gal (UK)  $\rightarrow \ell$ 

 $\ell \rightarrow \text{gal}(\text{UK})$ 

 $pc \rightarrow km$ 

 $km \rightarrow pc$ 

COMP

the display.

available constants.

mended values (1998).

proton mass (mp)

neutron mass (mn)

electron mass (me)

muon mass (m $\mu$ )

Planck constant (h)

nuclear magneton ( $\mu$ N)

fine-structure constant ( $\alpha$ )

classical electron radius (re)

proton gyromagnetic ratio (γp)

proton magnetic moment ( $\mu$ p)

electron magnetic moment ( $\mu$ e)

neutron magnetic moment ( $\mu$ n)

proton Compton wavelength ( $\lambda$ cp)

neutron Compton wavelength ( $\lambda$ cn)

Compton wavelength ( $\lambda c$ )

Rydberg constant (R∞)

atomic mass unit (u)

Planck constant, rationalized (%)

Bohr magneton ( $\mu$ B)

Bohr radius (a<sub>0</sub>)

Scientific Constant Table

To select this constant:

 $km/h \rightarrow m/s$ 

m/s  $\rightarrow$  km/h

SHIFT VCT 3 (Vct) 4 (Ans) 🕂 Ans =

COMP

MODE 1

Input this

pair number: 21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

MODE 1

# Q(t)

**Example:** To determine the normalized variate  $(\rightarrow t)$  for x = 53 and normal probability distribution P(t) for the following data: 55, 54, 51, 55, 53, 53, 54, 52

• Input a value from 1 to 4 to select the probability

distribution calculation you want to perform.

P(t)

 $(\rightarrow t = -0.284747398, P(t) = 0.38974)$ 55 DT 54 DT 51 DT 55 DT

53 DT DT 54 DT 52 DT 53 SHIFT DISTR  $(\rightarrow t)$ SHIFT DISTR 1 (P() - 0.28 )

#### Differential COMP Calculations

The procedure described below obtains the derivative of a function. Use the MORE key to enter the COMP Mode when you

want to perform a calculation involving differentials. COMP MODE 1 • Three inputs are required for the differential expression: the function of variable x, the point (a) at which the dif-

ferential coefficient is calculated, and the change in  $x (\Delta x)$ . SHIFT d/dx expression  $\cdot$  a  $\cdot$   $\Delta x$  ) • **Example:** To determine the derivative at point x = 2 for the function  $y = 3x^2 - 5x + 2$ , when the increase or decrease in x is  $\Delta x = 2 \times 10^{-4}$  (Result: 7)

2 EXP (--) 4 ) 🔳

• You can omit input of  $\Delta x$ , if you want. The calculator automatically substitutes an appropriate value for  $\Delta x$  if you do not input one. Discontinuous points and extreme changes in the value

of x can cause inaccurate results and errors. • Select Rad (Radian) for the angle unit setting when performing trigonometric function differential calculations.

# Integration

## Calculations The procedure described below obtains the definite integral

of a function. Use the me key to enter the COMP Mode when you

want to perform integration calculations.

MODE 1 COMP

• The following four inputs are required for integration calculations: a function with the variable x; a and b, which define the integration range of the definite integral; and n, which is the number of partitions (equivalent to N = 2<sup>n</sup>) for integration using Simpson's rule.

 $\int dx \text{ expression } \bullet a \bullet b \bullet n )$ • Example:  $\int_{-5}^{5} (2x^2 + 3x + 8) dx = 150.66666667$ 

• You can specify an integer in the range of 1 to 9 as the

Internal integration calculations may take considerable

• Display contents are cleared while an integration

• Select Rad (Radian) for the angle unit setting when

performing trigonometric function integration calculations.

The procedures in this section describe how to create

number of partitions, or you can skip input of the number

(Number of partitions n = 6)

Idx 2 MPM X X<sup>2</sup> 🖶 3 MPM X 🛨 🛛 Creating a Vector 8 • 1 • 5 • 6 ) 🗖

• Causes	Gravitational acceleration is $D = 9.8 \text{ m/s}^2$ .		you can perform matrix calculations.	• Example: To add Vector A = $(1 - 2 3)$ to Vector B = $(4 5 6)$	muon magnetic moment ( $\mu\mu$ )21Faraday constant (F)22
<ul> <li>Calculation result is outside the allowable calculation range.</li> </ul>	(Result: A = <b>16.8</b> ) B = AC $-\frac{1}{2}$ DC <sup>2</sup>	In addition to decimal values, calculations can be performed using binary, estal and bayadagimal values.	• You can have up to three matrices, named A, B, and C,	−6). (Result: <b>(5 3 −3)</b> )	elementary charge (e) 23
• An attempt to perform a function calculation using a	2	<ul><li>performed using binary, octal and hexadecimal values.</li><li>You can specify the default number system to be applied</li></ul>	in memory at one time. <ul> <li>The results of matrix calculations are stored automatically</li> </ul>	(3-dimensional Vector A) SHIFT VCT 1(Dim) 1(A) 3	Avogadro constant (NA)         24           Boltzmann constant (k)         25
value that exceeds the allowable input range.	ALPHA B ALPHA = ALPHA A X ALPHA C -	to all input and displayed values, and the number system	into MatAns memory. You can use the matrix in MatAns	(Element input) 1 = (-) 2 = 3 = AC	molar volume of ideal gas (Vm) 26
<ul> <li>An attempt to perform an illogical operation (division by zero, etc.)</li> </ul>		for individual values as you input them. • You cannot use scientific functions in binary, octal,	memory in subsequent matrix calculations.	(3-dimensional Vector B) II (Dim) (2) (B) 3	molar gas constant (R) 27
• Action	(B?) 14 <b>E</b>	decimal, and hexadecimal calculations. You cannot input	<ul> <li>Matrix calculations can use up to two levels of the matrix stack. Squaring a matrix, cubing a matrix, or inverting a</li> </ul>	(Element input) 4 = 5 = (-) 6 = AC	speed of light in vacuum ( $C_0$ )28first radiation constant ( $C_1$ )29
Check your input values and make sure they are all	(A?) <b>T</b>	values that include decimal part and an exponent.	matrix uses one stack level. See "Stacks" in the separate	(VctA + VctB) 500FT VCT 3 (Vct) 1 (A) +	second radiation constant (C <sub>2</sub> ) 30
within the allowable ranges. Pay special attention to	(C?) 2 🖬	<ul> <li>If you input a value that includes a decimal part, the unit automatically auto off the decimal part.</li> </ul>	"User's Guide" for more information.	Sum         Ver         3 (Ver)         2 (B)	Stefan-Boltzmann constant ( $\sigma$ )31electric constant ( $\epsilon_0$ )32
values in any memory areas you are using.	(D?) 9 • 8 =	<ul><li>automatically cuts off the decimal part.</li><li>Negative binary, octal, and hexadecimal values are</li></ul>			electric constant ( $\mu_0$ )     32       magnetic constant ( $\mu_0$ )     33
Stack ERROR	(A?) SALVE	produced by taking the two's complement.	Creating a Matrix	<ul> <li>An error occurs in the above procedure if you specify vectors of different dimensions.</li> </ul>	magnetic flux quantum ( $\phi_0$ ) 34
Cause	Since the SOLVE function uses Newton's Method. cer-	• You can use the following logical operators between	To create a matrix, press I I (Dim), specify a matrix	vectors of different differsions.	standard acceleration of gravity (g)     35       conductance guantum (G <sub>0</sub> )     36
The capacity of the numeric stack or operator stack is	tain initial values (assumed values) can make it impos-	values in Base- <i>n</i> calculations: and (logical product), or (logical sum), xor (exclusive or), xnor (exclusive nor),	name (A, B, or C), and then specify the dimensions (number of rows and number of columns) of the matrix.	Calculating the Scalar Product of	characteristic impedance of vacuum (Z <sub>o</sub> ) 37
exceeded.	sible to obtain solutions. In this case, try inputting an- other value that you assume to be near the solution and	Not (bitwise complement), and Neg (negation).	Next, follow the prompts that appear to input values that	a Vector	Celsius temperature (t)         38           Newtonian constant of gravitation (G)         39
Action	perform the calculation again.	• The following are the allowable ranges for each of the	make up the elements of the matrix.	Use the procedure shown below to obtain the scalar	standard atmosphere (atm) 40
<ul> <li>Simplify the calculation. The numeric stack has 10 levels and the operator stack has 24 levels.</li> </ul>	• The SOLVE function may be unable to obtain a solution,	available number systems.		product (fixed multiple) of a vector.	Input Ranges
• Divide your calculation into two or more separate parts.	<ul><li>even though a solution exists.</li><li>Due to certain idiosyncrasies of Newton's method, solu-</li></ul>	Binary $100000000 \le x \le 1111111111$ $0 \le x \le 0111111111$	MatA <u>23</u>	• <b>Example:</b> To multiply Vector $C = (-7.8 \ 9)$ by 5.	Internal digits: 12
Surstau EDBOD	tions for the following types of functions tend to be diffi-	Octal $400000000 \le x \le 7777777777777777777777777$		(Result: <b>(-39 45)</b> )	Accuracy*: As a rule, accuracy is $\pm 1$ at the 10th digit.
Syntax ERROR	cult to calculate.	$0 \le x \le 377777777777777777777777777777777$	2 rows and 3 columns	(2-dimensional Vector C) BHIFT VCT 1 (Dim) 3 (C) 2	Functions Input Range
<ul> <li>Cause</li> <li>An attempt to perform an illegal mathematical opera-</li> </ul>	Periodic functions (i.e. $y = \sin x$ ) Functions whose graph produce sharp slopes (i.e. $y =$	Decimal $-2147483648 \le x \le 2147483647$ Hexadecimal $8000000 \le x \le FFFFFFF$	You can use the cursor keys to move about the matrix in	(Element input) (-) 7 • 8 = 9 = AC	$\sin x$ DEG $0 \le  x  \le 4.499999999 \times 10^{10}$
tion.	$e^x, y = 1/x)$	$0 \le x \le 7 FFFFFF$	order to view or edit its elements.	(5×VctC) 5 🔀 SHIFT VCT 3 (Vct) 3 (C) =	RAD 0≦   <i>x</i>   ≦785398163.3
Action	Discontinuous functions (i.e. $y = \sqrt{x}$ ) • If an expression does not include an equals sign (=), the		To exit the matrix screen, press <b>AC</b> .	Colouisting the Inner Broduct of	GRA $0 \le  x  \le 4.999999999 \times 10^{10}$
$ullet$ Press $\blacksquare$ or $\blacktriangleright$ to display the calculation with the cur-	SOLVE function produces a solution for expression = 0.	• Example 1: To perform the following calculation and produce a binary result:	Editing the Elements of a Matrix	Calculating the Inner Product of Two Vectors	$\cos x$ DEG $0 \le  x  \le 4.50000008 \times 10^{10}$
sor located at the location of the error and make re- quired corrections.		$10111_2 + 11010_2 = 110001_2$	Press [min] [2] (Edit) and then specify the name (A, B, or	Use the procedure described below to obtain the inner	RAD $0 \le  x  \le 785398164.9$
quired corrections.	Scientific Function		C) of the matrix you want to edit to display a screen for	product (•) for two vectors.	GRA $0 \le  x  \le 5.00000009 \times 10^{10}$
Arg ERROR	Calculations <u>COMP</u>	Binary mode: AC BIN 0. b	editing the elements of the matrix.	• Example: To calculate the inner product of Vector A and	tanx DEG Same as sinx, except when $ x  = (2n-1) \times 90$ .
Cause		10111 🛨 11010 🚍	Matrix Addition Culturation and	Vector B (Result: -24)	RAD Same as sinx, except when $ x  = (2n-1) \times \pi/2$ .
<ul> <li>Improper use of an argument</li> </ul>	Use the meet key to enter the COMP Mode when you	• Example 2: To perform the following calculation and	Matrix Addition, Subtraction, and Multiplication	(VctA·VctB)	GRA Same as sinx, except when $ x  = (2n-1) \times 100$ .
• Action	want to perform scientific function calculations.	produce an octal result:	Use the procedures described below to add, subtract,		$\frac{\sin^{-1}x}{0 \le  x  \le 1}$
<ul> <li>Press I or b to display the location of the cause of the error and make required corrections.</li> </ul>		$7654_8 \div 12_{10} = 516_8$	and multiply matrices.	SHIFT VCT 3 (Vct) 2 (B)	$cos^{-1}x  0 \ge  x  \ge 1$
	Inputting Engineering Symbols	Octal mode: AC III 0. °	[ 1 2]	An error occurs in the above procedure if you specify	tan <sup>-1</sup> x $0 \le  x  \le 9.999999999 \times 10^{99}$
Order of Operations			• Example: To multiply Matrix A = $\begin{vmatrix} 4 & 0 \\ -2 & 5 \end{vmatrix}$ by	vectors of different dimensions.	sinhx $0 \le  x  \le 230.2585092$
Calculations are performed in the following order of prec-	• Turning on engineering symbols makes it possible for	LOGIC LOGIC 1 (d) 12 🚍	[[ 2 _ 8 _ 5 ]]	Calculating the Outer Product of	$\cosh x$ $O =  x  = 200.2000002$
edence.	you to use engineering symbols inside your calculations.	• Example 3: To perform the following calculation and	Matrix B = $\begin{vmatrix} -1 & 0 & 3 \\ 0 & 4 & 1 \end{vmatrix}$   -4 012	Two Vectors	sinh <sup>-1</sup> x $0 \le  x  \le 4.999999999 \times 10^{99}$
(1) Coordinate transformation: Pol ( $x$ , $y$ ), Rec ( $r$ , $\theta$ )	<ul> <li>To turn engineering symbols on and off, press the work key a number of times until you reach the setup screen</li> </ul>	produce a hexadecimal and a decimal result:	L 2 −4 T J ([ 12 −20 −1 ]/	Use the procedure described below to obtain the outer	cosh <sup>-1</sup> x $1 \le x \le 4.999999999 \times 10^{99}$
Differentials: $d/dx^*$ Integrations: $\int dx^*$	shown below.	$120_{16} \text{ or } 1101_2 = 12d_{16} = 301_{10}$	(Matrix A 3×2) MAT 1 (Dim) 1 (A) 3 🖬 2 🗐	product for two vectors.	tanhx $0 \le  x  \le 9.999999999 \times 10^{99}$
Normal distribution: P(*, Q(*, R(*		Hexadecimal mode: AC HEX 0. H	(Element input) 1 😑 2 🖴 4 🖨 0 🖨 🗁 2 🖨 5 🖨 🕰	• Example: To calculate the outer product of Vector A and	$\tanh^{-1}x$ $0 \le  x  \le 9.99999999 \times 10^{-1}$
Normal distribution: P(*, Q(*, R(* ② Type A functions:	Disp	120 [LOGIC] 2 (Or)		• Example: To calculate the outer product of Vector A and Vector B (Result: (-3, 18, 13))	$\log x/\ln x$ 0< x $\leq$ 9.9999999999×10 <sup>99</sup>
Normal distribution: P(*, Q(*, R(* ② Type A functions: With these functions, the value is entered and then the	Disp 1	120 LOGIE 2 (Or)	(Matrix B 2×3) ■ MAT 1 (Dim) 2 (B) 2 ■ 3 ■	Vector B         (Result: (-3, 18, 13))           (VctA×VctB)         Imm VCT 3 (Vct) 1 (A) X	$\log x/\ln x$ $0 < x \le 9.99999999 \times 10^{99}$ $10^x$ $-9.999999999 \times 10^{99} \le x \le 99.99999999$
Normal distribution: P(*, Q(*, R(* ② Type A functions:	■ D i s p 1 • Press 1. On the engineering symbol setting screen that	120 LOBIC 2 (or) LOBIC LOBIC 3 (b) 1101 = Decimal mode:		Vector B (Result: (-3, 18, 13))	$\log x/\ln x$ $0 < x \le 9.99999999 > 10^{99}$ $10^x$ $-9.99999999 > 10^{99} \le x \le 99.99999999$ $e^x$ $-9.999999999 > 10^{99} \le x \le 230.2585092$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>2) Type A functions:</li> <li>With these functions, the value is entered and then the function key is pressed.</li> <li>x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ° ' "</li> <li>Engineering symbols*</li> </ul>	<ul> <li>D is p 1</li> <li>Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corre-</li> </ul>	120 LOUIC 2 (or) LOUIC LOUIC 1000C 1000C 3 (b) 1101 Decimal mode: • Example 4: To convert the value 22 <sub>10</sub> to its binary, oc-	(Matrix B 2×3)       ■■■ MAT 1 (Dim) 2 (B) 2 3 3         (Element input)         (□ 1 ■ 0 ■ 3 ■ 2 ■ (□ 4 ■ 1 ■ A9)	Vector B         (Result: (-3, 18, 13))           (VctA×VctB)         Imm vct 3 (Vct) 1 (A) X           Imm vct 3 (Vct) 2 (B)         Imm vct 3 (Vct) 2 (B)	
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>2) Type A functions:</li> <li>With these functions, the value is entered and then the function key is pressed.</li> <li>x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ° , "</li> </ul>	<ul> <li>D is p 1</li> <li>Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.</li> </ul>	120 LOBIC 2 (or) LOBIC LOBIC 3 (b) 1101 = Decimal mode:	(Matrix B 2×3)	Vector B         (Result: (-3, 18, 13))           (VctA×VctB)         Imm VCT 3 (Vct) 1 (A) X	
Normal distribution: P(*, Q(*, R(* (2) Type A functions: With these functions, the value is entered and then the function key is pressed. $x^3, x^2, x^{-1}, x!, \circ : "$ Engineering symbols* Normal distribution: $\rightarrow t^*$ $\hat{x}, \hat{x}_1, \hat{x}_2, \hat{y}$ Angle unit conversions (DRG $\blacktriangleright$ )	<ul> <li>D is p 1</li> <li>Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corre-</li> </ul>	120 [LOUE] 2 (or) [LOUE] [LOUE] 3 (b) 1101 ■ Decimal mode: DEC • Example 4: To convert the value 22 <sub>10</sub> to its binary, oc- tal, and hexadecimal equivalents. (10110 <sub>2</sub> , 26 <sub>8</sub> , 16 <sub>16</sub> )	(Matrix B 2×3)       Imm 1 (Dim) 2 (B) 2 3 3         (Element input)       1 0 3 3 2 2 0 0 4 1 1 3 49         (MatA×MatB)       Imm MAT 3 (Mat) 1 (A) X	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm vct 3 (Vct) 1 (A) X         Imm vct 3 (Vct) 2 (B) =         • An error occurs in the above procedure if you specify vectors of different dimensions.	$\begin{array}{ c c c c c c } \hline log x/lnx & 0 < x \leq 9.999999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline \end{array}$
Normal distribution: P(*, Q(*, R(* (2) Type A functions: With these functions, the value is entered and then the function key is pressed. $x^3, x^2, x^{-1}, x_1, \circ : "$ Engineering symbols* Normal distribution: $\rightarrow t^*$ $\hat{x}, \hat{x}_1, \hat{x}_2, \hat{y}$ Angle unit conversions (DRG ) Metric conversions**	<ul> <li>Disp 1</li> <li>Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.</li> <li>1 (Eng ON): Engineering symbols on (indicated by</li> </ul>	120 LUGHE 2 (or)         LUGHE LUGHE LUGHE (LUGHE 3 (b) 1101 $\blacksquare$ Decimal mode:       DEE         • Example 4: To convert the value $22_{10}$ to its binary, octal, and hexadecimal equivalents.         (10110 <sub>2</sub> , 26 <sub>8</sub> , 16 <sub>16</sub> )         Binary mode:	(Matrix B 2×3)       Imm I (Dim) 2 (B) 2 3 3         (Element input)       I 1 0 3 2 2 I I 4 1 1 5 49         (MatA×MatB)       Imm MAT 3 (Mat) 1 (A) X         Imm MAT 3 (Mat) 2 (B) 5         • An error occurs if you try to add, subtract matrices whose dimensions are different from each other, or multiply a	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm vct 3 (Vct) 1 (A) IX         Imm vct 3 (Vct) 2 (B)       Imm vct 3 (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions.         Image: Determining the Absolute Value of	$\begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.999999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.9999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} \\ \hline \end{array}$
Normal distribution: P(*, Q(*, R(* (2) Type A functions: With these functions, the value is entered and then the function key is pressed. $x^3, x^2, x^{-1}, x!, \circ : "$ Engineering symbols* Normal distribution: $\rightarrow t^*$ $\hat{x}, \hat{x}_1, \hat{x}_2, \hat{y}$ Angle unit conversions (DRG $\blacktriangleright$ )	<ul> <li>D i s p 1</li> <li>Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.</li> <li>1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)</li> <li>2 (Eng OFF): Engineering symbols off (no "Eng" indicator)</li> </ul>	120  LOBEC  2  (or) $LOBEC  LOBEC  100  (LOBEC  3  (b)  1101$	(Matrix B 2×3)       Imm I (Dim) 2 (B) 2 3 3         (Element input)       Imm I (Dim) 2 (B) 2 3 3         (MatA×MatB)       Imm I (MatA 1 (A) X         Imm I (MatA 2 (B) 1)       Imm I (MatA 2 (B) 1)         • An error occurs if you try to add, subtract matrices whose dimensions are different from each other, or multiply a matrix whose number of columns is different from that of	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm ver 3 (Vct) 1 (A) X         Imm ver 3 (Vct) 2 (B)       Imm ver 3 (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions.         Image: Determining the Absolute Value of a Vector	$\begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 \ (x \text{ is an integer}) \\ \hline \end{array}$
Normal distribution: P(*, Q(*, R(* (2) Type A functions: With these functions, the value is entered and then the function key is pressed. $x^3, x^2, x^{-1}, x!, \circ : "$ Engineering symbols* Normal distribution: $\rightarrow t^*$ $\hat{x}, \hat{x}_1, \hat{x}_2, \hat{y}$ Angle unit conversions (DRG $\blacktriangleright$ ) Metric conversions** (3) Powers and roots: $\wedge (x^3), x\sqrt{-}$ (4) $a^{b}/c$ (5) Abbreviated multiplication format in front of $\pi$ , $e$ (natu-	<ul> <li>D i s p 1</li> <li>Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.</li> <li>1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)</li> <li>2 (Eng OFF): Engineering symbols off (no "Eng" indicator)</li> <li>The following are the nine symbols that can be used</li> </ul>	120 LUGHE 2 (or)         LUGHE LUGHE LUGHE (LUGHE 3 (b) 1101 $\blacksquare$ Decimal mode:       DEE         • Example 4: To convert the value $22_{10}$ to its binary, octal, and hexadecimal equivalents.         (10110 <sub>2</sub> , 26 <sub>8</sub> , 16 <sub>16</sub> )         Binary mode:	(Matrix B 2×3)       Imm I (Dim) 2 (B) 2 3 3         (Element input)       I 1 0 3 2 2 I I 4 1 1 5 49         (MatA×MatB)       Imm MAT 3 (Mat) 1 (A) X         Imm MAT 3 (Mat) 2 (B) 5         • An error occurs if you try to add, subtract matrices whose dimensions are different from each other, or multiply a	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm vct 3 (Vct) 1 (A) X         Imm vct 3 (Vct) 2 (B)       Imm vct 3 (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions.         Imm Determining the Absolute Value of a Vector         Use the procedure shown below to obtain the absolute	$\begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.999999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline x \\ \hline p_r & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline \end{array}$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed.</li> <li>x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ '" Engineering symbols* Normal distribution: →t*</li> <li>x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ</li> <li>Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), <sup>x</sup>√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name:</li> </ul>	<ul> <li>D i s p 1</li> <li>Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.</li> <li>1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)</li> <li>2 (Eng OFF): Engineering symbols off (no "Eng" indicator)</li> <li>The following are the nine symbols that can be used when engineering symbols are turned on.</li> </ul>	120  LOBEC  2  (or) $LOBEC  LOBEC  100  (LOBEC  3  (b)  1101$	(Matrix B 2×3)       Imm I (Dim) 2 (B) 2 3 3         (Element input)       Imm I (Dim) 2 (B) 2 3 3         (MatA×MatB)       Imm MI 3 (Mat) 1 (A) X         Imm MI 3 (Mat) 2 (B) 5         • An error occurs if you try to add, subtract matrices whose dimensions are different from each other, or multiply a matrix whose number of columns is different from that of	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm ver 3 (Vct) 1 (A) IX         Imm ver 3 (Vct) 2 (B)       Imm ver 3 (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions.         Imm betermining the Absolute Value of a Vector         Use the procedure shown below to obtain the absolute value (size) of a vector.	$\begin{array}{ c c c c c c } \hline \log x/\ln x & 0 < x \leq 9.999999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline ^3\sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 1 \leq 69 (x \text{ is an integer}) \\ \hline 0 \leq n < 1 \times 10^{10} , 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq n!/(n-r)! < 1 \times 10^{100} \\ \hline 0 \leq n < x > 0 \\ \hline \end{array}$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>② Type A functions: With these functions, the value is entered and then the function key is pressed.</li> <li>x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x<sup>1</sup>, ∘ ' " Engineering symbols* Normal distribution: →t*</li> <li>x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ</li> <li>Angle unit conversions (DRG►) Metric conversions**</li> <li>③ Powers and roots: ^(x<sup>3</sup>), x√</li> <li>④ a<sup>b</sup>/c</li> <li>⑤ Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>⑥ Type B functions:</li> </ul>	<ul> <li>D is p 1</li> <li>Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.</li> <li>1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)</li> <li>2 (Eng OFF): Engineering symbols off (no "Eng" indicator)</li> <li>The following are the nine symbols that can be used when engineering symbols are turned on.</li> <li>To input this symbol: Perform this key operation: Unit</li> </ul>	120 [LOBEC 2] (OT)         [LOBEC 1000C 1000C 3] (b) 1101 ]         Decimal mode:         Decimal mode: $BEC$ • Example 4: To convert the value 22 <sub>10</sub> to its binary, octal, and hexadecimal equivalents. $(10110_2, 26_8, 16_{16})$ Binary mode:       Image: 1000 min 1 (d) 22 Image: 100110. b         Cotal mode:       Image: 26. °         Hexadecimal mode:       Image: 16. H	(Matrix B 2×3)       Imm 1 (Dim) 2 (B) 2 3 3         (Element input)       Imm 1 0 3 2 2 1 0 4 1 1 1 4 4         (MatA×MatB)       Imm MAT 3 (Mat) 1 (A) 1	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm ver 3 (Vct) 1 (A) X         Imm ver 3 (Vct) 2 (B)       Imm ver 3 (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions.         Imm ver 3 (Vct) 2 (B)         • Determining the Absolute Value of a Vector         Use the procedure shown below to obtain the absolute value (size) of a vector.         • Example: To determine the absolute value of Vector C	$\begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 > 10^{99} \\ \hline 10^x & -9.999999999 > 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 > 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline x \\ \hline p_r & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline \end{array}$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed.</li> <li>x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ ' " Engineering symbols* Normal distribution: →t*</li> <li>x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ</li> <li>Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and</li> </ul>	D i s p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on.         To input this symbol: Perform this key operation: Unit k (kilo)         M (Mega)	120 [LOBEC 2] (OT)         [LOBEC 1000C 1000C 3] (b) 1101 1         Decimal mode:         Decimal mode:         Image:	(Matrix B 2×3)       Imm I (Dim) 2 (B) 2 3 3         (Element input)       Imm I (Dim) 2 (B) 2 3 3         (Imm I 1 0 0 3 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm ver 3 (Vct) 1 (A) X         Imm ver 3 (Vct) 2 (B)       Imm ver 3 (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions.         Imm ver 3 (Vct) 2 (B)         • Determining the Absolute Value of a Vector S         Use the procedure shown below to obtain the absolute value (size) of a vector.         • Example: To determine the absolute value of Vector C (Result: 11.90965994)	$\begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq n! / (n-r)! < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n! / (r! (n-r)!)] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.999999999 \times 10^{49} \\ \hline \end{array}$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ · "</li> <li>Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ</li> <li>Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered.</li> </ul>	D is p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on.         To input this symbol: Perform this key operation: Unit k (kilo)         K (kilo)         M (Mega)         Imm M       10°         G (Giga)       Imm G	120 LOBEE 2 (or) LOBE LOBE CODE 3 (b) 1101 Decimal mode: DEC • Example 4: To convert the value $22_{10}$ to its binary, oc- tal, and hexadecimal equivalents. (10110 <sub>2</sub> , 26 <sub>8</sub> , 16 <sub>16</sub> ) Binary mode: CODE 1 (d) 22 10110. <sup>b</sup> CODE CODE CODE 1 (d) 22 10110. <sup>b</sup> Octal mode: DET 26. <sup>o</sup> Hexadecimal mode: HEX 16. <sup>H</sup> • Example 5: To convert the value 513 <sub>10</sub> to its binary equivalent.	(Matrix B 2×3)       Imm I (Dim) 2 (B) 2 3 3         (Element input)       Imm I (Dim) 2 (B) 2 3 3         Imm I 1 0 3 3 2 2 Imm I 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm ver 3 (Vct) 1 (A) X         Imm ver 3 (Vct) 2 (B)       Imm ver 3 (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions.         Imm ver 3 (Vct) 2 (B)         • Determining the Absolute Value of a Vector Value of a vector.         Use the procedure shown below to obtain the absolute value (size) of a vector.         • Example: To determine the absolute value of Vector C (Result: 11.90965994)         (AbsVctC)       Imm Mer Wer 3 (Vct) 3 (C)	$ \begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq \{n!/(n-r)!\} < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/\{r!(n-r)!\}] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.999999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{99} \\ \hline \end{array} $
Normal distribution: P(*, Q(*, R(* (2) Type A functions: With these functions, the value is entered and then the function key is pressed. $x^3, x^2, x^{-1}, x!, \circ : "$ Engineering symbols* Normal distribution: $\rightarrow t^*$ $\hat{x}, \hat{x}_1, \hat{x}_2, \hat{y}$ Angle unit conversions (DRG $\blacktriangleright$ ) Metric conversions** (3) Powers and roots: $\wedge (x^y), x\sqrt{-}$ (4) $a^b/c$ (5) Abbreviated multiplication format in front of $\pi$ , $e$ (natu- ral logarithm base), memory name, or variable name: $2\pi, 3e, 5A, \pi A, \text{etc.}$ (6) Type B functions: With these functions, the function key is pressed and then the value is entered. $\sqrt{-}, \sqrt[3]{-}, \log, \ln, e^x, 10^x, \sin, \cos, \tan, \sin^{-1}, \cos^{-1}, \tan^{-1}, \sinh, \cosh, \tanh, \sinh^{-1}, \cosh^{-1}, \tanh^{-1}, (-)$	D is p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on.         To input this symbol: Perform this key operation: Unit k (kilo)         K (kilo)         Imm M       10 <sup>6</sup> G (Giga)       Imm T         To 10 <sup>12</sup>	120 [LOBEC 2] (or)         LOBEC LOBEC LOBEC 1000C 3 (b) 1101 =         Decimal mode:       DEE         • Example 4: To convert the value $22_{10}$ to its binary, octal, and hexadecimal equivalents.         (101102, 268, 1616)         Binary mode:       Image: 1000 1000 1000 1000 1000 1000 1000 10	<pre>(Matrix B 2×3)</pre>	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm VET 3 (Vct) 1 (A) X         Imm VET 3 (Vct) 2 (B)       Imm VET 3 (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions.         Imm Determining the Absolute Value of a Vector         Use the procedure shown below to obtain the absolute value (size) of a vector.         • Example: To determine the absolute value of Vector C (Result: 11.90965994)         (AbsVctC)       Imm Ahm Imm VET 3 (Vct) 3 (C)         • Example: To determine the size of the angle (angle unit:	$\begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/(n-r)!] < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/(r!(n-r)!]] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.99999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.99999999 \times 10^{99} \\ \hline \end{array}$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x<sup>1</sup>, ∘ , <sup>n</sup> Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), <sup>x</sup>√</li> <li>(4) <i>a<sup>b</sup></i>/<sub>c</sub></li> <li>(5) Abbreviated multiplication format in front of π, <i>e</i> (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √<sup>-</sup>, <sup>3</sup>√, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> </ul>	D i s p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on.         To input this symbol: Perform this key operation: Unit k (kilo)         k (kilo)       Imm" M         0 G (Giga)       Imm" G         10 <sup>6</sup> 10 <sup>9</sup> T (Tera)       Imm" T         m (milli)       Imm" M         m (milli)       Imm" M	120 LOBEE 2 (or) LOBE LOBE CODE 3 (b) 1101 Decimal mode: DEC • Example 4: To convert the value $22_{10}$ to its binary, oc- tal, and hexadecimal equivalents. (10110 <sub>2</sub> , 26 <sub>8</sub> , 16 <sub>16</sub> ) Binary mode: CODE 1 (d) 22 10110. <sup>b</sup> CODE CODE CODE 1 (d) 22 10110. <sup>b</sup> Octal mode: DET 26. <sup>o</sup> Hexadecimal mode: HEX 16. <sup>H</sup> • Example 5: To convert the value 513 <sub>10</sub> to its binary equivalent.	(Matrix B 2×3) (Element input) (Element input) (MatA×MatB) (MatB) (MatA×MatB) (MatA×MatB) (MatB	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm ver 3 (Vct) 1 (A) X         Imm ver 3 (Vct) 2 (B)       Imm ver 3 (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions.         Imm ver 3 (Vct) 2 (B)         • Determining the Absolute Value of a Vector Value of a vector.         Use the procedure shown below to obtain the absolute value (size) of a vector.         • Example: To determine the absolute value of Vector C (Result: 11.90965994)         (AbsVctC)       Imm Mer Wer 3 (Vct) 3 (C)	$\begin{array}{ c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{100} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline ^3 \sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 \ (x \ is \ an \ integer) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n \ (n, r \ are \ integers) \\ \hline 1 \leq [n!/(n-r)!] < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n \ (n, r \ are \ integers) \\ \hline 1 \leq [n!/(r!(n-r)!]] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.99999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.99999999 \times 10^{99} \\ \hline \end{array}$
Normal distribution: P(*, Q(*, R(* (2) Type A functions: With these functions, the value is entered and then the function key is pressed. $x^3, x^2, x^{-1}, x!, \circ : "$ Engineering symbols* Normal distribution: $\rightarrow t^*$ $\hat{x}, \hat{x}_1, \hat{x}_2, \hat{y}$ Angle unit conversions (DRG $\blacktriangleright$ ) Metric conversions** (3) Powers and roots: $\wedge (x^y), x\sqrt{-}$ (4) $a^b/c$ (5) Abbreviated multiplication format in front of $\pi$ , $e$ (natu- ral logarithm base), memory name, or variable name: $2\pi, 3e, 5A, \pi A, \text{etc.}$ (6) Type B functions: With these functions, the function key is pressed and then the value is entered. $\sqrt{-}, \sqrt[3]{-}, \log, \ln, e^x, 10^x, \sin, \cos, \tan, \sin^{-1}, \cos^{-1}, \tan^{-1}, \sinh, \cosh, \tanh, \sinh^{-1}, \cosh^{-1}, \tanh^{-1}, (-)$	D i s p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         • (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         • (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on.         • To input this symbol: Perform this key operation: Unit k (kilo)         • K (kilo)         • Umit M (Mega)         • Umit (C in 10 <sup>3</sup> )         • T (Tera)         • (micro)         • (nano)	$120 [1000C 2] (or)$ $120 [1000C 1000C 3] (b) 1101 =$ Decimal mode: DEE $Example 4: To convert the value 22_{10} to its binary, oc-tal, and hexadecimal equivalents. (10110_2, 26_3, 16_{16}) Binary mode: DEE 1 (d) 22 = 10110.^{b} Octal mode: DEE 26.^{\circ} Hexadecimal mode: DEE 16.^{H} • Example 5: To convert the value 513_{10} to its binaryequivalent. Binary mode: DEE 1 (d) 513 = Math ERROR_{b}$	(Matrix B 2×3) (Element input) (Element input) (MatA×MatB) (MatA	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm VCT 3 (Vct) 1 (A) IX         Imm VCT 3 (Vct) 2 (B)       Imm VCT 3 (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions.         Imm Vector       3 (Vct) 2 (B)         • Determining the Absolute Value of a Vector C         Use the procedure shown below to obtain the absolute value (size) of a vector.         • Example: To determine the absolute value of Vector C (Result: 11.90965994)         (AbsVctC)       Imm Imm VCT 3 (Vct) 3 (C)         • Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and	$\begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/(n-r)!] < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/(r!(n-r)!]] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.99999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.99999999 \times 10^{99} \\ \hline \end{array}$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ · " Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x³), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, <i>e</i> (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √, <sup>3</sup>√, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B func- tions: 2√3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr</li> </ul>	D i s p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on.         To input this symbol: Perform this key operation: Unit k (kilo)         K (kilo)         WIFF K         10 <sup>6</sup> G (Giga)         T (Tera)         WIFF T         10 <sup>6</sup> n (nano)         p (pico)	120 [LOBEC 2] (OT)         LOBEC LOBEC 1000C 3 (b) 1101 1         Decimal mode:         Decimal mode:         Example 4: To convert the value $22_{10}$ to its binary, octal, and hexadecimal equivalents.         (101102, 263, 1676)         Binary mode:       Image: 1000 1000 1000 1000 1000 1000 1000 10	(Matrix B 2×3) (Element input) (I = 0 = 3 = 2 = 1 = 4 = 1 = 4 = 4 = 4 = 4 = 4 = 4 = 4	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm VET ③ (Vct) 1 (A) IX         Imm VET ③ (Vct) 2 (B)       Imm VET ③ (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of a Vector</b> Use the procedure shown below to obtain the absolute value (size) of a vector.         • Example: To determine the absolute value of Vector C (Result: 11.90965994)         (AbsVctC)       Imm Imm VET ③ (Vct) ③ (C) Imm         • Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)	$\begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline ^3 \sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 \ (x \ is \ an \ integer) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n \ (n, r \ are \ integers) \\ \hline 1 \leq [n!/(n-r)!] < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n \ (n, r \ are \ integers) \\ \hline 1 \leq [n!/(r!(n-r)!]] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.99999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.999999999 \times 10^{99} \\ \hline  a , b, c < 1 \times 10^{100} \\ \hline \end{array}$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ ' " Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x'), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √, <sup>3</sup>√, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2√3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr ∠*</li> </ul>	D is p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on.         To input this symbol: Perform this key operation: Unit k (kilo)         k (kilo)       Imm M         0G (Giga)       Imm G         10 <sup>12</sup> m (milli)         m (milli)       Imm M         10 <sup>-6</sup> 10 <sup>-9</sup> p (pico)       Imm P         10 <sup>-15</sup> 10 <sup>-15</sup>	120 [LOBEC 2 (or) [LOBE LOBEC GOBC 3 (b) 1101 Decimal mode: Example 4: To convert the value $22_{10}$ to its binary, oc- tal, and hexadecimal equivalents. (10110 <sub>2</sub> , 26 <sub>8</sub> , 16 <sub>16</sub> ) Binary mode: [LOBEC LOBEC 1 (d) 22 10110. <sup>b</sup> Octal mode: Hexadecimal mode: HEX 16. <sup>H</sup> • Example 5: To convert the value 513 <sub>10</sub> to its binary equivalent. Binary mode: [LOBEC LOBEC 1 (d) 513 [Math ERROR b] • You may not be able to convert a value from a number system whose calculation range is greater than the cal- culation range of the resulting number system.	(Matrix B 2×3) (Element input) (Element input) (MatA×MatB) (MatA	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm Vet 3 (Vct) 1 (A) IX         Imm Vet 3 (Vct) 2 (B)       Imm Vet 3 (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions.         Imm Vet 3 (Vct) 2 (B)         • Determining the Absolute Value of a Vector         Use the procedure shown below to obtain the absolute value (size) of a vector.         • Example: To determine the absolute value of Vector C (Result: 11.90965994)         (AbsVctC)       Imm The Imm Vet 3 (Vct) 3 (C) Imm         • Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B.	$\begin{array}{ c c c c c c } \hline log x/lnx & 0 < x \leq 9.999999999 \times 10^{99} \\ \hline lox & -9.9999999999 \times 10^{99} \leq x \leq 99.999999999 \\ \hline e^x & -9.9999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} , 0 \leq r \leq n (n, r \ are \ integers) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \ are \ integers) \\ \hline 1 \leq [n!/(n-r)!] < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \ are \ integers) \\ \hline 1 \leq [n!/(r!(n-r)!]] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \geq 9.999999999 \times 10^{49} \\ \hline (x^2+y^2) \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.9999999999 \times 10^{99} \\ \hline 0 \leq n < 1 \times 10^{100} \\ \hline 0 \leq b, c \\ \hline  x  < 1 \times 10^{100} \\ \hline 0 = c \\ \hline nr & Decimal \leftrightarrow Sexagesimal Conversions \\ \hline \end{array}$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ · " Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x³), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, <i>e</i> (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √, <sup>3</sup>√, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2√3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr</li> </ul>	D i s p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on.         To input this symbol: Perform this key operation: Unit k (kilo)         K (kilo)         WIFF K         10 <sup>6</sup> G (Giga)         T (Tera)         WIFF T         10 <sup>6</sup> n (nano)         p (pico)	120 [LOBEC 2] (or)         [LOBEC [2] (or)         Decimal mode:         Decimal mode:         Decimal mode:         Image: Ima	<text></text>	Vector B(Result: (-3, 18, 13))(VctA×VctB)Imm Vct 3 (Vct) 1 (A) IXImm Vct 3 (Vct) 2 (B)Imm Vct 3 (Vct) 2 (B)• An error occurs in the above procedure if you specify vectors of different dimensions.IDetermining the Absolute Value of a VectorUse the procedure shown below to obtain the absolute value (size) of a vector.• Example: To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Res Imm Vct 3 (Vct) 3 (C)• Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)cos $\theta = (A \cdot B) /  A   B $ , which becomes $\theta = \cos^{-1} (A \cdot B) /  A   B $ Circ 4 vector perpendicular to both A and B.	$\begin{array}{ c c c c c c } \hline log x/lnx & 0 < x \leq 9.999999999 \times 10^{99} \\ \hline lox & -9.9999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.9999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline ^3 \sqrt{x} &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline ^3 \sqrt{x} &  x  < 1 \times 10^{100}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/(n-r)!] < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/(r!(n-r)!]] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \geq 9.999999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.9999999999 \times 10^{99} \\ \hline 0 \leq n c \\ \hline ix  < 1 \times 10^{100} \\ \hline 0 \leq b, c \\ \hline ix  < 1 \times 10^{100} \\ \hline Decimal \leftrightarrow Sexagesimal Conversions \\ O^\circ 0^\circ 0^\circ \leq  x  \leq 99999995 $
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ · " Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √<sup>-</sup>, <sup>3</sup>√, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2√3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr ∠*</li> <li>(9) Dot (•)**</li> <li>(10) + .</li> </ul>	D is p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on.         1 (Mega)         10 <sup>n</sup> (Mega)         10 <sup>n</sup> (Tera)         10 <sup>n</sup> (ninco)         10 <sup>n</sup> (milli)         10 <sup>n</sup> (fermon)         10 <sup>n</sup> (nano)         10 <sup>n</sup> (fermo)         10 <sup>-12</sup> f (fermo)         • For displayed values, the calculator selects the engineering symbol that makes the numeric part of the value fall within the range of 1 to 1000.	120 [LOBEC 2 (or) [LOBE LOBEC GOBC 3 (b) 1101 Decimal mode: Example 4: To convert the value $22_{10}$ to its binary, oc- tal, and hexadecimal equivalents. (10110 <sub>2</sub> , 26 <sub>8</sub> , 16 <sub>16</sub> ) Binary mode: [LOBEC LOBEC 1 (d) 22 10110. <sup>b</sup> Octal mode: Hexadecimal mode: HEX 16. <sup>H</sup> • Example 5: To convert the value 513 <sub>10</sub> to its binary equivalent. Binary mode: [LOBEC LOBEC 1 (d) 513 [Math ERROR b] • You may not be able to convert a value from a number system whose calculation range is greater than the cal- culation range of the resulting number system.	(Matrix B 2×3)       (Matrix C 2×2)         (Element input)       (Matrix B 2×3)         (Matrix B 2×3)       (Matrix B 2×3)         (Element input)       (Matrix B 2×3)         (Matrix B 2×3)       (Matrix B 2×3)         (Matrix B 2×3)       (Matrix B 2×3)         (Element input)       (Matrix B 2×3)         (Matrix B 2×3)       (Matrix B 2)         (Matrix A MatB)       (Matrix B 2)         (Matrix A MatB)       (Matrix B 2)         (Matrix S 2)       (Matrix G 2)         (Matrix C 2)       (Matrix C 2)         (Matrix C 2×2)       (Matrix 1)         (Matrix 3)       (Matri 3)         (Matrix C 2×2)       (Matrix 1)         (Matrix C 2×2)       (Matrix 1)         (Matrix 3)       (Matri 3)         (Matrix C 2×2)       (Matrix 3)         (Matrix 3)       (Matri 3)         (Matrix C 2×2)       (Matrix 3)         (Matrix 3)       (Matri 3)         (Matrix C 2×2)       (Matri 3)         (Matrix 3)       (Matri 3)         (Matrix C 2×2)       (Matri 3) </td <td>Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm VET ③ (Vct) 1 (A) IX         Imm VET ③ (Vct) 2 (B)       Imm VET ③ (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions.         <b>Determining the Absolute Value of a Vector</b>         Use the procedure shown below to obtain the absolute value (size) of a vector.         • Example: To determine the absolute value of Vector C (Result: 11.90965994)         (AbsVctC)       Imm Imm VET ③ (Vct) ③ (C) Imm         • Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)</td> <td><math display="block">\begin{array}{ c c c c c c } \hline log x/lnx &amp; 0 &lt; x \leq 9.999999999 \times 10^{99} \\ \hline lox &amp; -9.9999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x &amp; -9.9999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} &amp; 0 \leq x &lt; 1 \times 10^{100} \\ \hline x^2 &amp;  x  &lt; 1 \times 10^{100} \\ \hline x^2 &amp;  x  &lt; 1 \times 10^{100} ; x \neq 0 \\ \hline \sqrt{x} &amp;  x  &lt; 1 \times 10^{100} ; x \neq 0 \\ \hline \sqrt{x} &amp;  x  &lt; 1 \times 10^{100} ; x \neq 0 \\ \hline x^1 &amp; 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr &amp; 0 \leq n &lt; 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/(n-r)!] &lt; 1 \times 10^{100} \\ \hline nCr &amp; 0 \leq n &lt; 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/(r!(n-r)!]] &lt; 1 \times 10^{100} \\ \hline Pol(x, y) &amp;  x ,  y  \leq 9.99999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) &amp; 0 \leq r \leq 9.999999999 \times 10^{99} \\ \hline 0 \leq n = a \sin x \\ \hline 0 \leq n </math></td>	Vector B       (Result: (-3, 18, 13))         (VctA×VctB)       Imm VET ③ (Vct) 1 (A) IX         Imm VET ③ (Vct) 2 (B)       Imm VET ③ (Vct) 2 (B)         • An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of a Vector</b> Use the procedure shown below to obtain the absolute value (size) of a vector.         • Example: To determine the absolute value of Vector C (Result: 11.90965994)         (AbsVctC)       Imm Imm VET ③ (Vct) ③ (C) Imm         • Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)	$\begin{array}{ c c c c c c } \hline log x/lnx & 0 < x \leq 9.999999999 \times 10^{99} \\ \hline lox & -9.9999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.9999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline \sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline \sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline x^1 & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/(n-r)!] < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/(r!(n-r)!]] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.99999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.999999999 \times 10^{99} \\ \hline 0 \leq n = a \sin x \\ \hline 0 \leq n $
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ · " Engineering symbols* Normal distribution: →t* x̂, x̂1, x̂2, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x³), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √, <sup>3</sup>√, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2 √3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr ∠*</li> <li>(9) Dot (•)**</li> <li>(10) ×, ÷</li> <li>(11) +, -</li> <li>(2) and*</li> </ul>	D i s p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on. <b>To input this symbol:</b> Perform this key operation: Unit k (kilo)         WIFF K       10 <sup>3</sup> M (Mega)       WIFF M         T (Tera)       WIFF M         M (milli)       WIFF M         µ (micro)       WIFF M         µ (micro)       WIFF M         p (pico)       WIFF M         0 (femto)       WIFF M         • For displayed values, the calculator selects the engineering symbol that makes the numeric part of the value fall within the range of 1 to 1000.	120 [LOBEC 2] (or)         [LOBEC [2] (or)         Decimal mode:         Decimal mode:         Decimal mode:         Image: Ima	(Matrix B 2×3) IFF MAT 1 (Dim) 2 (B) 2 3 3 4 (Element input) (I 1 0 0 3 2 2 1 0 4 1 1 4 4 (MatA×MatB) IFF MAT 3 (Mat) 1 (A) 1 (MatA×MatB) IFF MAT 3 (Mat) 2 (B) 4 • An error occurs if you try to add, subtract matrices whose dimensions are different from each other, or multiply a matrix whose number of columns is different from that of the matrix by which you are multiplying it. <b>Calculating the Scalar Product of a Matrix</b> Use the procedure shown below to obtain the scalar product (fixed multiple) of a matrix. <b>Example:</b> Multiply Matrix $C = \begin{bmatrix} 2 - 1 \\ -5 3 \end{bmatrix}$ by 3. $(\begin{bmatrix} 6 - 3 \\ -15 9 \end{bmatrix})$ (Matrix C 2×2) IFF MAT 1 (Dim) 3 (C) 2 2 2 2 4 (Element input) 2 5 1 1 5 1 5 3 4 45 (3×MatC) 3 1 FF MAT 3 (Mat) 3 (C) 5	Vector B(Result: (-3, 18, 13))(VctA×VctB)Imm Vct 3 (Vct) 1 (A) IXImm Vct 3 (Vct) 2 (B)Imm Vct 3 (Vct) 2 (B)• An error occurs in the above procedure if you specify vectors of different dimensions.IDetermining the Absolute Value of a VectorUse the procedure shown below to obtain the absolute value (size) of a vector.• Example: To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Res Imm Vct 3 (Vct) 3 (C)• Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)cos $\theta = (A \cdot B) /  A   B $ , which becomes $\theta = \cos^{-1} (A \cdot B) /  A   B $ Circ 4 vector perpendicular to both A and B.	$\begin{array}{ c c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline ^3\sqrt{x} &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline ^3\sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 \ (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n \ (n, r \text{ are integers}) \\ \hline 1 \leq \{n!/(n-r)!\} < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n \ (n, r \text{ are integers}) \\ \hline 1 \leq \{n!/(n-r)!\} < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.999999999 \times 10^{49} \\ \hline (x^2+y^2) \leq 9.999999999 \times 10^{49} \\ \hline 0 \leq r \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.9999999999 \times 10^{99} \\ \hline 0 \leq h \ c \\ \hline  x  < 1 \times 10^{100} \\ \hline 0 \leq h \ c \\ \hline  x  < 1 \times 10^{100} \\ \hline 0 = h \ c \\ \hline x > 0^{\circ}, \ 0 \ 0 \leq h \ x \leq 9.99999999 \\ \hline x > 0^{\circ} =  x  \leq 9999999 \\ \hline x > 0^{\circ} =  x  \leq 9999999 \\ \hline x > 0^{\circ} = 1 \times 10^{100} \\ \hline 0 \leq h \ x > 0^{\circ} = 1 \times 10^{100} \\ \hline $
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x<sup>1</sup>, ∘ · " Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), x√-</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √, <sup>3</sup>√, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2√3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr ∠*</li> <li>(9) Dot (•)**</li> <li>(10) ×, ÷</li> <li>(11) +, -</li> <li>(2) and*</li> </ul>	D i s p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on. <b>To input this symbol:</b> Perform this key operation: Unit k (kilo)         6 (Giga)         9 (Tera)         9 (milli)         9 (pico)         9 (pico)         9 (femto)         9 (femto)         9 (femto)         9 (femto)         9 (femto)         9 (femto)         9 (pico)         9 (femto)	120 [DBEF 2 (or)         Decimal mode:       EE         • Example 4: To convert the value 22 <sub>10</sub> to its binary, octal, and hexadecimal equivalents.       (101102, 263, 1616)         Binary mode:       Image: I	(Matrix B 2×3)       (min 1 (Dim) 2 (B) 2 3 3 4         (Element input)       (min 1 0 0 3 4 2 4 4 1 4 4 5         (MatA×MatB)       (min 1 3 (Mat) 1 (A) 1 4         (MatA×MatB)       (min 1 3 (Mat) 2 (B) 4         (MatA×MatB)       (min 1 3 (Mat) 2 (B) 4         • An error occurs if you try to add, subtract matrices whose dimensions are different from each other, or multiply a matrix whose number of columns is different from that of the matrix by which you are multiplying it. <b>Calculating the Scalar Product of a Matrix</b> Use the procedure shown below to obtain the scalar product (fixed multiple) of a matrix.         (Matrix C 2×2)       (min 1 (Dim) 3 (C) 2 4 2 4         (Matrix C 2×2)       (min 1 (Dim) 3 (C) 2 4 2 4         (Matrix C 2×2)       (min 1 (Dim) 3 (Mat) 3 (C) 4         (Matrix C 2×2)       (min 1 (Dim) 3 (Mat) 3 (C) 4         (Matrix C 2×2)       (min 1 (Dim) 3 (Mat) 3 (C) 4         (Matrix C 2×2)       (min 1 (Dim) 3 (Mat) 3 (C) 4         (Matrix C 2×2)       (min 1 (Dim) 3 (Mat) 3 (C) 4         (Matrix C 3 3 1 (min 3 (Mat) 3 (C) 4       (Matrix C 3 4 (Matrix 3 (Mat) 3 (C) 4	Vector B(Result: (-3, 18, 13))(VctA×VctB)Imm Vct 3 (Vct) 1 (A) XImm Vct 3 (Vct) 2 (B) Imm• An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of</b> a VectorUse the procedure shown below to obtain the absolute value (size) of a vector.• Example: To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Als Imm Vct 3 (Vct) 3 (C) Imm• Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)cos $\theta = \frac{(A \cdot B)}{ A  B }$ , which becomes $\theta = \cos^{-1} \frac{(A \cdot B)}{ A  B }$ Size 1 vector perpendicular to both A and B = $\frac{A \times B}{ A \times B }$	$\begin{array}{ c c c c c c } \hline log x/lnx & 0 < x \leq 9.999999999 \times 10^{99} \\ \hline lox & -9.9999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.9999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline \sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline \sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline x^1 & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/(n-r)!] < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq [n!/(r!(n-r)!]] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.99999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.999999999 \times 10^{99} \\ \hline 0 \leq n = a \sin x \\ \hline 0 \leq n $
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed.</li> <li>x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ <sup>1</sup>" Engineering symbols* Normal distribution: →t*</li> <li>x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ</li> <li>Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered.</li> <li>√, <sup>3</sup>√, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-)</li> <li>d', h<sup>*</sup>, b<sup>*</sup>, o<sup>*</sup>, Neg<sup>*</sup>, Not<sup>*</sup>, Det<sup>**</sup>, Trn<sup>**</sup>, arg<sup>*</sup>, Abs<sup>*</sup>, Conjg<sup>*</sup></li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2√3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr ∠<sup>*</sup></li> <li>(9) Dot (•)**</li> <li>(10) x, ÷</li> <li>(11) +, -</li> <li>(2) and*</li> <li>(3) xnor*, xor*, or*</li> </ul>	D i s p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on.         1 (Mega)         1 (Mega)         1 (Tera)         1 (milli)         1 (micro)         1 (femto)         • For displayed values, the calculator selects the engineering symbols cannot be used within the range of 1 to 1000.         • For displayed values, the calculator selects the engineering symbols cannot be used when inputting fractions.         • Example: 9 ÷ 10 = 0.9 m (milli)	120 [DOEC 2 (or)         Decimal mode:       DEC         • Example 4: To convert the value 22 <sub>10</sub> to its binary, octal, and hexadecimal equivalents.       (101102, 268, 1676)         Binary mode:       Image:	(Matrix B 2×3) INF I (Dim) 2 (B) 2 3 3 ↓ (Element input) I 1 0 3 2 2 I 4 1 1 4 1 (MatA×MatB) INF I I 3 (Mat) 1 (A) X (MatA×MatB) INF I I 3 (Mat) 1 (A) X INF I I 3 (Mat) 2 (B) 1 • An error occurs if you try to add, subtract matrices whose dimensions are different from each other, or multiply a matrix whose number of columns is different from that of the matrix by which you are multiplying it. • Calculating the Scalar Product of a Matrix Use the procedure shown below to obtain the scalar product (fixed multiple) of a matrix. • Example: Multiply Matrix C = 2 -1   by 3 (	Vector B(Result: (-3, 18, 13)) $(VctA \times VctB)$ Imm Vet 3 (Vct) 1 (A) IXImm Vet 3 (Vct) 2 (B) I• An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of a Vector</b> Use the procedure shown below to obtain the absolute value (size) of a vector.• Example: To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Max Imm Vet 3 (Vct) 3 (C) III• Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B.(Result: 108.4349488°) $\cos \theta = \frac{(A.B)}{ A  B }$ , which becomes $\theta = \cos^{-1}\frac{(A.B)}{ A  B }$ Size 1 vector perpendicular to both A and B = $\frac{A \times B}{ A \times B }$ (3-dimensional Vector A)	$\begin{array}{ c c c c c c } \hline \log x/\ln x & 0 < x \leq 9.99999999 > 10^{99} \\ \hline 10^x & -9.999999999 > 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 > 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{100} \\ \hline x/x &  x  < 1 \times 10^{100} \\ \hline x/x &  x  < 1 \times 10^{100} \\ \hline x/x &  x  < 1 \times 10^{100} \\ \hline x/x &  x  < 1 \times 10^{100} \\ \hline x/x & 0 \leq x \leq 69 \ (x \ \text{is an integer}) \\ \hline n \Pr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n \ (n, r \ \text{are integers}) \\ 1 \leq \{n!/(n-r)!\} < 1 \times 10^{100} \\ \hline n Cr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n \ (n, r \ \text{are integers}) \\ 1 \leq \{n!/(n-r)!\} < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.999999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{49} \\ \hline 0 \leq x \ \text{csame as sinx} \\ \hline e^{o^* n} & 0 \leq h \ c \\ \hline  x  < 1 \times 10^{100} \\ \hline o^{\circ n} & 0 \leq h \ c \\ \hline  x  < 1 \times 10^{100} \\ \hline o^{\circ 0} \leq  x  \leq 999999^{\circ}59^{\circ} \\ \hline x > 0: \ -1 \times 10^{100} < y \log x < 100 \\ \hline n(x^y) & x > 0 \\ \hline x < 0: \ y = n, \ \frac{1}{2n+1} \ (n \ \text{is an integer}) \\ \hline \end{array}$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x<sup>1</sup>, ∘ · " Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), x√-</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √, <sup>3</sup>√, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2√3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr ∠*</li> <li>(9) Dot (•)**</li> <li>(10) ×, ÷</li> <li>(11) +, -</li> <li>(2) and*</li> </ul>	D i s p         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on. <b>To input this symbol:</b> Perform this key operation: Unit k (kilo)         6 (Giga)         9 (Tera)         9 (milli)         9 (pico)         9 (pico)         9 (femto)         9 (femto)         9 (femto)         9 (femto)         9 (femto)         9 (femto)         9 (pico)         9 (femto)	120 [DBEF 2 (or)         Decimal mode:       EE         • Example 4: To convert the value 22 <sub>10</sub> to its binary, octal, and hexadecimal equivalents.       (101102, 263, 1616)         Binary mode:       Image: I	(Matrix B 2×3) INF IN (Dim) 2 (B) 2 3 3 (Element input) (I 1 0 3 2 2 1 4 1 1 5 45 (MatA×MatB) INF IN 3 (Mat) 1 (A) 1 INF IN 3 (Mat) 2 (B) 5 • An error occurs if you try to add, subtract matrices whose dimensions are different from each other, or multiply a matrix whose number of columns is different from that of the matrix by which you are multiplying it. <b>Calculating the Scalar Product of a</b> Matrix <b>Dese</b> the procedure shown below to obtain the scalar product (fixed multiple) of a matrix. • <b>Example:</b> Multiply Matrix C = $\begin{bmatrix} 2 - 1 \\ -5 3 \end{bmatrix}$ by 3. $\begin{bmatrix} 6 - 3 \\ -15 9 \end{bmatrix}$ (Matrix C 2×2) INF INT 1 (Dim) 3 (C) 2 2 2 5 (Element input) 2 5 1 5 3 5 5 (3×MatC) 3 1 1 5 5 3 3 5 5 <b>Dottaining the Determinant of a Matrix</b> You can use the procedure below to determine the determinant of a square matrix. • <b>Example:</b> To obtain the determinant of Matrix A = $\begin{bmatrix} 2 - 1 & 6 \\ 5 & 0 & 1 \end{bmatrix}$ (Result: 73)	Vector B(Result: (-3, 18, 13))(VctA×VctB)Imm Vet 3 (Vct) 1 (A) IXImm Vet 3 (Vct) 2 (B) I• An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of</b> a VectorUse the procedure shown below to obtain the absolute value (size) of a vector.• Example: To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Rab Imm Vet 3 (Vct) 3 (C) I• Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)cos $\theta = (A \cdot B) (A   B)$ , which becomes $\theta = \cos^{-1}(A \cdot B) (A   B)$ Size 1 vector perpendicular to both A and B = $\frac{A \times B}{ A   B }$ (3-dimensional Vector A)Imm Vet 1 (Dim) 1 (A) 3 IImm Vet 1 I 0 I 1 IImm Vet 1 I 0 I 1 IImm Vet 1 I 0 I 1 IImm Vet I I 0 I 1 I	$ \begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq \{n!/(n-r)!\} < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq \{n!/(r+(n-r))!\} < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.999999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{49} \\ \hline (x^2+y^2) \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.9999999999 \times 10^{99} \\ \hline \theta \in \text{ Same as sinx} \\ \hline 0^{\circ r} & 0 \leq b, c \\ \hline  x  < 1 \times 10^{100} \\ \hline \text{Decimal } \leftrightarrow \text{ Sexagesimal Conversions} \\ \hline 0^{\circ 0}0^{\circ 0} \leq  x  \leq 999999^{\circ}59^{\circ} \\ \hline x > 0: -1 \times 10^{100} < y\log x < 100 \\ \land (x^3) & x = 0; y > 0 \\ x < 0: y = n, \frac{1}{2n+1} (n \text{ is an integer}) \\ \hline \text{However: } -1 \times 10^{100} < y\log  x  < 100 \\ \hline y > 0: x \neq 0 \\ -1 \times 10^{100} < 1/x \log y < 100 \\ \hline \end{array}$
Normal distribution: P(*, Q(*, R(* (2) Type A functions: With these functions, the value is entered and then the function key is pressed. $x^3, x^2, x^{-1}, x!, \circ : "$ Engineering symbols* Normal distribution: $\rightarrow t^*$ $\hat{x}, \hat{x}_1, \hat{x}_2, \hat{y}$ Angle unit conversions (DRG $\blacktriangleright$ ) Metric conversions** (3) Powers and roots: $\wedge (x^3), x\sqrt{-}$ (4) $a^b/c$ (5) Abbreviated multiplication format in front of $\pi$ , $e$ (natu- ral logarithm base), memory name, or variable name: $2\pi, 3e, 5A, \pi A, \text{etc.}$ (6) Type B functions: With these functions, the function key is pressed and then the value is entered. $\sqrt{-}, \sqrt[3]{-}$ , log, ln, $e^x$ , $10^x$ , sin, cos, tan, $\sin^{-1}$ , $\cos^{-1}$ , $\tan^{-1}$ , sinh, cosh, tanh, $\sinh^{-1}$ , $\cosh^{-1}$ , $\tanh^{-1}$ , (-)) $d^*, h^*, b^*, 0^*, Neg^*, Not^*, Det^*, Trn^{**}, arg^*, Abs^*, Corig^*$ (7) Abbreviated multiplication format in front of Type B func- tions: $2\sqrt{3}$ , Alog2, etc. (8) Permutation and combination: $nPr$ , $nCr$ $\angle^*$ (9) Dot (•)** (10) $\times, \div$ (11) $+, -$ (2) and* (2) xnor*, xor*, or* • Operations of the same precedence are performed from right to left. $e^x \ln \sqrt{-} 120 \rightarrow e^x \{\ln(\sqrt{-} 120)\}$ Other operations are performed from left to right. • Operations enclosed in parentheses are performed first.	Disp         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         • (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         • (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • Context and the symbol of the symbol of the following are to the symbol of	120 [DOEC 2 (or)         Decimal mode:       EE         • Example 4: To convert the value 22 <sub>10</sub> to its binary, octal, and hexadecimal equivalents.       (101102, 268, 1616)         Binary mode:       Image: I	$(Matrix B 2 \times 3)$ $(Matrix B 2 \times 3)$ $(Matrix B 2 \times 3)$ $(Hatrix B 2$	Vector B(Result: (-3, 18, 13))(VctA×VctB)Imm VCT 3 (Vct) 1 (A) XImm VCT 3 (Vct) 2 (B) Imm VCT 3 (Vct) 2 (B) Imm• An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of a Vector</b> Use the procedure shown below to obtain the absolute value (size) of a vector.• <b>Example:</b> To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Aha Imm VCT 3 (Vct) 3 (C) Imm• <b>Example:</b> To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)cos $\theta = (A.B) (A. B) (which becomes \theta = \cos^{-1}(A.B) (A. B) (A. B)$	$ \begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline ^3\sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq n!/(n-r)! < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq n!/(r!(n-r)!) < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq h c \\ \hline  x  < 1 \times 10^{100} \\ \hline o^*, n & 0 \leq b, c \\ \hline  x  < 1 \times 10^{100} \\ \hline o^*, n & 0 \leq 0 \leq r \\ \hline x > 0^{\circ} 0^{\circ} 0^{\circ}  x  \leq 999999^{\circ} 59^{\circ} \\ \hline x > 0^{\circ} 0^{\circ} 0^{\circ}  x  \leq 999999^{\circ} 59^{\circ} \\ \hline x < 0^{\circ} y > 0, \\ \hline x < 0^{\circ} y = n, \frac{1}{2n+1} (n \text{ is an integer}) \\ \hline However: -1 \times 10^{100} < y \log  x  < 100 \\ \hline y > 0^{\circ} x \neq 0 \\ \hline -1 \times 10^{100} < 1/x \log y < 100 \\ \hline x & \sqrt{y} & y = 0^{\circ} x > 0 \end{array}$
Normal distribution: P(*, Q(*, R(* (2) Type A functions: With these functions, the value is entered and then the function key is pressed. $x^3, x^2, x^{-1}, x!, \circ : "$ Engineering symbols* Normal distribution: $\rightarrow t^*$ $\hat{x}, \hat{x}_1, \hat{x}_2, \hat{y}$ Angle unit conversions (DRG $\blacktriangleright$ ) Metric conversions** (3) Powers and roots: $\wedge (x^3), x\sqrt{-}$ (4) $a^b/c$ (5) Abbreviated multiplication format in front of $\pi$ , $e$ (natu- ral logarithm base), memory name, or variable name: $2\pi, 3e, 5A, \pi A$ , etc. (6) Type B functions: With these functions the function key is pressed and then the value is entered. $\sqrt{-}, \sqrt[3]{-}$ , log, ln, $e^x$ , $10^x$ , sin, cos, tan, sin <sup>-1</sup> , cos <sup>-1</sup> , tan <sup>-1</sup> , sinh, cosh, tanh, sinh <sup>-1</sup> , cosh <sup>-1</sup> , tanh <sup>-1</sup> , (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg* (7) Abbreviated multiplication format in front of Type B func- tions: $2\sqrt{3}$ , Alog2, etc. (8) Permutation and combination: $nPr$ , $nCr$ $\angle^*$ (9) Dot (•)** (10) $\times, \div$ (11) $+, -$ (2) and* (12) $\rightarrow e^x \{\ln(\sqrt{-} 120)\}$ • Operations of the same precedence are performed from right to left. $e^x \ln \sqrt{-} 120 \rightarrow e^x \{\ln(\sqrt{-} 120)\}$ • Other operations are performed from left to right. • Operations enclosed in parentheses are performed first. • When a calculation contains an argument that is	<ul> <li>Disp 1</li> <li>Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.</li> <li>1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)</li> <li>2 (Eng OFF): Engineering symbols off (no "Eng" indicator)</li> <li>The following are the nine symbols that can be used when engineering symbols are turned on.</li> <li>1 the following are the nine symbols that can be used when engineering symbols are turned on.</li> <li>1 the following are the nine symbols that can be used when engineering symbols are turned on.</li> <li>1 the following are the nine symbols that can be used when engineering symbols are turned on.</li> <li>1 the following are the nine symbols that can be used when engineering symbols are turned on.</li> <li>1 the following are the nine symbols that can be used when engineering symbols are turned on.</li> <li>1 the following are the nine symbols that can be used when engineering symbols are turned on.</li> <li>1 the following are the nine symbols that can be used when engineering symbols are turned on.</li> <li>1 the following are the nine symbol second the value fall of a n(nano) mer m 10<sup>-9</sup> n(10<sup>-15</sup>) the range of 1 to 1000.</li> <li>1 fem 1 (Disp) 1 0<sup>-15</sup> 0<sup>-15</sup>.</li> <li>2 that makes the numeric part of the value fall within the range of 1 to 1000.</li> <li>3 the numeric second when inputting fractions.</li> <li>3 the numeric second when inputting fractions.</li> </ul>	120 [DOEE] 2 (or)         Decimal mode:	$(Matrix B 2 \times 3)$ $(Matrix B 2 \times 3)$ $(Hatrix A 2 \times 3)$ $(Hatrix B 2 \times 3)$ $(Hatrix B 2 \times 3)$ $(Hatrix A 2 \times 3)$ $(Hatrix B 2 \times 3)$ $(Hatrix A 2 \times 3)$ $(Hatrix A 2 \times 3)$ $(Hatrix A 3 \times 3)$ $(Hatrix A 2 \times 3)$ $(Hatrix A 2 \times 3)$ $(Hatrix A 2 \times 3)$ $(Hatrix A 3 \times 3)$ $(Hatrix A 3 \times 3)$ $(Hatrix A 3 \times 3)$ $(Hatrix A 2 \times 3)$ $(Hatrix A 2 \times 3)$ $(Hatrix A 3 \times 3)$ $(Hatrix A 3$	Vector B(Result: (-3, 18, 13))(VctA×VctB)Imm VET 3 (Vct) 1 (A) XImm VET 3 (Vct) 2 (B) Imm VET 3 (Vct) 2 (B) Imm• An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of</b> a VectorUse the procedure shown below to obtain the absolute value (size) of a vector.• Example: To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Ahs Imm VET 3 (Vct) 3 (C) Imm• Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)cos $\theta = (A.B) (A.B) (AI)(BI) (A) A A A A B B (A A B) (A A B)$	$ \begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100}, x \neq 0 \\ \hline x^1 & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ 1 \leq \{n!/(n-r)!\} < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ 1 \leq \{n!/(n-r)!\} < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.999999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.9999999999 \times 10^{99} \\ \hline e^x \text{ Same as sinx} \\ \hline 0^{\circ 1, n} & 0 = b, c \\ \hline  x  < 1 \times 10^{100} \\ \hline o^{\circ 0, n} & 0 \leq b, c \\ \hline  x  < 1 \times 10^{100} \\ \hline x < 0; y > 0 \\ x < 0; y = n, \frac{1}{2n+1} (n \text{ is an integer}) \\ \hline However: -1 \times 10^{100} < y \log  x  < 100 \\ \hline y > 0; x \neq 0 \\ -1 \times 10^{100} < 1/x \log y < 100 \\ x < \sqrt{y} & y = 0; x > 0 \\ y < 0; x = 2n + 1, \frac{1}{n} (n \neq 0; n \text{ is an integer}) \\ \hline \end{array}$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x1, ∘ <sup>1</sup>" Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √, <sup>3</sup>√, log. In, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Tm**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2 √3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr ∠*</li> <li>(9) Dot (•)**</li> <li>(10) ×, ., o*</li> <li>(11) ×, ., o*</li> <li>(12) → e<sup>x</sup>{(In(√ 120))})</li> <li>Other operations are performed from left to right.</li> <li>Operations enclosed in parentheses are performed first.</li> <li>When a calculation contains an argument that is a negative number, the negative number must be enclosed within parentheses. The negative sign (-) is</li> </ul>	Disp         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         • (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         • (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • The following are the nine symbols that can be used when engineering symbols are turned on.         • Context and the symbol of the symbol of the following are to the symbol of	120 [DOEE] 2 (or)         Decimal mode:	(Matrix B 2×3) INF INT I (Dim) 2 (B) 2 3 3 4 (Element input) (I 1 0 0 3 2 2 1 4 1 1 4 4 (MatA×MatB) INF INT 3 (Mat) 1 (A) 1 (MatA×MatB) INF INT 3 (Mat) 2 (B) 4 • An error occurs if you try to add, subtract matrices whose dimensions are different from each other, or multiply a matrix whose number of columns is different from that of the matrix by which you are multiplying it. <b>Calculating the Scalar Product of a Matrix</b> Use the procedure shown below to obtain the scalar product (fixed multiple) of a matrix. • <b>Example:</b> Multiply Matrix C = $\begin{pmatrix} 2 & -1 \\ -5 & 3 \end{pmatrix}$ by 3. $\begin{pmatrix} 6 & -3 \\ -15 & 9 \end{pmatrix}$ (Matrix C 2×2) INF II (Dim) 3 (C) 2 2 2 4 (Element input) 2 1 1 1 1 5 3 3 1 10 (3×MatC) 3 1 INF INT 3 (Mat) 3 (C) 1 <b>Dotaining the Determinant of a Matrix</b> You can use the procedure below to determine the determinant of a square matrix. • <b>Example:</b> To obtain the determinant of $Matrix A = \begin{pmatrix} 2 & -1 & 6 \\ 5 & 0 & 1 \\ 3 & 2 & 4 \end{bmatrix}$ (Result: 73) (Matrix A 3×3) INF INF 1 (Dim) 1 (A) 3 3 3 1 (Element input) 2 1 1 6 6 5 6 0 1 1	Vector B(Result: (-3, 18, 13))(VctA×VctB)Imm VCT 3 (Vct) 1 (A) XImm VCT 3 (Vct) 2 (B) Imm• An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of</b> a VectorUse the procedure shown below to obtain the absolute value (size) of a vector.• Example: To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Abs Imm VCT 3 (Vct) 3 (C) Imm• Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)cos $\theta = (A \cdot B) /  A  B $ , which becomes $\theta = \cos^{-1}(A \cdot B) /  A  B $ Size 1 vector perpendicular to both A and B = $\frac{A \times B}{ A \times B }$ (3-dimensional Vector A)(3-dimensional Vector B)Imm VCT 1 (Dim) 1 (A) 3 Imm (Element input)1 Imm 2 Imm Imm 3 (Vct) 2 (B) Imm (VctA·VctB)Imm VCT 3 (Vct) 1 (A) Imm (Vct) 2 (B) Imm (VctA·VctB)Imm VCT 3 (Vct) 2 (B) Imm (Vct) 2 (B) Imm	$ \begin{array}{ c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline ^3\sqrt{x} &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline ^3\sqrt{x} &  x  < 1 \times 10^{100}, 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline 1 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ 1 \leq \{n!/(n-r)!\} < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ 1 \leq [n!/(r!(n-r)!)] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \geq 9.99999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.999999999 \times 10^{99} \\ \hline 0 \leq n c \\ \hline  x  < 1 \times 10^{100} \\ \hline o^* & 0 \leq h c \\ \hline  x  < 1 \times 10^{100} \\ \hline o^* & 0 \geq y 0 \\ x < 0; y > 0 \\ x < 0; y > 0 \\ x < 0; y > 0, \frac{1}{2n+1} (n \text{ is an integer}) \\ \hline However: -1 \times 10^{100} < y \log  x  < 100 \\ \hline x \\ \sqrt{y} & y > 0; x \neq 0 \\ -1 \times 10^{100} < 1/x \log y < 100 \\ x \\ \sqrt{y} & y < 0; x = 2n + 1, \frac{1}{n} (n \neq 0; n \text{ is an integer}) \\ \hline However: -1 \times 10^{100} < 1/x \log  y  < 100 \\ \hline \end{array}$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ · " Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √, <sup>3</sup>√, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2√3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr ∠*</li> <li>(9) Dot (•)**</li> <li>(10) ×, ÷</li> <li>(11) +, -</li> <li>(2) and*</li> <li>(3) xnor*, xor*, or*</li> <li>Operations of the same precedence are performed from right to left. e<sup>x</sup>In √ 120 → e<sup>x</sup>{In(√ 120)}</li> <li>Other operations are performed from left to right.</li> <li>Operations enclosed in parentheses are performed first.</li> <li>When a calculation contains an argument that is a negative number, the negative number must be enclosed within parentheses. The negative sign (-) is treated as a Type B function, so particular care is</li> </ul>	<ul> <li>Disp 1</li> <li>Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.</li> <li>1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)</li> <li>2 (Eng OFF): Engineering symbols off (no "Eng" indicator)</li> <li>The following are the nine symbols that can be used when engineering symbols are turned on.</li> <li>1 (Kilo) WIL (Kilo) (1 Or (Kilo))</li> <li>1 (Fera) (1 Or (Kilo))</li> <li>2 (fento) (1 Or (Kilo))</li> <li>2 (fermto) (1 Or (Kilo))</li> <li>3 (Fer displayed values, the calculator selects the engineering symbols cannot be used when inputting fractors.</li> <li>5 (For displayed values, the calculator selects the engineering symbols cannot be used when inputting fractors.</li> <li>5 (Figneering symbols cannot be used when inputting fractors.</li> <li>6 (King) (1 Or (0 Or (King))</li> <li>9 (1 O (1 Or (King))</li> </ul>	120 [DOEE] 2 (or)         Decimal mode:	<equation-block><pre>(Matrix B 2×3)</pre></equation-block>	Vector B(Result: (-3, 18, 13))(VctA×VctB)Imm VET 3 (Vct) 1 (A) XImm VET 3 (Vct) 2 (B) E• An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of a Vector</b> Use the procedure shown below to obtain the absolute value (size) of a vector.• <b>Example:</b> To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Aha Imm VET 3 (Vct) 3 (C) E• <b>Example:</b> To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)cos $\theta = (A.B) (A   B )$ , which becomes $\theta = \cos^{-1}(A.B) (A   B )$ Size 1 vector perpendicular to both A and B = $A \times B (A \times B)$ (3-dimensional Vector A)(G-dimensional Vector B)Imm VET 1 (Dim) 1 (A) 3 E(Element input)1 E 2 E 0 E C(VctA·VctB)Imm VET 3 (Vct) 1 (A) Imm VET 3 (Vct) 2 (B) E(Ans + (AbsVctA×AbsVctB))E 1 Imm Aha Imm VET 3 (Vct) 1 (A)	$ \begin{array}{ c c c c c c } \hline \log x/\ln x & 0 < x \leq 9.99999999 > 10^{99} \leq x \leq 99.99999999 \\ \hline 10^x & -9.999999999 > 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{100} ; x \neq 0 \\ \hline {}^3\sqrt{x} &  x  < 1 \times 10^{10} , 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline {}^{1}12 &  nl/(r!(n-r)!)] < 1 \times 10^{100} \\ \hline {}^{0}nCr & 0 \leq n < 1 \times 10^{10} , 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline {}^{1}12 &  nl/(r!(n-r)!)] < 1 \times 10^{100} \\ \hline {}^{0}nCr & 0 \leq n < 1 \times 10^{100} , 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline {}^{1}12 &  nl/(r!(n-r)!)] < 1 \times 10^{100} \\ \hline {}^{0}nCr & 0 \leq n < 1 \times 10^{100} , 0 \leq r \leq n (n, r \text{ are integers}) \\ \hline {}^{1}12 &  nl/(r!(n-r)!)] < 1 \times 10^{100} \\ \hline {}^{0}nCr & 0 \leq n < 1 \times 10^{100} \\ \hline {}^{0}nCr & 0 \leq n < 1 \times 10^{100} \\ \hline {}^{0}ncr & 0 \leq h c \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{0}ncr & 0 \leq h c \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{0}ncr & 0 \leq h c \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{0}ncr & 0 \leq h c \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{0}ncr & 0 \leq h c \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{0}ncr & 0 \leq h c \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{0}ncr & 0 \leq h c \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &  x  < 1 \times 10^{100} \\ \hline {}^{1}12 &$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x1, ∘ <sup>1</sup>" Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √, <sup>3</sup>√, log. In, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Tm**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2 √3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr ∠*</li> <li>(9) Dot (•)**</li> <li>(10) ×, ., or*</li> <li>(11) ×, nor*, xor*, or*</li> <li>Operations of the same precedence are performed from right to left. e<sup>x</sup>In √ 120 → e<sup>x</sup>{In(√ 120)}</li> <li>Other operations are performed from left to right.</li> <li>Operations enclosed in parentheses are performed first.</li> <li>When a calculation contains an argument that is a negative number, the negative number must be enclosed within parentheses. The negative sign (-) is</li> </ul>	Disp         1         • Press 1. On the engineering symbols setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on. <u>m (milli)</u> <u>9 ⊕ 10 ⊕ 9 m(milli)</u> <u>0 ⊕ 10 m(milli)</u>	120 [DOEE] 2 (or)         Decimal mode:	<pre>(Matrix B 2×3)</pre>	Vector B(Result: (-3, 18, 13))(VctA×VctB)Imm VET 3 (Vct) 1 (A) XImm VET 3 (Vct) 2 (B) Imm VET 3 (Vct) 2 (B) Imm• An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of a Vector</b> Use the procedure shown below to obtain the absolute value (size) of a vector.• Example: To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Ahn Imm VET 3 (Vct) 3 (C) Imm• Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B.(Result: 108.4349488°)cos $\theta = (A.B) (A    B )$ , which becomes $\theta = \cos^{-1}(A.B) (A    B )$ Size 1 vector perpendicular to both A and B = $A \times B   A    B $ (3-dimensional Vector A)(3-dimensional Vector B)Imm VET 1 (Dim) 1 (A) 3 Imm(Clement input)Imm VET 3 (Vct) 2 (B) Imm(VctA-VctB)Imm VET 3 (Vct) 1 (A) Imm(VctA-VctB)Imm VET 3 (Vct) 1 (A) Imm(Bernent input)Imm VET 3 (Vct) 2 (B) Imm(Ans ÷ (AbsVctA × AbsVctB))(Ans ÷ (AbsVctA × AbsVctB))(Ans ÷ (AbsVctA × AbsVctB))Imm VET 3 (Vct) 2 (B) Imm(Ans = (Abs Hotta × AbsVctB))(Ans = (Abs Hotta × AbsVctB))(Ans = (Abs Hotta × AbsVctB))(Ans = (AbsVctA × AbsVctB))(Ans =	$ \begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 \times 10^{99} \\ \hline 10^x & -9.999999999 \times 10^{99} \leq x \leq 99.99999999 \\ \hline e^x & -9.999999999 \times 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline ^3\sqrt{x} &  x  < 1 \times 10^{100} \\ \hline x! & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ 1 \leq \{n!/(n-r)!\} < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ 1 \leq [n!/(r!(n-r)!)] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \leq 9.999999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{49} \\ (x^2+y^2) \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.999999999 \times 10^{99} \\ \hline e^x \text{ Same as sinx} \\ \hline 0^{\circr} & 0 \leq b, c \\ \hline  x  < 1 \times 10^{100} \\ \hline o^{\circr} & 0 \leq b, c \\ \hline  x  < 1 \times 10^{100} \\ \hline x < 0; y = n, \frac{1}{2n+1} (n \text{ is an integer}) \\ \hline however: -1 \times 10^{100} < y \log  x  < 100 \\ \hline n(x^3) & x < 0; y = n, \frac{1}{2n+1} (n \text{ is an integer}) \\ \hline however: -1 \times 10^{100} < 1/x \log  x  < 100 \\ \hline x & \sqrt{y} & y = 0 : x > 0 \\ \hline y > 0; x \neq 0 \\ -1 \times 10^{100} < 1/x \log y < 100 \\ \hline x^3\sqrt{y} & y = 0 : x > 0 \\ \hline y < 0; x > 0 \\ y < 0; x > 0 \\ \hline y < 0; x > 0 \\ y < 0; x > 0 \\ \hline y < 0; x > 0 \\ y < 0; x > 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & y = 0 : x > 0 \\ y < 0; x > 0 \\ y < 0; x > 0 \\ \hline x & \sqrt{y} & y < 0 : x < 0 \\ \hline x & \sqrt{y} & y < 0 : x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & 1 \\ \hline x & \sqrt{y} & x < 0 \\ \hline x & \sqrt{y} & 0 : x < 0 \\ \hline x & \sqrt{y} & 0 : x < 0 \\ \hline x & \sqrt{y} & 0 : x < 0 \\ \hline x & \sqrt{y} & 0 : x < 0 \\ \hline x & \sqrt{y} & 0 : x < 0 \\ \hline x & \sqrt{y} & 0 : 1 \\ \hline x & 0 & 0 \\ \hline x & 0 \\ $
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ · " Engineering symbols* Normal distribution: →t* x̂, x̂1, x̂2, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x³), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, e (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √<sup>-</sup>, <sup>3</sup>√<sup>-</sup>, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2 √3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr ∠*</li> <li>(9) Dot (•)**</li> <li>(10) ×, ÷</li> <li>(11) +, -</li> <li>(2) and*</li> <li>(3) xnor*, xor*, or*</li> <li>Operations of the same precedence are performed from right to left. e<sup>x</sup>In √<sup>-</sup> 120 → e<sup>x</sup>[In(√<sup>-</sup> 120)]</li> <li>Other operations are performed from left to right.</li> <li>Operations enclosed in parentheses are performed first.</li> <li>When a calculation contains an argument that is a negative number, the negative number must be enclosed within parentheses. The negative anight-priority</li> </ul>	<ul> <li>Disp 1</li> <li>Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.</li> <li>1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)</li> <li>2 (Eng OFF): Engineering symbols off (no "Eng" indicator)</li> <li>The following are the nine symbols that can be used when engineering symbols are turned on.</li> <li>1 (Kilo) WIL (Kilo) (1 Or (Kilo))</li> <li>1 (Fera) (1 Or (Kilo))</li> <li>2 (fento) (1 Or (Kilo))</li> <li>2 (fermto) (1 Or (Kilo))</li> <li>3 (Fer displayed values, the calculator selects the engineering symbols cannot be used when inputting fractors.</li> <li>5 (For displayed values, the calculator selects the engineering symbols cannot be used when inputting fractors.</li> <li>5 (Figneering symbols cannot be used when inputting fractors.</li> <li>6 (King) (1 Or (0 Or (King))</li> <li>9 (1 O (1 Or (King))</li> </ul>	120 [DOEE] 2 (or)         Decimal mode:         EE         • Example 4: To convert the value 22 <sub>10</sub> to its binary, octal, and hexadecimal equivalents.         (10110 <sub>2</sub> , 26 <sub>8</sub> , 16 <sub>16</sub> )         Binary mode:       Image: Image	<equation-block><pre>(Matrix B 2×3)</pre></equation-block>	Vector B(Result: (-3, 18, 13))(VctA×VctB)IIIII VET 3 (Vct) 1 (A) IXIIIIII VET 3 (Vct) 2 (B) IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	$ \begin{array}{ c c c c c c } \hline \log x \ln x & 0 < x \leq 9.99999999 > 10^{99} \leq x \leq 99.99999999 \\ \hline 0^{x} & -9.999999999 > 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^{2} &  x  < 1 \times 10^{50} \\ \hline 1/x &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline {}^{3}\sqrt{x} &  x  < 1 \times 10^{100}, x \neq 0 \\ \hline {}^{3}\sqrt{x} &  x  < 1 \times 10^{100}, x \neq 0 \\ \hline {}^{3}\sqrt{x} &  x  < 1 \times 10^{100}, 0 \leq r \leq n (n, r \ are \ integers) \\ \hline 1 \leq n! / (n-r)! < 1 \times 10^{100} \\ \hline n \ r & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \ are \ integers) \\ 1 \leq [n! / (r-r)!] < 1 \times 10^{100} \\ \hline n \ Cr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \ are \ integers) \\ 1 \leq [n! / (r! (n-r)!] < 1 \times 10^{100} \\ \hline n \ cr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \ are \ integers) \\ 1 \leq [n! / (r! (n-r)!] < 1 \times 10^{100} \\ \hline n \ Cr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \ are \ integers) \\ 1 \leq [n! / (r! (n-r)!] < 1 \times 10^{100} \\ \hline n \ cr & 0 \leq n < 1 \times 10^{100} \\ \hline 0 \leq n < 1 \times 10^{100} \\ \hline 0 \leq n < 1 \times 10^{100} \\ \hline 0 \leq n < 1 \times 10^{100} \\ \hline 0 \leq h \ c \\ \hline  x  <  x  > 9.99999999 > 10^{99} \\ \hline \text{Rec}(r, \theta) & 0 \leq r \leq 9.999999999 > 10^{99} \\ \hline \text{Rec}(r, \theta) & 0 \leq h \ c \\ \hline  x  < 1 \times 10^{100} \\ \hline 0 \leq n \ c \\ \hline x > 0^{\circ} 0^{\circ} 0^{\circ}  x  \\ \hline x > 0^{\circ} 0^{\circ} 0^{\circ}  x  \\ \hline 0 \leq 999999^{\circ} 59^{\circ} \\ \hline x > 0^{\circ} 0^{\circ} 0^{\circ}  x  \\ \hline 0 \leq 0^{\circ} 0^{\circ}  x  \\ \hline 0 = 0^{\circ}  x  \\ \hline 1 = 0^{\circ}  x  \\ \hline 0 = 0^{\circ}  x  \\ $
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ · " Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, <i>e</i> (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √<sup>-</sup>, <sup>3</sup>√, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2 √3, Alog2, etc.</li> <li>(8) Permutation and combination: <i>n</i>P<i>r</i>, <i>n</i>C<i>r</i> ∠*</li> <li>(9) Dot (•)**</li> <li>(10) ×, ÷</li> <li>(11) +, -</li> <li>(2) and*</li> <li>(3) xnor*, xor*, or*</li> <li>Operations of the same precedence are performed from right to left. e<sup>x</sup>In √<sup>-</sup>120 → e<sup>x</sup>[In(√<sup>-</sup>120)]</li> <li>Other operations are performed from left to right.</li> <li>Operations enclosed in parentheses are performed first.</li> <li>When a calculation contains an argument that is a negative number, the negative number must be enclosed within parentheses. The negative sign (-) is treated as a Type B function, so particular care is required when the calculation includes a high-priority Type A function, or power or root operations.</li> </ul>	Disp         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on. <u>minicator</u> )          • The following are the nine symbols that can be used when engineering symbols are turned on. <u>minicator</u> )          • The following are the nine symbols that can be used when engineering symbols are turned on. <u>minicator</u> )         • The following are the nine symbols that can be used when engineering symbols are turned on. <u>n indicator</u> ) <u>n indicator</u> ) <u>n indicator</u> <u>n indicator</u> <u>n disagneering symbols are turned on</u> . <u>n (minic</u> ) <u>minic</u> <u>10<sup>12</sup></u> <u>n (minic</u> ) <u>10<sup>13</sup></u> <u>n (minic</u> )	120 [DOEE] 2 (or)         Decimal mode:       DEE         • Example 4: To convert the value 22 <sub>10</sub> to its binary, octal, and hexadecimal equivalents.       (10110 <sub>2</sub> , 26 <sub>8</sub> , 16 <sub>16</sub> )         Binary mode:       Im       0. b         Image:       Image:       Image:         Image:       Image:       Image:       10110. b         Octal mode:       Image:       Image:       10110. b         Octal mode:       Image:       Image:       Image:       Image:         Hexadecimal mode:       Image:       Ima	(Matrix B 2×3) INF I (Dim) 2 (B) 2 3 3 4 (Element input) I 1 0 0 3 1 2 0 4 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 2 0 4 0 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 2 0 0 4 0 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 2 0 0 4 0 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 2 0 0 4 0 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 2 0 0 4 0 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 2 0 0 4 0 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 0 1 1 1 1 1 (Matrix C 2×2) INF I I 0 0 0 1 1 0 0 1 0 0 0 0 1 1 1 1 (Matrix C 2×2) INF I I 0 0 1 0 0 0 0 0 1 1 1 1 (Matrix C 2×2) INF I I 0 0 0 1 0 1 0 0 0 0 0 0 1 1 1 (Matrix C 2×2) INF I I 0 0 0 0 0 1 1 1 1 (Matrix C 2×2) INF I I 0 0 0 0 0 1 1 1 1 (Matrix A 3×3) INF I I 0 0 0 1 0 1 0 0 0 0 1 1 1 (Matrix A 3×3) INF I I 0 0 0 1 0 1 0 0 0 0 1 1 1 (Matrix A 3×3) INF I I 0 0 0 1 0 1 0 0 0 0 1 1 1 (Matrix A 3×3) INF I I 0 0 0 1 1 0 0 0 0 0 1 1 1 (Matrix A 3×3) INF I I 0 0 0 1 1 0 0 0 0 0 1 1 1 (Matrix A 3×3) INF I I 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 0 0 0	Vector B(Result: $(-3, 18, 13)$ )(VctA×VctB)Imm VET 3 (Vct) 1 (A) IXImm VET 3 (Vct) 2 (B) I• An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of</b> a Vector <b>Use the procedure shown below to obtain the absolute</b> value (size) of a vector.• Example: To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Abs(AbsVctC)Imm Abs(Besult: 108.4349488°)(Cos $= (A.B)$ (A-I) B(3-dimensional Vector A)Imm VET 1 (Dim) 1 (A) 3 I(2-dimensional Vector B)Imm VET 1 (Dim) 2 (B) 3 I(2-dimensional Vector B)Imm VET 3 (Vct) 2 (B) I(Ans + (AbsVctA×AbsVctB))(Ans + (AbsVctA×AbsVctB))(Cos <sup>-1</sup> Ans) (Result: 108.4349488°)Imm VET 3 (Vct) 1 (A) Imm VET 3	$\begin{split} \hline \log x/\ln x & 0 < x \le 9.99999999 \times 10^{99} \\ \hline 10^x & -9.99999999 \times 10^{99} \le x \le 99.99999999 \\ \hline e^x & -9.99999999 \times 10^{99} \le x \le 230.2585092 \\ \hline \sqrt{x} & 0 \le x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{100} ; x \ne 0 \\ \hline 3\sqrt{x} &  x  < 1 \times 10^{100} ; x \div 0 \\ \hline 3\sqrt{x} &  x  < 1 \times 10^{100} ; x \div 0 \\ \hline 3\sqrt{x} &  x  < 1 \times 10^{100} ; x \div 0 \\ \hline 3\sqrt{x} &  x  < 1 \times 10^{100} ; x \div 0 \\ \hline 1/x &  x  < 1 \times 10^{100} ; x \div 0 \\ \hline 1/x &  x  < 1 \times 10^{100} ; x \div 0 \\ \hline 1/x &  x  < 1 \times 10^{100} ; x \div 0 \\ \hline 1/x &  x  < 1 \times 10^{100} ; x \div 0 \\ \hline 1/x &  x  < 1 \times 10^{100} ; x \div 0 \\ \hline 1/x &  x  < 1 \times 10^{100} ; x \div 0 \\ \hline 1/x &  x  < 1 \times 10^{100} ; x \div 0 \\ \hline 1/x &  x  <  y  \le 9.999999999 \times 10^{49} \\ \hline 1/x &  x ,  y  \le 9.999999999 \times 10^{49} \\ \hline 1/x &  x  <  x  &  y  \le 9.999999999 \times 10^{49} \\ \hline 1/x &  x  < 1 \times 10^{100} \\ \hline 1/x &  x  < 1 \times 10^{100} \\ \hline 1/x &  x  < 1 \times 10^{100} \\ \hline 1/x &  x  < 1 \times 10^{100} \\ \hline 1/x &  x  < 1 \times 10^{100} \\ \hline 1/x &  x  < 1 \times 10^{100} \\ \hline 1/x &  x  < 1 \times 10^{100} \\ \hline 1/x &  x  < 1 \times 10^{100} \\ \hline 1/x &  x  &  y  & = 999999999 \\ \hline 1/x &  y  &  y  & = 9999999999 \\ \hline 1/x &  x  &  y  & = 99999999999 \\ \hline 1/x &  y  &  y  & = 9999999999999 \\ \hline 1/x &  x  &  x  &  y  & = 9999999999999999999999999999999999$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ · " Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, <i>e</i> (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √<sup>-</sup>, <sup>3</sup>√<sup>-</sup>, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2 √3, Alog2, etc.</li> <li>(8) Permutation and combination: nPr, nCr ∠*</li> <li>(9) Dot (•)**</li> <li>(10) ×, ÷</li> <li>(11) +, -</li> <li>(2) and*</li> <li>(3) xnor*, xor*, or*</li> <li>Operations of the same precedence are performed from right to left. e<sup>x</sup>In √<sup>-</sup> 120 → e<sup>x</sup>{In(√<sup>-</sup> 120)}</li> <li>Other operations are performed from left to right.</li> <li>Operations enclosed in parentheses are performed first.</li> <li>When a calculation contains an argument that is a negative number, the negative number must be enclosed within parentheses. The negative sign (-) is treated as a Type B function, so particular care is required when the calculation includes a high-priority Type A function, or power or root operations.</li> </ul>	Disp         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on. <u>minicator</u> )          • The following are the nine symbols that can be used when engineering symbols are turned on. <u>minicator</u> )          • The following are the nine symbols that can be used when engineering symbols are turned on. <u>minicator</u> )         • The following are the nine symbols that can be used when engineering symbols are turned on. <u>n indicator</u> ) <u>n indicator</u> ) <u>n indicator</u> <u>n indicator</u> <u>n disagneering symbols are turned on</u> . <u>n (minic</u> ) <u>minic</u> <u>10<sup>12</sup></u> <u>n (minic</u> ) <u>10<sup>13</sup></u> <u>n (minic</u> )	120 [DOE: 2 (or)         Decimal mode:         EE         • Example 4: To convert the value 22 <sub>10</sub> to its binary, octal, and hexadecimal equivalents.         (101102, 268, 16re)         Binary mode:       Im         0       0	<equation-block>(Matrix B 2×3) (Matrix B 2×3) (Matrix B 2×3) (Matrix B 2×3) (Matrix A 2×3) (Matrix A 3×3) (Matrix A 3×3)<td>Vector B(Result: (-3, 18, 13))(VctA×VctB)Imm VET 3 (Vct) 1 (A) IXImm VET 3 (Vct) 2 (B) I• An error occurs in the above procedure if you specify vectors of different dimensions.<b>Determining the Absolute Value of</b> a VectorUse the procedure shown below to obtain the absolute value (size) of a vector.• Example: To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Ras Imm VET 3 (Vct) 3 (C) I• Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)cos <math>\theta = (A \cdot B) / (A   B)</math>, which becomes <math>\theta = \cos^{-1}(A \cdot B) / (A   B)</math>Size 1 vector perpendicular to both A and B = <math>\frac{A \times B}{ A \times B }</math>(3-dimensional Vector A)Imm VET 1 (Dim) 1 (A) 3 I(element input)I I I I I III(3-dimensional Vector B)Imm VET 3 (Vct) 2 (B) I(Ans ÷ (AbsVctA×AbsVctB))Imm VET 3 (Vct) 1 (A)(Cos<sup>-1</sup>Ans) (Result: 108.4349488°)Imm VET 3 (Vct) 1 (A)(VctA×VctB)Imm VET 3 (Vct) 1 (A) IX(mot an emp VET 3 (Vct) 1 (A)Imm VET 3 (Vct) 1 (A)</td><td><math display="block">\frac{\log x/\ln x}{\sqrt{y}} = 0 &lt; x \le 9.99999999 &gt; 10^{99} \le x \le 99.999999999 = x^{10^{99}} \le x \le 99.9999999999 = x^{10^{99}} \le x \le 230.2585092 = \sqrt{x}</math> <math display="block">\frac{\sqrt{x}}{\sqrt{y}} = 0 &lt; x &lt; 1 \times 10^{100} = x \le 230.2585092 = \sqrt{x}</math> <math display="block">\frac{\sqrt{x}}{\sqrt{x}} = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x \pm 0) = (x &lt; 1 \times 10^{100}; x = x &lt; 1 \times 10^{100}; x</math></td></equation-block>	Vector B(Result: (-3, 18, 13))(VctA×VctB)Imm VET 3 (Vct) 1 (A) IXImm VET 3 (Vct) 2 (B) I• An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of</b> a VectorUse the procedure shown below to obtain the absolute value (size) of a vector.• Example: To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Ras Imm VET 3 (Vct) 3 (C) I• Example: To determine the size of the angle (angle unit: Deg) formed by vectors A = (-1 0 1) and B = (1 2 0), and the size 1 vector perpendicular to both A and B. (Result: 108.4349488°)cos $\theta = (A \cdot B) / (A   B)$ , which becomes $\theta = \cos^{-1}(A \cdot B) / (A   B)$ Size 1 vector perpendicular to both A and B = $\frac{A \times B}{ A \times B }$ (3-dimensional Vector A)Imm VET 1 (Dim) 1 (A) 3 I(element input)I I I I I III(3-dimensional Vector B)Imm VET 3 (Vct) 2 (B) I(Ans ÷ (AbsVctA×AbsVctB))Imm VET 3 (Vct) 1 (A)(Cos <sup>-1</sup> Ans) (Result: 108.4349488°)Imm VET 3 (Vct) 1 (A)(VctA×VctB)Imm VET 3 (Vct) 1 (A) IX(mot an emp VET 3 (Vct) 1 (A)Imm VET 3 (Vct) 1 (A)	$\frac{\log x/\ln x}{\sqrt{y}} = 0 < x \le 9.99999999 > 10^{99} \le x \le 99.999999999 = x^{10^{99}} \le x \le 99.9999999999 = x^{10^{99}} \le x \le 230.2585092 = \sqrt{x}$ $\frac{\sqrt{x}}{\sqrt{y}} = 0 < x < 1 \times 10^{100} = x \le 230.2585092 = \sqrt{x}$ $\frac{\sqrt{x}}{\sqrt{x}} = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x \pm 0) = (x < 1 \times 10^{100}; x = x < 1 \times 10^{100}; x$
<ul> <li>Normal distribution: P(*, Q(*, R(*</li> <li>(2) Type A functions: With these functions, the value is entered and then the function key is pressed. x<sup>3</sup>, x<sup>2</sup>, x<sup>-1</sup>, x!, ∘ · " Engineering symbols* Normal distribution: →t* x̂, x̂<sub>1</sub>, x̂<sub>2</sub>, ŷ Angle unit conversions (DRG►) Metric conversions**</li> <li>(3) Powers and roots: ^(x<sup>3</sup>), x√</li> <li>(4) a<sup>b</sup>/c</li> <li>(5) Abbreviated multiplication format in front of π, <i>e</i> (natural logarithm base), memory name, or variable name: 2π, 3e, 5A, πA, etc.</li> <li>(6) Type B functions: With these functions, the function key is pressed and then the value is entered. √, <sup>3</sup>√, log, ln, e<sup>x</sup>, 10<sup>x</sup>, sin, cos, tan, sin<sup>-1</sup>, cos<sup>-1</sup>, tan<sup>-1</sup>, sinh, cosh, tanh, sinh<sup>-1</sup>, cosh<sup>-1</sup>, tanh<sup>-1</sup>, (-) d*, h*, b*, o*, Neg*, Not*, Det**, Trn**, arg*, Abs*, Conjg*</li> <li>(7) Abbreviated multiplication format in front of Type B functions: 2√3, Alog2, etc.</li> <li>(8) Permutation and combination: <i>nPr</i>, <i>nCr</i> ∠*</li> <li>(9) Dot (•)**</li> <li>(10) ×, ÷</li> <li>(11) +, -</li> <li>(2) and*</li> <li>(3) xnor*, xor*, or*</li> <li>Operations of the same precedence are performed from right to left. e<sup>x</sup>In √ 120 → e<sup>x</sup>{In(√ 120)}</li> <li>Other operations are performed from left to right.</li> <li>Operations enclosed in parentheses are performed first.</li> <li>When a calculation contains an argument that is a negative number, the negative number must be enclosed within parentheses. The negative sign (-) is treated as a Type B function, so particular care is required when the calculation includes a high-priority Type A function, or power or root operations.</li> </ul>	Disp         1         • Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use.         1 (Eng ON): Engineering symbols on (indicated by "Eng" on the display)         2 (Eng OFF): Engineering symbols off (no "Eng" indicator)         • The following are the nine symbols that can be used when engineering symbols are turned on. <u>minicator</u> )          • The following are the nine symbols that can be used when engineering symbols are turned on. <u>minicator</u> )          • The following are the nine symbols that can be used when engineering symbols are turned on. <u>minicator</u> )         • The following are the nine symbols that can be used when engineering symbols are turned on. <u>n indicator</u> ) <u>n indicator</u> ) <u>n indicator</u> <u>n indicator</u> <u>n disagneering symbols are turned on</u> . <u>n (minic</u> ) <u>minic</u> <u>10<sup>12</sup></u> <u>n (minic</u> ) <u>10<sup>13</sup></u> <u>n (minic</u> )	120 [DOEE] 2 (or)         Decimal mode:       Decimal mode:         Decimal mode:       Decimal mode:         (101102, 268, 16re)         Binary mode:       Decimal mode:         (101102, 268, 16re)         Binary mode:       Decimal mode:         (101102, 268, 16re)         Binary mode:       Decimal mode:         (101102)       10110.         Octal mode:       Decimal mode:         Hexadecimal mode:       HEX         Hexadecimal mode:       HEX         Binary mode:       Decimal mode:         <	(Matrix B 2×3) INF I (Dim) 2 (B) 2 3 3 4 (Element input) I 1 0 0 3 1 2 0 4 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 2 0 4 0 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 2 0 0 4 0 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 2 0 0 4 0 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 2 0 0 4 0 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 2 0 0 4 0 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 2 0 0 4 0 1 1 1 1 1 (MatA×MatB) INF I I 0 0 3 0 0 1 1 1 1 1 (Matrix C 2×2) INF I I 0 0 0 1 1 0 0 1 0 0 0 0 1 1 1 1 (Matrix C 2×2) INF I I 0 0 1 0 0 0 0 0 1 1 1 1 (Matrix C 2×2) INF I I 0 0 0 1 0 1 0 0 0 0 0 0 1 1 1 (Matrix C 2×2) INF I I 0 0 0 0 0 1 1 1 1 (Matrix C 2×2) INF I I 0 0 0 0 0 1 1 1 1 (Matrix A 3×3) INF I I 0 0 0 1 0 1 0 0 0 0 1 1 1 (Matrix A 3×3) INF I I 0 0 0 1 0 1 0 0 0 0 1 1 1 (Matrix A 3×3) INF I I 0 0 0 1 0 1 0 0 0 0 1 1 1 (Matrix A 3×3) INF I I 0 0 0 1 1 0 0 0 0 0 1 1 1 (Matrix A 3×3) INF I I 0 0 0 1 1 0 0 0 0 0 1 1 1 (Matrix A 3×3) INF I I 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 0 0 0	Vector B(Result: (-3, 18, 13))(VctA×VctB)Imm VET 3 (Vct) 1 (A) IXImm VET 3 (Vct) 2 (B) I• An error occurs in the above procedure if you specify vectors of different dimensions. <b>Determining the Absolute Value of</b> a Vector <b>Use the procedure shown below to obtain the absolute</b> value (size) of a vector.• Example: To determine the absolute value of Vector C (Result: 11.90965994)(AbsVctC)Imm Abs(AbsVctC)Imm Abs(Besult: 108.4349488°)(Cos $= (A.B)$ (A-I) B(3-dimensional Vector A)Imm VET 1 (Dim) 1 (A) 3 I(2-dimensional Vector B)Imm VET 1 (Dim) 2 (B) 3 I(2-dimensional Vector B)Imm VET 3 (Vct) 2 (B) I(Ans + (AbsVctA×AbsVctB))(Ans + (AbsVctA×AbsVctB))(Cos <sup>-1</sup> Ans) (Result: 108.4349488°)Imm VET 3 (Vct) 1 (A) Imm VET 3	$\begin{split} \hline \log x/\ln x & 0 < x \leq 9.99999999 > 10^{99} \leq x \leq 99.99999999 \\ \hline 10^x & -9.999999999 > 10^{99} \leq x \leq 230.2585092 \\ \hline \sqrt{x} & 0 \leq x < 1 \times 10^{100} \\ \hline x^2 &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline ^3\sqrt{x} &  x  < 1 \times 10^{100}; x \neq 0 \\ \hline ^3\sqrt{x} &  x  < 1 \times 10^{100}, x \neq 0 \\ \hline x^1 & 0 \leq x \leq 69 (x \text{ is an integer}) \\ \hline nPr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ 1 \leq \{n!/(n-r)!\} < 1 \times 10^{100} \\ \hline nCr & 0 \leq n < 1 \times 10^{10}, 0 \leq r \leq n (n, r \text{ are integers}) \\ 1 \leq [n!/(r!(n-r)!)] < 1 \times 10^{100} \\ \hline Pol(x, y) &  x ,  y  \geq 9.99999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.999999999 \times 10^{99} \\ \hline Rec(r, \theta) & 0 \leq r \leq 9.9999999999 \times 10^{99} \\ \hline x^2 + y^2) \leq 9.999999999 \times 10^{99} \\ \hline x^2 + (x^2 + 1) \times 10^{100} \\ \hline 0 \leq x > 0 \\ \hline x^2 + (x^2 + 1) \times 10^{100} \\ \hline y^2 n; & 0 \\ \hline x^2 + (x^2 + 1) \times 10^{100} \\ \hline y^2 n; & 0 \\ -1 \times 10^{100} < y \log x < 100 \\ \hline x^2 (y) & x < 0 \\ x < 0; y = n, \frac{1}{2n+1} (n \text{ is an integer}) \\ \hline However: -1 \times 10^{100} < y \log  x  < 100 \\ \hline x^2 (y) & x < 0 \\ x^2 (y) & x < 0 \\ \hline x^2 (y) & x < 0 \\ y < 0; x > 0 \\ x^2 (y) & x < 0 \\ -1 \times 10^{100} < 1/x \log y < 100 \\ \hline x^2 (y) & x < 0 \\ \hline x^2 (y) & x < 0 \\ y < 0; x < 0 \\ y < 0 \\ $

See the "EAI-350 User's Guide" for details about the following items Removing and Replacing the Calculator's Cover Safety Precautions Handling Precautions Two-line Display Before getting started... (except for "Modes") **Basic Calculations** Memory Calculations

Scientific Function Calculations **Equation Calculations** 

Statistical Calculations

**Technical Information** 

#### **Before getting started...**

#### Modes

- Before starting a calculation, you must first enter the correct mode as indicated in the table below.
- The following table shows the modes and required operations for the EAI-350.

To perform this type of calculation:	Perform this key operation:	To enter this mode:
Basic arithmetic calculations	MODE 1	COMP
Complex number calculations	MODE 2	CMPLX
Standard deviation	MODE MODE 1	SD
Regression calculations	MODE MODE 2	REG
Base-n calculations	MODE MODE 3	BASE
Solution of equations	MODE MODE MODE 1	EQN
Matrix calculations	MODE MODE MODE 2	MAT
Vector calculations	MODE MODE MODE 3	VCT

• Pressing the more than three times displays additional setup screens. Setup screens are described where they are actually used to change the calculator setup

• In this manual, the name of the mode you need to enter in order to perform the calculations being described is indicated in the main title of each section

#### Complex Number Calculations Example: CMPLX

#### Note!

- To return the calculation mode and setup to the initial defaults shown below, press SHFT CLR 2 (Mode) Calculation Mode: COMP Angle Unit: Deg Norm 1, Eng OFF Exponential Display Format: Complex Number Display Format: a+bi Fraction Display Format: a♭⁄c
- **Decimal Point Character:** Dot Mode indicators appear in the upper part of the display, except for the BASE indicators, which appear in the exponent part of the display.
- · Engineering symbols are automatically turned off while the calculator is the BASE Mode.
- You cannot make changes to the angle unit or other display format (Disp) settings while the calculator is in the BASE Mode
- The COMP, CMPLX, SD, and REG modes can be used in combination with the angle unit settings.
- · Be sure to check the current calculation mode (SD, REG, COMP, CMPLX) and angle unit setting (Deg, Rad, Gra) before beginning a calculation.

### Mathematical Expression Calculations and Editing COMP **Functions**

Use the week to enter the COMP Mode when you want to perform mathematical expression calculations
or edit expressions.
COMP

#### Replay Copy

Replay copy lets you recall multiple expressions from replay so they are connected as a multi-statement on the screen.

- Example: Replay memory contents:
- 1 + 1
- 2 + 2
- 3 + 3
- 4 + 4
- 5 + 5 6+6
- Multi-statement: 4 + 4:5 + 5:6 + 6 Use  $\blacktriangle$  and  $\bigtriangledown$  to display the expression 4 + 4.
- Press SHIFT (COPY). You can also edit expr

· Note that the expression you store is cleared whenever you start another operation, change to another mode, or turn off the calculator.

#### ■ SOLVE Function

The SOLVE function lets you solve an expression using variable values you want, without the need to transform or simply the expression.

- Example: C is the time it would take for an object thrown straight up with initial velocity A to reach height B.
- Use the formula below to calculate initial velocity A for a height of B = 14 meters and a time of C = 2 seconds. Gravitational acceleration is D = 9.8 m/s<sup>2</sup>. (Result: A = 16.8)

 $B = AC - \frac{1}{2}DC^2$ 

(B?)

(A?)

(C?)

(D?)

Alpha 🖪 Alpha 🚍 Alpha 🗛 🗙 Alpha C 🗖
(1 $\div$ 2) × ALPHA D × ALPHA C $x^2$
SHIFT SOLVE
14 🚍
2 🚍
9 💀 8 🚍
SHIFT SOLVE

(A?) · Since the SOLVE function uses Newton's Method, certain initial values (assumed values) can make it impossible to obtain solutions. In this case, try inputting another value that you assume to be near the solution and perform the calculation again.

- The SOLVE function may be unable to obtain a solution, even though a solution exists.
- Due to certain idiosyncrasies of Newton's method, solutions for the following types of functions tend to be difficult to calculate.

Periodic functions (i.e.  $y = \sin x$ )

- Functions whose graph produce sharp slopes (i.e. y =
- $e^x, y = 1/x$ Discontinuous functions (i.e.  $y = \sqrt{x}$ )
- If an expression does not include an equals sign (=), the
- SOLVE function produces a solution for expression = 0.

#### **Scientific Function** COMP Calculations

Use the MODE key to enter the COMP Mode when you want to perform scientific function calculations COMP ..... MODE 1

#### Inputting Engineering Symbols

- · Turning on engineering symbols makes it possible for
- you to use engineering symbols inside your calculations. • To turn engineering symbols on and off, press the MODE key a number of times until you reach the setup screen shown below



- Press 1. On the engineering symbol setting screen that appears, press the number key (1 or 2) that corresponds to the setting you want to use
- (Eng ON): Engineering symbols on (indicated by "Eng" on the display)
- 2 (Eng OFF): Engineering symbols off (no "Eng" indicator)
- The following are the nine symbols that can be used when engineering symbols are turned on.

To input this symbol:	Perform this key operation:	Unit
k (kilo)	SHIFT <b>k</b>	10 <sup>3</sup>
M (Mega)	SHIFT M	10 <sup>6</sup>
G (Giga)	SHIFT G	10 <sup>9</sup>
T (Tera)	SHIFT T	10 <sup>12</sup>
m (milli)	SHIFT <b>m</b>	10 <sup>-3</sup>
μ (micro)	SHIFT []	10-6
n (nano)	SHIFT <b>n</b>	10 <sup>-9</sup>
p (pico)	SHIFT P	10-12
f (femto)	SHIFT <b>f</b>	10-15

- · For displayed values, the calculator selects the engineering symbol that makes the numeric part of the value fall within the range of 1 to 1000.
- · Engineering symbols cannot be used when inputting fractions
- **Example:** 9 ÷ 10 = 0.9 m (milli) MODE ..... 1 (Disp) 1 0. 9÷10 9 🖶 10 🚍 900. When engineering symbols are turned on, even standard (non-engineering) calculation results are displayed using engineering symbols SHIFT ENG 0.9

#### • Example: (2+3*i*)+(4+5*i*) = 6+8*i*

2 🛨 3 🚺 🛨 4 🛨 5 🚺 🗖 (Real part 6) SHIFT Re→lm (Imaginary part 8 i)

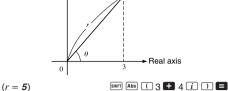
# Absolute Value and Argument

Calculation

Supposing the imaginary number expressed by the rectangular form z = a + bi is represented as a point in the Gaussian plane, you can determine the absolute value (r)and argument ( $\theta$ ) of the complex number. The polar form is  $r \angle \theta$ .

• Example 1: To determine the absolute value (r) and argument ( $\theta$ ) of 3+4*i* (Angle unit: Deg)

 $(r = 5, \ \theta = 53.13010235^{\circ})$ Imaginary axis



SHIFT arg ( 3 🛨 4 i ) 🔳  $(\theta = 53.13010235^{\circ})$ 

 The complex number can also be input using the polar form  $r \angle \theta$ .

• Example 2:  $\sqrt{2} \angle 45 = 1 + i$ (Angle unit: Deg) ✓ 2 SHIFT ∠ 45

#### ■ Rectangular Form ↔ Polar Form Display

You can use the operation described below to convert a rectangular form complex number to its polar form, and a polar form complex number to its rectangular form. Press BIFT Re-Im to toggle the display between the absolute value (r) and argument ( $\theta$ ).

• Example:  $1 + i \leftrightarrow 1.414213562 \angle 45$ 

(Angle unit: Deg) 1 *i* SHIFT ► *r∠θ* SHIFT Re--Im 

You select rectangular form (a+bi) or polar form  $(r \angle \theta)$ for display of complex number calculation results

#### MODE ···· 1 (Disp) ►

(1)(a+bi): Rectangular form

**(** $r \angle \theta$ **)**: Polar form (indicated by " $r \angle \theta$ " on the display)

#### Conjugate of a Complex Number

For any complex number z where z = a+bi, its conjugate  $(\overline{z})$  is  $\overline{z} = a - bi$ .

• Example: To determine the conjugate of the complex number 1.23 + 2.34*i* (Result: 1.23 - 2.34*i*)

SHIFT Conjg ( 1 • 23 🖶 2 • 34 *i* ) 🔳

SHIFT Re→Im

#### **Base-***n* **Calculations** BASE

	enter the BASE Mode when you lculations using Base- <i>n</i> values.
BASE	MODE MODE 3

- In addition to decimal values, calculations can be performed using binary, octal and hexadecimal values. You can specify the default number system to be applied
- to all input and displayed values, and the number system for individual values as you input them.
- You cannot use scientific functions in binary, octal. decimal, and hexadecimal calculations. You cannot input
- values that include decimal part and an exponent. · If you input a value that includes a decimal part, the unit
- automatically cuts off the decimal part. · Negative binary, octal, and hexadecimal values are
- produced by taking the two's complement.
- You can use the following logical operators between values in Base-n calculations: and (logical product), or (logical sum), xor (exclusive or), xnor (exclusive nor),
- Not (bitwise complement), and Neg (negation). The following are the allowable ranges for each of the available number systems.

Binary	$100000000 \le x \le 1111111111$
	$0 \le x \le 0111111111$
Octal	$400000000 \le x \le 7777777777 \\ 0 \le x \le 377777777777777777777777777777777$
Decimal	$0 \ge x \ge 377777777777777777777777777777777$
Hexadecimal	$8000000 \le x \le FFFFFFFFFFFFFFFFFFFFFFFFFFF$
	$0 \le x \le$ 7FFFFFF

• Example 1: To perform the following calculation and

	<b>1</b> 0110. <sup>b</sup>
Octal mode:	т <b>26</b> . °
Hexadecimal mode:	х 16. <sup>н</sup>
• Example 5: To convert the value equivalent.	e 513 <sub>10</sub> to its binary
Binary mode: AC BI	N 0. b
	Math ERROR b

Statistical

SD ..

Shift Re⇔lm

Calculations

Normal Distribution

P(t)

Differential

a function.

COMP

 $x (\Delta x)$ .

Calculations

 You may not be able to convert a value from a number system whose calculation range is greater than the calculation range of the resulting number system. • The message "Math ERROR" indicates that the result

has too many digits (overflow)

Use the More key to enter the SD Mode when you want

to perform a calculation involving normal distribution.

• In the SD Mode and REG Mode, the M+ key operates as

the DT key. • Press Imm (DISTR), which produces the screen shown below.

3

Input a value from 1 to 4 to select the probability

• **Example:** To determine the normalized variate  $(\rightarrow t)$  for

The procedure described below obtains the derivative of

Use the MODE key to enter the COMP Mode when you

• Three inputs are required for the differential expression:

the function of variable x, the point (a) at which the dif-

ferential coefficient is calculated, and the change in

• **Example:** To determine the derivative at point x = 2 for

the function  $y = 3x^2 - 5x + 2$ , when the increase or de-

• You can omit input of  $\Delta x$ , if you want. The calculator

automatically substitutes an appropriate value for  $\varDelta x$  if

Discontinuous points and extreme changes in the value

Select Rad (Radian) for the angle unit setting when

performing trigonometric function differential calculations.

The procedure described below obtains the definite integral

Use the  $\underline{\mbox{\tiny MODE}}$  key to enter the COMP Mode when you

• The following four inputs are required for integration

want to perform integration calculations.

of x can cause inaccurate results and errors.

SHIFT d/dx 3 APHA X  $x^2$  = 5 APHA X + 2 , 2 ,

crease in x is  $\Delta x = 2 \times 10^{-4}$  (Result: 7)

you do not input one.

Integration

of a function

COMP ...

0. b

0. °

Note!

Calculations

want to perform a calculation involving differentials.

x = 53 and normal probability distribution P(t) for the

Q(t)

4

55 DT 54 DT 51 DT 55 DT

SHIFT DISTR 1 (P() (-) 0.28 )

SHIFT d/dx expression  $a \rightarrow \Delta x$ 

53 DT DT 54 DT 52 DT

53 SHIFT DISTR  $4(\rightarrow t)$ 

COMP

MODE 1

2 EXP (--) 4 ) 🔳

COMP

.. MODE 1

 $P(Q(R(\rightarrow t$ 

2

distribution calculation you want to perform.

following data: 55, 54, 51, 55, 53, 53, 54, 52

 $(\rightarrow t = -0.284747398, P(t) = 0.38974)$ 

<u>\_sd</u>\_

MODE MODE 1

R(t)

- ions on the display and perform other multi-statement operations. For more details about using multi-statements, see "Multi-statements" in the separate "User's Guide."
- · Only the expressions in replay memory starting from the currently displayed expression and continuing to the last expression are copied. Anything before the displayed expression is not copied.

#### CALC Memory

### COMP CMPLX

CALC 8 🗖

- · CALC memory lets you temporarily store a mathematical expression that you need to perform a number of times using different values. Once you store an expression, you can recall it, input values for its variables, and calculate a result quickly and easily.
- You can store a single mathematical expression, with up to 79 steps. Note that CALC memory can be used in the COMP Mode and CMPLX Mode only.
- . The variable input screen shows the values currently assigned to the variables.

• <b>Example:</b> Calculate the result for $Y = X^2 + 3X - 12$
when $X = 7$ (Result: <b>58</b> ), and when $X = 8$ (Result: <b>76</b> ).
(Input the function.)

#### Alpha Y Alpha = Alpha X X<sup>2</sup> 🖬 3 Alpha X 🗖 12 CALC (Store the expression.)

- (Input 7 for X? prompt.)
- (Input 8 for X? prompt.)



**Complex Number** CMPLX Calculations

Use the MODE key to enter the CMPLX Mode when you want to perform calculations that include complex numbers

CMPLX. MODE 2

- The current angle unit setting (Deg, Rad, Gra) affects CMPLX Mode calculations. You can store an expression in CALC memory while in the CMPLX Mode.
- Note that you can use variables A. B. C. and M only in the CMPLX Mode, Variables D. E. F. X. and Y are used by the calculator, which frequently changes their values. You should not use these variables in your expressions.
- The indicator "R↔I" in the upper right corner of a calculation result display indicates a complex number result. Press Err Re-Im to toggle the display between the real part and imaginary part of the result.
- You can use the replay function in the CMPLX Mode. Since complex numbers are stored in replay memory in 7 🔳
  - the CMPLX Mode, however, more memory than normal is used up

produce a binary result  $10111_2 + 11010_2 = \textbf{110001}_2$ 

#### Binary mode: AC BIN

#### 10111 🛨 11010 🖃

• Example 2: To perform the following calculation and produce an octal result:

654 <sub>8</sub> ÷ 12 <sub>10</sub> = <b>516</b> <sub>8</sub>	
---	--

Binary mode:

- Octal mode AC OCT LOGIC LOGIC LOGIC 4 (0) 7654 🖶 LOGIC LOGIC 1 (d) 12
- Example 3: To perform the following calculation and produce a hexadecimal and a decimal result:
- $120_{16} \text{ or } 1101_2 = 12d_{16} = 301_{10}$ Hexadecimal mode: AC HEX 0. <sup>н</sup> 120 LOGIC 2 (Or) LOGIC LOGIC 3 (b) 1101 🔳 Decimal mode: DEC
- Example 4: To convert the value 22<sub>10</sub> to its binary, octal, and hexadecimal equivalents.

 $(10110_2, 26_8, 16_{16})$ 



calculations: a function with the variable x; a and b, which define the integration range of the definite integral; and n, which is the number of partitions (equivalent to N = 2<sup>n</sup>) for integration using Simpson's rule.

 $\int dx \text{ expression } \bullet a \bullet b \bullet n )$ 

```
• Example: \int_{-5}^{5} (2x^2 + 3x + 8) dx = 150.66666667
             (Number of partitions n = 6)
```

 $\int dx$  2 ALPHA X  $x^2$  + 3 ALPHA X + 8 • 1 • 5 • 6 ) 🗖

- You can specify an integer in the range of 1 to 9 as the number of partitions, or you can skip input of the number of partitions entirely, if you want.
- · Internal integration calculations may take considerable time to complete.
- Display contents are cleared while an integration calculation is being performed internally. Select Rad (Radian) for the angle unit setting when
- performing trigonometric function integration calculations.

#### **Matrix Calculations**

The procedures in this section describe how to create matrices with up to three rows and three columns, and how to add, subtract, multiply, transpose and invert matrices, and how to obtain the scalar product. determinant, and absolute value of a matrix.

	y to enter the MAT Mode when you want trix calculations.
MAT	MODE MODE 2

Note that you must create one or more matrices before you can perform matrix calculations.

- You can have up to three matrices, named A, B, and C, in memory at one time.
- The results of matrix calculations are stored automatically into MatAns memory. You can use the matrix in MatAns memory in subsequent matrix calculations.
- Matrix calculations can use up to two levels of the matrix stack. Squaring a matrix, cubing a matrix, or inverting a matrix uses one stack level. See "Stacks" in the separate "User's Guide" for more information.

#### Creating a Matrix

To create a matrix, press  $\underbrace{\text{MMT}}$  (1)(Dim), specify a matrix name (A, B, or C), and then specify the dimensions (number of rows and number of columns) of the matrix. Next, follow the prompts that appear to input values that make up the elements of the matrix.



order to view or edit its elements.

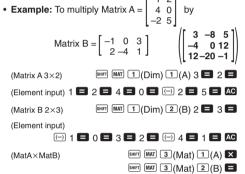
To exit the matrix screen, press

#### Editing the Elements of a Matrix

Press I (Edit) and then specify the name (A, B, or C) of the matrix you want to edit to display a screen for editing the elements of the matrix.

#### Matrix Addition, Subtraction, and Multiplication

Use the procedures described below to add, subtract, and multiply matrices.



 An error occurs if you try to add, subtract matrices whose dimensions are different from each other, or multiply a matrix whose number of columns is different from that of the matrix by which you are multiplying it.

# Calculating the Scalar Product of a Matrix

Use the procedure shown below to obtain the scalar product (fixed multiple) of a matrix.

• Example: Multiply	$ \text{Matrix C} = \begin{bmatrix} 2 & -1 \\ -5 & 3 \end{bmatrix} \text{ by 3.} \left( \begin{bmatrix} 6 & -3 \\ -15 & 9 \end{bmatrix} \right) $
(Matrix C 2×2)	shift MAT 1 (Dim) 3(C) 2 🗖 2 🚍
(Element input)	2 <b>=</b> (-) 1 <b>=</b> (-) 5 <b>=</b> 3 <b>=</b> AC

(3×MatC) 3 🗙 SHIFT MAT 3 (Mat) 3 (C) 🗖

#### Obtaining the Determinant of a Matrix

You can use the procedure below to determine the determinant of a square matrix.

'	Example: To obtain the determinant of
	Matrix A = $\begin{bmatrix} 2 & -1 & 6 \\ 5 & 0 & 1 \\ 3 & 2 & 4 \end{bmatrix}$ (Result: <b>73</b> )
	(Matrix A 3×3) MAT 1(Dim) 1(A) 3 3 3
	(Element input) 2 🖼 () 1 🖨 6 🖨 5 🖨 0 🖨 1 🖨
	3 🖬 2 🚍 4 🚍 🗚
	(DetMatA) SHIFT MAT <b>I</b> (Det)

- The above procedure results in an error if a non-square
- The above procedure results in an error if a non-squa matrix is specified.

#### Transposing a Matrix

 The above procedure results in an error if a non-square matrix or a matrix for which there is no inverse (determinant = 0) is specified.

#### Determining the Absolute Value of a Matrix

You can use the procedure described below to determine the absolute value of a matrix.

• **Example:** To determine the absolute value of the matrix produced by the inversion in the previous example.

```
0.4 1 0.8
```

(AbsMatAns) SHIFT MAT 3 (Mat) 4 (Ans)

#### Vector Calculations

The procedures in this section describe how to create a vector with a dimension up to three, and how to add, subtract, and multiply vectors, and how to obtain the scalar product, inner product, outer product, and absolute value of a vector. You can have up to three vectors in memory at one time.

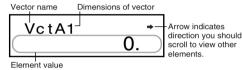
Use the MORE key to enter the VCT Mode when you want
to perform vector calculations.
VCT MODE MODE MODE 3

Note that you must create one or more vector before you can perform vector calculations.

- You can have up to three vectors, named A, B, and C, in memory at one time.
  The results of vector calculations are stored automatically
- into VctAns memory. You can use the matrix in VctAns memory in subsequent vector calculations.

#### Creating a Vector

To create a vector, press [urf] [ver] 1 (Dim), specify a vector name (A, B, or C), and then specify the dimensions of the vector. Next, follow the prompts that appear input values that make up the elements of the vector.



#### Editing Vector Elements

Press I (Edit) and then specify the name (A, B, C) of the vector you want to edit to display a screen for editing the elements of the vector.

#### Adding and Subtracting Vectors

Use the procedures described below to add and subtract vectors.

Example: To add Vector A = (1 -2 3) to Vector B = (4 5 -6). (Result: (5 3 -3))

(3-dimensional Vector A)	SHIFT VCT 1 (Dim) 1 (A) 3 🗖
(Element input)	1 🚍 🗐 2 🚍 3 🚍 AC
(3-dimensional Vector B)	SHIFT VCT 1 (Dim) 2(B) 3 🗖
(Element input)	4 <b>E</b> 5 <b>E</b> () 6 <b>E</b> AC
(VctA + VctB)	SHIFT         VCT         3 (Vct)         1 (A)         +           SHIFT         VCT         3 (Vct)         2 (B)         =

 An error occurs in the above procedure if you specify vectors of different dimensions.

#### Calculating the Scalar Product of a Vector

Use the procedure shown below to obtain the scalar product (fixed multiple) of a vector. • Example: To multiply Vector C = (-7.8 9) by 5. (Result: (-39 45))

(2-dimensional Vector C)	shift VCT 1 (Dim) 3(C) 2 🔳
(Element input)	(-) 7 • 8 = 9 = AC
(5×VctC)	5 🗙 SHIFT VCT 3 (Vct) 3 (C) =

# Calculating the Inner Product of

Two Vectors

Use the procedure described below to obtain the inner product (  $\cdot )$  for two vectors.

- Example: To determine the size of the angle (angle unit:

Deg) formed by vectors  $A = (-1 \ 0 \ 1)$  and  $B = (1 \ 2 \ 0)$ , and the size 1 vector perpendicular to both A and B. (Result: **108.4349488**°)

 $\cos\,\theta=\frac{(A\,\cdot B)}{|A|\,|B|}$  , which becomes  $\,\,\theta=\cos^{-1}\!\frac{(A\,\cdot B)}{|A|\,|B|}$ 

Size 1 vector perpendicular to both A and B =  $\frac{A \times B}{|A \times B|}$ 

(3-dimensional Vector A)	SHIFT VCT 1 (Dim) 1 (A) 3 🗖
(Element input)	() 1 <b>=</b> 0 <b>=</b> 1 <b>= AC</b>
(3-dimensional Vector B)	SHIFT VCT 1 (Dim) 2(B) 3 🗖
(Element input)	1 <b>E</b> 2 <b>E</b> 0 <b>E AC</b>

← ( SHIFT ABS SHIFT VCT 3 (Vct) 1 (A)
 K SHIFT ABS SHIFT VCT 3 (Vct) 2 (B)

(cos⁻¹Ans) (Result: <i>108.4349488</i>	°)	SHIFT COS <sup>-1</sup> Ans
(VctA×VctB)	SHIFT VCT 3	(Vct) 1 (A) 🗙

(AbsVctAns) 5배키 VCT 3 (Vct) 2 (B) 〓

(VctAns÷Ans)

(Result: (-0.6666666666 0.3333333333 -0.66666666666))

#### Metric Conversions

Use the week key to enter the COMP Mode when you want to perform metric conversions.

 A total of 20 different conversion pairs are built-in to provide quick and easy conversion to and from metric units.

- See the Conversion Pair Table for a complete list of available conversion pairs.
- When inputting a negative value, enclose it within parentheses (, ).

Example: To convert –31 degrees Celsius to Fahrenheit

#### Conversion Pair Table

#### Based on NIST Special Publication 811 (1995).

To perform this conversion:	Input this pair number:	To perform this conversion:	Input this pair number:
in $\rightarrow$ cm	01	$oz \rightarrow g$	21
$\text{cm} \rightarrow \text{in}$	02	$g \rightarrow oz$	22
$ft \rightarrow m$	03	$lb \to kg$	23
$m \to ft$	04	$kg \rightarrow lb$	24
$yd \rightarrow m$	05	$atm \rightarrow Pa$	25
$m \rightarrow yd$	06	$Pa \rightarrow atm$	26
$mile \to km$	07	mmHg $\rightarrow$ Pa	27
$\text{km} \rightarrow \text{mile}$	08	$Pa \rightarrow mmHg$	28
n mile $\rightarrow$ m	09	$hp \rightarrow kW$	29
$m \rightarrow n$ mile	10	$kW \rightarrow hp$	30
acre $\rightarrow m^2$	11	kgf/cm <sup>2</sup> $\rightarrow$ Pa	31
$m^2 \rightarrow acre$	12	$Pa \rightarrow kgf/cm^2$	32
gal (US) $\rightarrow \ell$	13	kgf•m $\rightarrow$ J	33
$\ell \rightarrow \text{gal}(\text{US})$	14	$J \rightarrow kgf \bullet m$	34
gal (UK) $ ightarrow {\it \ell}$	15	$lbf/in^2 \rightarrow kPa$	35
$\ell \rightarrow \text{gal}(UK)$	16	$kPa \rightarrow lbf/in^2$	36
$pc \rightarrow km$	17	$^{\circ}F \rightarrow ^{\circ}C$	37
$\text{km} \rightarrow \text{pc}$	18	$C \rightarrow {}^{\circ}F$	38
km/h $\rightarrow$ m/s	19	$J \rightarrow cal$	39
m/s $\rightarrow$ km/h	20	$cal \rightarrow J$	40

#### Scientific Constants COMP

Use the we key to enter the COMP Mode when you want to perform calculations using scientific constants.

- A total of 40 commonly-used scientific constants, such as the speed of light in a vacuum and Planck's constant are built-in for quick and easy lookup whenever you need them.
- Simply input the number that corresponds to the scientific constant you want to look up and it appears instantly on the display.
- See the Scientific Constant Table for a complete list of available constants.

To select this constant:	Input this scientific constant number:
atomic mass unit (u)	17
proton magnetic moment ( $\mu$ p)	18
electron magnetic moment ( $\mu$ e)	19
neutron magnetic moment ( $\mu$ n)	20
muon magnetic moment ( $\mu\mu$ )	21
Faraday constant (F)	22
elementary charge (e)	23
Avogadro constant (NA)	24
Boltzmann constant (k)	25
molar volume of ideal gas (Vm)	26
molar gas constant (R)	27
speed of light in vacuum (C <sub>0</sub> )	28
first radiation constant (C1)	29
second radiation constant (C2)	30
Stefan-Boltzmann constant ( $\sigma$ )	31
electric constant ( $\varepsilon_0$ )	32
magnetic constant (µ <sub>0</sub> )	33
magnetic flux quantum ( $\phi_0$ )	34
standard acceleration of gravity (g)	35
conductance quantum (G <sub>0</sub> )	36
characteristic impedance of vacuum (Z <sub>0</sub> )	37
Celsius temperature (t)	38
Newtonian constant of gravitation (G)	39
standard atmosphere (atm)	40

#### **Power Supply**

The TWO WAY POWER system actually has two power supplies: a solar cell and a G13 Type (LR44) button battery. Normally, calculators equipped with a solar cell alone can operate only when relatively bright light is present. The TWO WAY POWER system, however, lets you continue to use the calculator as long as there is enough light to read the display.

#### • Replacing the Battery

- Either of the following symptoms indicates battery power is low, and that the battery should be replaced.
- Display figures are dim and difficult to read in areas where there is little light available.
- Nothing appears on the display when you press the ON key.

Screw

٤

#### • To replace the battery Screw

- Remove the five screws that hold the back cover in place and then remove the back cover.
- ② Remove the old battery.
- ③ Wipe off the sides of new battery with a dry, soft cloth. Load it into the unit with the positive ⊕ side facing up (so you can see it).
   ④ Pastere the back areas and approximately a side and ap
- ④ Replace the back cover and secure it in place with the five screws.
- (5) Press ON to turn power on. Be sure not to skip this step.

#### Auto Power Off

Weight:

Calculator power automatically turns off if you do not perform any operation for about six minutes. When this happens, press (IM) to turn power back on.

#### Specifications

Power Consumption: 0.0002 W

Power Supply: Solar cell and a single G13 Type button battery (LR44)

Battery Life: Approximately 3 years (1 hour use per day).

 $^{1}\text{/}2^{\prime\prime}$  (H)  $\times$  31/16 $^{\prime\prime}$  (W)  $\times$  61/16 $^{\prime\prime}$  (D)

105 g (3.7 oz) including battery

Operating Temperature: 0°C to 40°C (32°F to 104°F)

Dimensions: 12.7 (H)  $\times$  78 (W)  $\times$  154.5 (D) mm

Use the procedure described below when you want to transpose a matrix.

```
• Example: To transpose Matrix B = \begin{bmatrix} 5 & 7 & 4 \\ 8 & 9 & 3 \end{bmatrix}

\begin{pmatrix} \begin{bmatrix} 5 & 8 \\ 7 & 9 \\ 4 & 3 \end{pmatrix}
(Matrix B 2×3)

(Element input) 5 5 7 5 4 5 8 5 9 5 3 5 AG

(TrnMatB)

(TrnMatB)

(Matrix 3 (Mat) 2 (B) 5
```

#### Inverting a Matrix

You can use the procedure below to invert a square matrix.		
• Example: To invert Matrix C = $\begin{bmatrix} -3 & 6 & -11 \\ 3 & -4 & 6 \\ 4 & -8 & 13 \end{bmatrix}$		
$\begin{pmatrix} -0.4 & 1 & -0.8 \\ -1.5 & 0.5 & -1.5 \\ -0.8 & 0 & -0.6 \end{pmatrix}$		
(Matrix C 3×3)		
(Element input) (=) 3 = 6 = (=) 11 = 3 = (=) 4 = 6 = 4 = (=) 8 = 13 = AC		
(MatC <sup>-1</sup> ) (Mat 3 (Mat) 3 (C) x <sup>-1</sup>		

 Example: To calculate the inner product of Vector A and Vector B (Result: -24) (VctA·VctB)
 Imm WE 3 (Vct) 1 (A)

SHIFT VCT ▶ 1 (Dot) SHIFT VCT 3 (Vct) 2 (B) ■

- An error occurs in the above procedure if you specify vectors of different dimensions.
- Calculating the Outer Product of Two Vectors
- Use the procedure described below to obtain the outer product for two vectors.
- Example: To calculate the outer product of Vector A and Vector B (Result: (-3, 18, 13)) (VctA×VctB) IIII VCT 3 (Vct) 1 (A) IIIII VCT 3 (Vct) 2 (B) IIIII
- An error occurs in the above procedure if you specify vectors of different dimensions.
- Determining the Absolute Value of a Vector

Use the procedure shown below to obtain the absolute value (size) of a vector.

------

• Example: To determine how much total energy a person weighing 65kg has (E =  $mc^2 = 5.841908662 \times 10^{18}$ )



28 is the "speed of light in vacuum" constant number

#### Scientific Constant Table

Based on ISO Standard (1992) data and CODATA recommended values (1998).

To select this constant:	Input this scientific constant number:
proton mass (mp)	01
neutron mass (mn)	02
electron mass (me)	03
muon mass (m $\mu$ )	04
Bohr radius (a <sub>0</sub> )	05
Planck constant (h)	06
nuclear magneton ( $\mu$ N)	07
Bohr magneton ( $\mu$ B)	08
Planck constant, rationalized (٢)	09
fine-structure constant (α)	10
classical electron radius (re)	11
Compton wavelength (λc)	12
proton gyromagnetic ratio (γp)	13
proton Compton wavelength (λcp)	14
neutron Compton wavelength (λcn)	15
Rydberg constant (R∞)	16