TEXAS INSTRUMENTS

SCIENTIFIC

TI-35 PLUS

QUICK REFERENCE GUIDE

Reminder—In Case of Difficulty

If the calculator does not respond as you expect, it may be in a special mode. Press [MODE] [DEC] [2nd] [FD] [2nd] [FIX] [·] to restore the calculator to normal settings.

Key Index

This index provides a quick page reference to the description of each key.

				[ON/C] 5,14
	[$\sqrt{x}$] 24	[10^x] 26	[e^x] 26	
[2nd] 12	[x^2] 24	[log] 26	[lnx] 26	[OFF] 4
	<A> 8,42	<B> 8,42	<C> 8,42	
[hyp^{-1}] 12	[$\sin^{-1}$] 29	[$\cos^{-1}$] 29	[$\tan^{-1}$] 29	[DRG►] 27
[hyp] 12,32	[sin] 29	[cos] 29	[tan] 29	[DRG] 27
	<D> 8,42	<E> 8,42	<F> 8,42	
[$\sqrt[x]{y}$] 25	[$\sqrt[3]{x}$] 24	[P►R] 30	[R►P] 31	[nCr] 34
[y^x] 24	[1/x] 24	[a] 30,31,33	[b] 30,31,33	[÷] 18
[Σ−] 36	[π] 8	[FIX] 11	[Rnd] 8	[nPr] 34
[Σ+] 36	[EXP] 10	[(] 17	[)] 17	[×] 18
[EXC] 22	[P(t)] 39	[R(t)] 38	[Q(t)] 39	[►DMS] 28
[STO] 22	[7] 8	[8] 8	[9] 8	[−] 18
	[HEX] 13,41	[CPLX] 13,33	[STAT] 13,35	
[x⇆y] 15	[$\bar{x}$] 36	[$\sigma n-1$] 36	[σn] 36	[►DD] 28
[RCL] 22	[4] 8	[5] 8	[6] 8	[+] 18
	[DEC] 13,40	[BIN] 13,40	[OCT] 13,41	
[x!] 34	[Σx] 36	[Σx^2] 36	[n] 36	[%] 20
[SUM] 23	[1] 8	[2] 8	[3] 8	
				[=] 18
	[FD] 9	[Sci] 9	[Eng] 10	
[MODE] 13	[0] 8	[·] 8	[+/−] 8	

Multiple-Function Keys

Some calculator keys have multiple functions, which are accessed by pressing the [2nd], [hyp], or [MODE] key just prior to the function key. Each key is described in the appropriate section of this manual.

The TI-35 PLUS Calculator

The TI-35 PLUS calculator offers you a wide range of mathematical and statistical capabilities. This manual is designed to help you learn about these capabilities and how to use them effectively.

Features

- 89 calculator functions assist you in performing a wide range of arithmetic, algebraic, trigonometric, and statistical computations.
- Functions include hexadecimal, octal, and binary calculations and conversions, statistical functions, complex-number functions, and permutations and combinations.
- A 10-digit display (plus a two-digit exponent) lets you work with large numbers.
- The Constant Memory™ feature holds a number in memory even when the calculator is turned off.
- The APD™ Automatic Power Down is a power-saving feature that turns the calculator off automatically after about 10 minutes of nonuse.

TI-35 PLUS Quick Reference Guide

This Quick Reference Guide provides you with information about operating the calculator.

Table of Contents

Table of Contents (Continued)

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Turning the Calculator On and Off

The [ON/C] and [OFF] keys turn the calculator on and off. If you don't turn the calculator off, the APD™ Automatic Power Down feature turns it off for you.

Turning the Calculator On

To turn the calculator on, press the [ON/C] key. After you press [ON/C], **0.** should appear in the display. Other display indicators may also appear, depending on the operating mode of the calculator when you turned it off.

To clear the calculator and set it to floating-decimal operation, press [ON/C], [ON/C], [MODE] [DEC], [2nd] [FD], [2nd] [FIX] [.]. The calculator is then ready for you to begin your calculations.

Turning the Calculator Off

To turn the calculator off, press [OFF]. The display, any pending operations, and the automatic constant are cleared when you turn the calculator off.

The APD™ Feature

To conserve power, the Automatic Power Down (APD) feature automatically turns the calculator off after about 10 minutes of nonuse (the time may vary slightly). The effect is the same as if you had pressed [OFF].

Clearing the Calculator

Clearing the Display and Pending Operations

The [ON/C] key clears incorrect entries, error conditions, the display, and pending operations. Pressing [ON/C] does not affect the memory, the statistical registers, the angle units, the operating mode, or the display format.

- To clear an incorrect numerical entry, press [ON/C] once.
- To clear an error condition, indicated by **E** in the display, press [ON/C] once.
- To clear the display and all pending operations, press [ON/C] twice.

Clearing the Memory

To clear the memory, press [STO] when a zero is in the display.

Clearing the Statistical Registers

If **STAT** is displayed, the calculator is in the statistics mode. Press [MODE] [DEC] to clear the statistical registers and leave the statistics mode. **STAT** is erased from the display, and the calculator is ready for general operation.

The Display

The display shows entries and results with a maximum of 10 significant digits (plus a two-digit exponent in scientific and engineering notations). However, the calculator uses a maximum of 12 digits internally. To present additional information about the calculator, special indicators may also appear in the display.

Indicator	Meaning
M	The memory contains a number other than zero.
E	An error condition has occurred. To clear the error, press ON/C.
2nd	The calculator will access the alternate function of the next key pressed.
HYP	The calculator will access the hyperbolic function of the next key pressed.
BIN	The calculator is in the binary number mode.

Indicator	Meaning
OCT	The calculator is in the octal number mode.
HEX	The calculator is in the hexadecimal number mode.
CPLX	The calculator is in the complex number mode.
STAT	The calculator is in the statistics mode.
DEG	The angle units are set to degrees.
RAD	The angle units are set to radians.
GRAD	The angle units are set to grads.
()	There are one or more open parentheses.

Data Entry Keys

The keys listed on this page are used to enter numeric values.

[0]-[9], <A>-<F>—Digit Entry Keys

These keys enter digits in the display. (<A>-<F> are available only in the hexadecimal mode.) You can enter a maximum of 10 digits and a decimal point.

[·]—Decimal-Point Key

This key enters a decimal point in a numeric value.

[+/−]—Change-Sign Key

This key changes the sign of the number in the display. To enter a negative number, first enter the number as a positive value, then press [+/−]. (In the binary, octal, or hexadecimal number mode, [+/−] calculates the two's complement of the number in the display.)

[2nd] [π]—Pi Key Sequence

This key sequence enters the value of pi to twelve digits, 3.14159265359. The display shows the value rounded to ten digits, 3.141592654.

[2nd] [Rnd]—Random-Number Key Sequence

This key sequence displays a three-digit random number from 0.000 through 0.999.

Display Formats

After you select a display format, all results are displayed in this format until you select another.

2nd [FD]—Floating-Decimal Key Sequence

This key sequence selects floating-decimal notation. This removes scientific or engineering notation; it does not cancel the fix decimal setting. Results are displayed in the following range.

– 9999999999 to – 0.000000001,
0,
0.000000001 to 9999999999

Note: Any results outside of this range are automatically displayed in scientific notation.

2nd [Sci]—Scientific Notation Key Sequence

This key sequence selects scientific notation. Each result is expressed as a base value (mantissa) times 10 raised to some power (exponent).

In scientific notation, the calculator always displays "normalized" results. (That is, the result has a single digit to the left of the decimal point.)

(continued)

2nd [Eng]—Engineering Notation Key Sequence

This key sequence selects engineering notation. This is like scientific notation, except that all exponents are multiples of 3.

EXP—Exponent Entry Key

This key enables you to enter an exponent in scientific and engineering notations. You can enter a number as small as $\pm 1 \times 10^{-99}$ and as large as $\pm 9.999999999 \times 10^{99}$.

To enter such a number:

1. Enter the mantissa. If it is negative, press +/−.
2. Press EXP. The number **00** appears in the right side of the display. (If you press EXP without first entering a mantissa, the calculator sets the mantissa as 1 and displays **1. 00**.)
3. Enter the exponent. If it is negative, press +/−. If you press an incorrect digit key, simply re-enter the correct digits. (The calculator uses only the last two digits entered as the exponent.)
4. Press = to enter the number. Then, if necessary, press 2nd [Sci] or 2nd [Eng] to place the display in the desired format.

2nd [FIX]—Fixed-Decimal Key Sequence

This key sequence enables you to set the number of decimal places displayed in a result.

- To set the number of decimal places, press 2nd [FIX] and then press the appropriate digit key (0–9).
- To remove the fixed-decimal setting, press 2nd [FIX] [·].

If a result has more than the selected number of decimal places, the displayed result is rounded. If a result has less than the selected number of decimal places, trailing zeros are inserted.

Changing Display Formats

By changing the display format, you can convert the result of a calculation from one format to another.

To convert a result, simply press the 2nd [FD], 2nd [Scl], 2nd [Eng], or 2nd [FIX] key sequence, depending on the display format you desire.

To convert a number that you enter:

1. Enter the number.
2. Press [=].
3. Press the desired key sequence.

Alternate Function Keys

Most keys can perform more than one function. The [2nd], [hyp], and [MODE] keys give you access to these alternate functions.

Note: If you press [2nd] or [hyp] and then a key with no second or hyperbolic function, the key performs its normal function. If you accidentally press [2nd] or [hyp], press [2nd] or [hyp] again to cancel its effect.

[2nd]—Second Function Key

This key enables you to perform the "second" function that is marked above and to the left of a key.

$\sqrt{x}$

x^2

To perform a second function, press [2nd] and then press the appropriate function key.

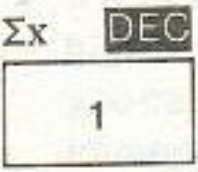
[hyp]—Hyperbolic Function Key

The [hyp] and [2nd] [hyp^{-1}] key sequences enable you to use the trigonometric keys to perform hyperbolic functions. Press [hyp] or [2nd] [hyp^{-1}] and then press the trig function key. For example:

- Press [hyp] [sin] to find the hyperbolic sine.
- Press [2nd] [hyp^{-1}] [sin] to find the inverse hyperbolic sine.

[MODE]—Mode Key

This key enables you to select the "modes" that are marked above and to the right of the [1], [2], [3], [4], [5], and [6] keys.



To select a mode, press [MODE] and then press the appropriate key.

Key Sequence	Mode Setting
[MODE] [DEC]	Decimal number mode
[MODE] [BIN]	Binary number mode
[MODE] [OCT]	Octal number mode
[MODE] [HEX]	Hexadecimal number mode
[MODE] [CPLX]	Complex number mode
[MODE] [STAT]	Statistics mode

Note: Some operating features are available only in the decimal mode.

Correcting Entry Errors

If you enter an incorrect number or function, you can always clear the calculation and begin again. Often, however, you can correct the error without clearing the entire calculation.

[ON/C] —On/Clear Key

This key clears pending operations, incorrect entries, or immediate functions.

- To clear all pending operations, press [ON/C] twice.
- To clear a numeric entry, press [ON/C] once.

  Note: When clearing an incorrect entry, be sure to press [ON/C] before you press [(], [)], [y^x], [2nd] [$\sqrt[x]{y}$], [×], [÷], [+], or [−]. Pressing [ON/C] following any of these keys clears the calculator as if you had pressed [ON/C] twice.
- To clear an immediate function, press [ON/C] once.

After clearing an incorrect entry and entering the correct value, you can continue your calculation.

Correcting Pending Operations

If you press an incorrect pending operation key ([y^x], [2nd] [$\sqrt[x]{y}$], [×], [÷], [+], or [−]), you may or may not be able to correct the operation.

- If the incorrect operation has an equal or higher priority than the intended operation, you can press the correct operation key immediately after the incorrect one and continue with the calculation.
- If the incorrect operation has a lower priority than the intended operation, simply pressing the correct key may not correct the problem. If there are any pending operations, pressing a lower-priority operation key completes the previous pending operations. In this case, you should press [ON/C] [ON/C] to clear the calculation and begin again.

The priorities of operations are discussed on the following page.

[2nd] [x⇆y]—x Exchange y Key Sequence

This key sequence exchanges:

- The values of x and y in universal power and root calculations.
- The minuend and subtrahend in subtraction.
- The divisor and dividend in division.
- The constant value and the value in the display in a constant calculation.

Algebraic Operating System

The AOS™ Algebraic Operating System completes all operations according to their relative priorities, which are listed below.

Priority	Operations
1 (highest)	Trigonometric, hyperbolic, square, square root, cube root, factorial, reciprocal, angle conversion, combinations, permutations, percent, logarithms, change sign
2	Universal powers and roots
3	Multiplication and division
4	Addition and subtraction
5 (lowest)	Equals

Operations in priority 1 are immediate functions; they are performed as soon as you press the operation keys.

Operations in priorities 2, 3, and 4 are completed by any operation with the same priority or with a lower priority.

The [=] key completes all operations.

Pending Operations and Parentheses

A pending operation is any operation that is delayed until you press a key with an equal or lower priority. The parentheses keys help you arrange the order of completion for a calculation.

Pending Operation Keys

Because the operation keys in priorities 2, 3, and 4—[y^x], [2nd] [$\sqrt[x]{y}$], [×], [÷], [+], and [−]—create pending operations, they are called the **pending operation keys**. If you enter 4 [×] 5, for example, the result is not displayed until you complete the operation by pressing an appropriate key, such as [=]. Until completed, 4 [×] 5 creates a pending multiplication.

The calculator allows you to enter a maximum of six pending operations. If you attempt to enter a seventh, an error condition occurs. Pending operations are cleared when you press any of the following keys or key sequences.

[ON/C] [ON/C]
[MODE] [STAT]
[b]
[MODE] [CPLX]
[a]
[OFF]

[(], [)]—Parentheses Keys

These keys open and close a parenthetical expression. A set of operations enclosed in parentheses is given priority over operations outside the parentheses. Within each level of parentheses, the calculator operates according to the rules of AOS.

With each pending operation, you can enter up to 15 levels of open parentheses.

Basic Operations

Arithmetic Functions

The [+], [−], [×], and [÷] keys perform the arithmetic operations of addition, subtraction, multiplication, and division.

The [=] key completes all pending operations and displays the result.

Example: $-4 \times 7.3 \div 2 = -14.6$

Enter	Press	Display
4	[+/−] [×]	−4.
7.3	[÷]	−29.2
2	[=]	−14.6

Rounding and Accuracy

Even though a calculation can produce a 12-digit result, the display can show only 10 digits. Results are, therefore, rounded to a 10-digit standard display or to a 10-digit mantissa and 2-digit exponent for scientific notation.

Higher-order mathematical functions use iterative calculations. The cumulative error from these calculations in most cases is maintained beyond the 10-digit display. Most calculations are accurate to ± 1 in the last displayed digit.

Constant Calculations

The constant register is set automatically when you perform a calculation that uses [+], [−], [×], [÷], [y^x], or [2nd] [$\sqrt[x]{y}$]. The register uses the number entered **after** the function key as the constant number.

When you enter another number and press [=], the calculator completes the problem using the number and function in the constant register.

The constant register is cleared when you press [ON/C] [ON/C], [a], [b], or a pending operation key, or when you turn the calculator off.

Example: Use [×] [2nd] [π] as a constant to calculate π2, π4, and π8.

Enter	Press	Display
2	[×] [2nd] [π] [=]	6.283185307
4	[=]	12.56637061
8	[=]	25.13274123

Percentage Calculations

[2nd] [%]—Percent Key Sequence

This key sequence automatically divides the number in the display by 100, converting the number to its equivalent decimal percent.

For example, if you enter 43.9 and press [2nd] [%], **0.439** is displayed.

In the chart below, the "principal amount" is the number in the display immediately after you press [×], [+], [−], or [÷].

Operation	Key Sequence	Function
Percentage	[×] n [2nd] [%] [=]	Calculates n% of the principal amount.
Add-On	[+] n [2nd] [%] [=]	Calculates n% of the principal amount and adds the percentage to the number.
Discount	[−] n [2nd] [%] [=]	Calculates n% of the principal amount and subtracts the percentage from the number.
Percentage Ratio	[÷] n [2nd] [%] [=]	Divides the principal amount by n%.

Percentage Examples

What is 2.5% of 15?

Enter	Press	Display
15	[×]	15.
2.5	[2nd] [%] [=]	0.375

What is the total cost of a $15 item with a 5% sales tax?

Enter	Press	Display
15	[+]	15.
5	[2nd] [%] [=]	15.75

How much is paid for a $5 item that is discounted 2%?

Enter	Press	Display
5	[−]	5.
2	[2nd] [%] [=]	4.9

25 is 15% of what number?

Enter	Press	Display
25	[+]	25.
15	[2nd] [%] [=]	166.6666667

Memory Operations

Four keys are used in memory operations.

STO—Store Key

This key stores the displayed number in memory, replacing the previous memory contents. To clear the memory, press STO when 0 is displayed.

RCL—Recall Key

This key displays (recalls) the number stored in memory, without affecting the memory contents.

Example: Store and recall 45.68.

Enter	Press	Display	
45.68	STO	M	45.68
	OFF ON/C	M	0.
	RCL	M	45.68

2nd [EXC]—Exchange Key Sequence

This key sequence exchanges the number in the display with the number in memory. For example, the key sequence 3 2nd [EXC] stores the number 3 in memory and displays the number that was previously in memory.

Example: Store 55.4 in memory and use 2nd [EXC] to exchange a displayed value with the stored value.

Enter	Press	Display	
55.4	STO	M	55.4
67	2nd [EXC]	M	55.4
	2nd [EXC]	M	67.

SUM—Sum Key

This key adds the number in the display to the number in memory. For example, if 5 is in memory and you press 3 SUM, the number in memory is then 8. The 3 remains in the display.

Note: If you want to add to the current contents of memory, use SUM. However, if you are beginning a new problem, be sure to use STO to store the first number in memory. (This clears the previous contents.) You can then use SUM to add subsequent numbers.

Example:

28.3 × 7 =	198.1
173 + 16 =	189
312 − 42 + 7.8 =	277.8
Total	664.9

Enter	Press		Display	Memory
28.3	×		28.3	0.
7	= STO	M	198.1	198.1
173	+	M	173.	198.1
16	= SUM	M	189.	387.1
312	−	M	312.	387.1
42	+	M	270.	387.1
7.8	= SUM	M	277.8	664.9
	RCL	M	664.9	664.9

Reciprocals, Powers, and Roots

The [1/x], [x²], [2nd] [√x], and [2nd] [∛x] keys calculate the reciprocal, square, square root, and cube root of the displayed number. These are immediate functions that operate only on the displayed number.

Example: Calculate $\sqrt{(3^2 + 4^2)}$

Enter	Press	Display
3	[x²] [+]	9.
4	[x²]	16.
	[=]	25.
	[2nd] [√x]	5.

[yˣ]—Universal Power Key

This key raises any positive number to any power (within the range of the calculator).

1. Enter the number (y) that you want to raise to a power.
2. Press [yˣ].
3. Enter the power (x).
4. Press [=] or any key that completes the operation.

Example: $2.86^{-.42} = 0.643170721$

Enter	Press	Display
2.86	[yˣ]	2.86
.42	[+/−]	−0.42
	[=]	0.643170721

[2nd] [$\sqrt[x]{y}$] — Universal Root Key Sequence

This key sequence calculates any root of any positive number (within the range of the calculator).

1. Enter the number (y) whose root you want to find.
2. Press [2nd] [$\sqrt[x]{y}$].
3. Enter the root (x).
4. Press [=] or any key that completes the operation.

Example: $\sqrt[3.12]{1460} = 10.33274375$

Enter	Press	Display
1460	[2nd] [$\sqrt[x]{y}$]	1460.
3.12	[=]	10.33274375

Logarithms and Antilogarithms

The logarithm key sequences perform common and natural logarithms and common and natural antilogarithms.

Key Sequence	Function
[log]	Calculates the common logarithm (base 10) of the number in the display.
[lnx]	Calculates the natural logarithm (base e) of the number in the display. (The value of e is 2.718281828.)
[2nd] [10^x]	Calculates the common antilogarithm of the number in the display (10 raised to the power of the number).
[2nd] [e^x]	Calculates the natural antilogarithm of the number in the display (e raised to the power of the number).

Examples: Calculate log 15.32, ln 203.451, and $e^{-.69315}$.

Enter	Press	Display
15.32	[log]	1.185258765
203.451	[lnx]	5.31542519
.69315	[+/−] [2nd] [e^x]	0.49999859

Angle Units

The angle units setting is important when you are performing trigonometric calculations and polar/rectangular conversions.

The current angle setting is indicated by **DEG**, **RAD**, or **GRAD** in the display.

Each time you press [DRG] or [2nd] [DRG►], the setting advances from one unit to the next in the following order:

Key Sequence	Function
[DRG]	Changes the angle setting without affecting the angle in the display.
[2nd] [DRG►]	Changes the angle setting and converts the angle in the display to the new units.

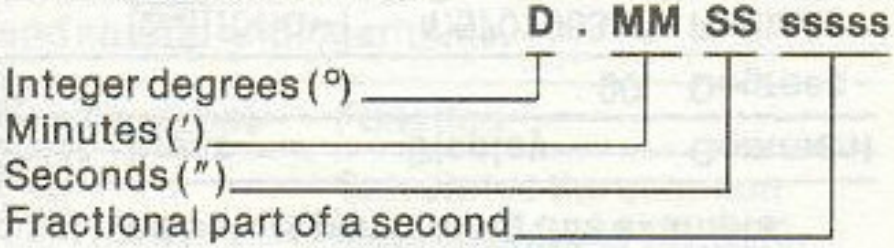
Example: Convert 90° to radians, grads, and then back to degrees.

Note: If necessary, press [DRG] until **DEG** is displayed before performing this example.

Enter	Press	Display	Comment
90		90.	Degrees
	[2nd] [DRG►]	1.570796327	Radians
	[2nd] [DRG►]	100.	Grads
	[2nd] [DRG►]	90.	Degrees

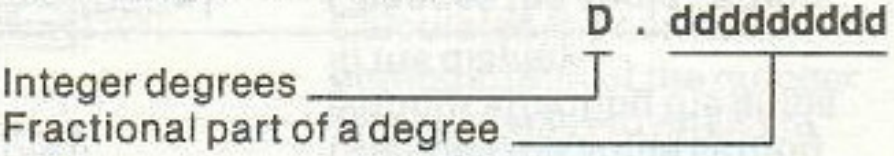
Deg/Min/Sec and Decimal Degrees

In deg/min/sec, angles are represented by the D.MMSSssssss format.



When you enter minutes and seconds, remember to include zeros where needed to place the digits in the proper positions. For example, the angle 9° 7′ 50″ is entered as 9.075.

In decimal degrees, angles are represented by the D.ddddddddd format.



Note: The key sequences below also apply to hours/min/sec and decimal hours.

Key Sequence	Function
2nd [►DMS]	Converts an angle from decimal degrees to deg/min/sec. Enter the angle as D.ddddddddd and press 2nd [►DMS]. The result is rounded to six decimal places.
2nd [►DD]	Converts an angle from deg/min/sec to decimal degrees. Enter the angle as D.MMSSssssss and press 2nd [►DD].

Note: The calculator can perform these conversions in any angle units setting.

Trigonometric Functions

[sin], [cos], [tan]—Trig Keys

These keys calculate the sine, cosine, and tangent of the angle in the display.

Note: The calculator interprets the angle in the units (**DEG**, **RAD**, or **GRAD**) selected by the [DRG] or [2nd] [DRG►] key sequence. Also, if you enter an angle in deg/min/sec format, you must convert it to decimal degrees before using these functions.

[2nd] [$\sin^{-1}$], [2nd] [$\cos^{-1}$], [2nd] [$\tan^{-1}$]—
Inverse Trig Key Sequences

These keys calculate the angle (in the units selected) whose sine, cosine, or tangent is in the display.

Examples: Find sine 30° and arctangent 1.

Note: If necessary, press [DRG] until **DEG** is displayed before performing this example.

Enter	Press	Display
30	[sin]	0.5
1	[2nd] [$\tan^{-1}$]	45.

Polar/Rectangular Conversions

[2nd] [P►R]—Polar to Rectangular Key Sequence

To convert from polar to rectangular:

1. Select the correct angle units.
2. Enter the r-coordinate and press [a].
3. Enter the θ-coordinate and press [b]. (If θ is in deg/min/sec format, convert it to decimal degree format before you press [b].)
4. Press [2nd] [P►R] to display the x-coordinate.
5. Press [b] to display the y-coordinate.

Note: To recall the x-coordinate, press [a]. You can use [a] and [b] to recall the x- and y-coordinates until you enter a new number into the display, press a function key, use [MODE] to change the mode, or press [ON/C].

Example: Convert the polar coordinates ($r = 10, \theta = -45°$) to rectangular coordinates.

Note: If necessary, press [DRG] until **DEG** is displayed before performing this example.

Enter	Press	Display
10	[a]	10.
45	[+/−] [b]	−45.
	[2nd] [P►R]	7.071067812
	[b]	−7.071067812

[2nd] [R►P]—Rectangular to Polar Key Sequence

To convert from rectangular to polar:

1. Select the correct angle units.
2. Enter the x-coordinate and press [a].
3. Enter the y-coordinate and press [b].
4. Press [2nd] [R►P] to display the r-coordinate.
5. Press [b] to display the θ-coordinate.

Note: To recall the r-coordinate, press [a]. You can use [a] and [b] to recall the r- and θ-coordinates until you enter a new number into the display, press a function key, use [MODE] to change the mode, or press [ON/C].

Example: Convert the rectangular coordinates ($x = 5, y = 6$) to polar coordinates.

Note: If necessary, press [DRG] until **DEG** is displayed before performing this example.

Enter	Press	Display
5	[a]	5.
6	[b]	6.
	[2nd] [R►P]	7.810249676
	[b]	50.19442891

Hyperbolic Functions

[hyp]—Hyperbolic Key

This key enables you to use the trigonometric keys to perform hyperbolic functions. The [2nd] [hyp^{-1}] key sequence enables you to perform inverse hyperbolic functions.

Key Sequence	Function
[hyp] [sin]	sinh
[2nd] [hyp^{-1}] [sin]	$sinh^{-1}$
[hyp] [cos]	cosh
[2nd] [hyp^{-1}] [cos]	$cosh^{-1}$
[hyp] [tan]	tanh
[2nd] [hyp^{-1}] [tan]	$tanh^{-1}$

Example: Calculate sinh 3 and $tanh^{-1}$ 0.5.

Enter	Press	Display
3	[hyp] [sin]	10.01787493
.5	[2nd] [hyp^{-1}] [tan]	0.549306144

Complex Number Mode

[MODE] [CPLX]—Complex Number Mode Key Sequence

This key sequence selects the complex number mode, indicated by **CPLX** in the display. In this mode, some of the calculator's operating features are limited.

- Arithmetic operations are completed in the order in which they are entered. (The AOS™ system and the parentheses keys do not operate in the complex number mode.)
- Immediate functions are performed only on the number in the display, not on the complex number.

You can perform combinations, permutations, and polar/rectangular conversions, as well as the arithmetic operations.

Entering Complex Numbers

To enter a complex number:

1. Press [MODE] [CPLX].
2. Enter the real part and press [a].
3. Enter the imaginary part and press [b].

You can add, subtract, multiply, and divide complex numbers. When the calculation is complete, the real part of the result appears in the display. To display the imaginary part, press [b]. To recall the real part, press [a].

Example: Calculate (5 + 4i) × (6 + 9i)

Procedure	Press	Display
Select mode,	[MODE] [CPLX]	
perform calculation,	5 [a] 4 [b] [×]	4.
and show real part.	6 [a] 9 [b] [=]	−6.
Show imaginary part.	[b]	69.

Combinations, Permutations, and Factorials

A combination is an arrangement of objects in which the order is not important. A permutation is an arrangement in which the order is important.

2nd [nCr]—Combination Key Sequence

This key sequence calculates the number of combinations of n items taken r at a time.

1. Enter n and press [a].
2. Enter r and press [b].
3. Press 2nd [nCr].

2nd [nPr]—Permutation Key Sequence

This key sequence calculates the number of permutations of n items taken r at a time.

1. Enter n and press [a].
2. Enter r and press [b].
3. Press 2nd [nPr].

Example: Find the number of possible permutations for the first-, second-, and third-place finishers (no ties) in an eight-horse race.

Enter	Press	Display
8	[a]	8.
3	[b]	3.
	2nd [nPr]	336.

Factorials

2nd [x!]—Factorial Key Sequence

This key sequence calculates the factorial of the displayed number. The displayed number must be a non-negative integer ⩽ 69.

[MODE] [STAT]—Statistics Mode Key Sequence

This key sequence selects the statistics mode, indicated by **STAT** in the display. In this mode, some of the operating features are limited, as described below.

- You can enter a maximum of three pending operations.
- You cannot perform permutations, combinations, or polar/rectangular conversions.

Clearing the Statistical Registers

Before beginning a new statistics problem, you must clear the statistical registers.

Caution: Simply pressing [MODE] [STAT] does not always clear the registers. The registers are cleared only when you use the [MODE] key to **change from one mode to another** or when you turn the calculator off. If the calculator is already in the statistics mode when you press [MODE] [STAT], the registers are not cleared.

To make sure the registers are properly cleared, use the following key sequence.

[MODE] [DEC] [MODE] [STAT]

This sequence clears the registers but does not affect the calculator's memory.

(continued)

Entering Statistical Data

To enter statistical data values:

1. Press [MODE] [DEC] [MODE] [STAT] to clear the statistical registers and enter the statistics mode.
2. Enter a data value and press the [Σ+] key. Continue until all the data values are entered. If you enter an incorrect value, remove it by re-entering the value and pressing [2nd] [Σ−].

   Each time you press [Σ+] or [2nd] [Σ−], the display shows the number of data values currently in the registers.

Analyzing the Data

After entering the data values, you can perform any of the following calculations.

Calculation	Key Sequence
Mean	[2nd] [$\bar{x}$]
"n weighted" population standard deviation	[2nd] [σn]
"n − 1 weighted" sample standard deviation	[2nd] [$\sigma n-1$]
Sum of data values	[2nd] [Σx]
Sum of squares	[2nd] [Σx^2]
Number of data values	[2nd] [n]

Example: Analyze the following test scores: 96, 81, 87, 70, 93, and 77, assuming that the six students are the entire population.

Enter	Press	Display	Comments
	MODE DEC MODE STAT	0	Clear
96	Σ+	1.	1st entry
81	Σ+	2.	2nd entry
97	Σ+	3.	3rd entry (incorrect)
97	2nd [Σ−]	2.	3rd entry removed
87	Σ+	3.	3rd entry (correct)
70	Σ+	4.	4th entry
93	Σ+	5.	5th entry
77	Σ+	6.	6th entry
	2nd [$\bar{x}$]	84.	Mean (class average)
	2nd [σn]	9.018499506	Standard deviation
	x^2	81.33333333	Variance
	2nd [Σx]	504.	Sum of the data values
	2nd [Σx^2]	42824.	Sum of the squares

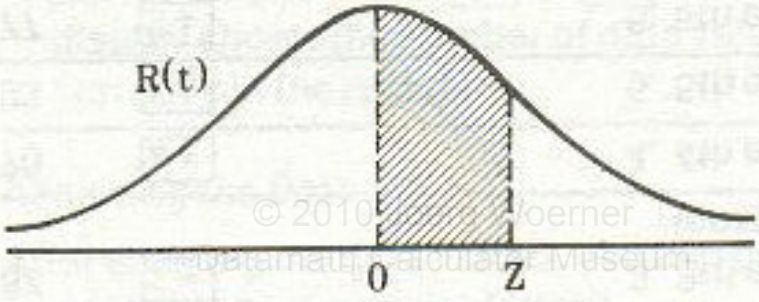
Normal Distribution Keys

To use the normal distribution keys, select the statistics mode by pressing [MODE] [STAT].

[2nd] [R(t)]—Key Sequence

This key sequence clears pending operations and calculates the area between the mean (0) and Z. This area, often called the "z score," is expressed as a percentage of the total area under the curve.

To find R(t), enter a value for Z and press [2nd] [R(t)].

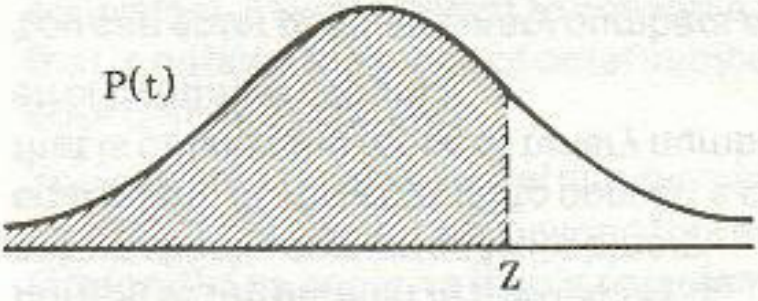


Note: When you use [2nd] [R(t)] with a negative value for z, the area is displayed as a negative number.

2nd [P(t)]—Key Sequence

This key sequence clears pending operations and calculates the area to the left of Z. This area is expressed as a percentage of the total area under the curve.

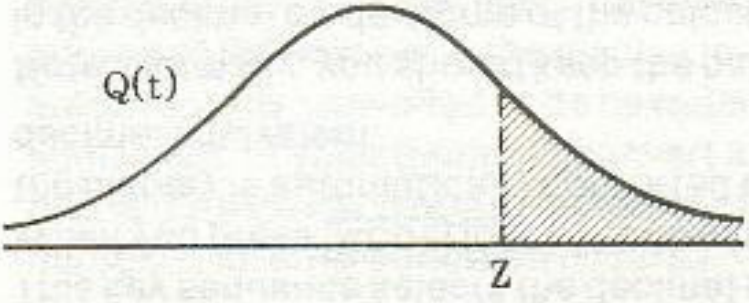
To find P(t), enter a value for Z and press 2nd [P(t)].



2nd [Q(t)]—Key Sequence

This key sequence clears pending operations and calculates the area to the right of Z. This area is expressed as a percentage of the total area under the curve.

To find Q(t), enter a value for Z and press 2nd [Q(t)].



Number-System Modes

[MODE] [DEC]—Decimal Mode Key Sequence

This key sequence selects the decimal mode. When you press [MODE] [DEC], the number in the display is automatically converted to its decimal equivalent.

Note: Normally, you should keep the calculator in the decimal mode. Some of the calculator's operating features are limited in the other modes.

[MODE] [BIN]—Binary Mode Key Sequence

This key sequence selects the binary mode and shows the **BIN** indicator. In this mode, you can only perform arithmetic operations with binary numbers (integers only).

When you press [MODE] [BIN], the integer portion of the number in the display is automatically converted to its binary equivalent. (If you attempt to convert a number that is outside the range of binary numbers, an error condition occurs.)

You can enter positive binary numbers as large as 111111111 (9 digits). Numbers beyond this are interpreted as negative (two's complement) numbers.

MODE OCT—Octal Mode Key Sequence

This key sequence selects the octal mode and shows the **OCT** indicator. In this mode, you can only perform arithmetic operations with octal numbers (integers only).

When you press MODE OCT, the integer portion of the number in the display is automatically converted to its octal equivalent. (If you attempt to convert a number that is outside the range of octal numbers, an error condition occurs.)

You can enter positive octal numbers as large as 3777777777. Numbers beyond this are interpreted as negative (two's complement) numbers.

MODE HEX—Hexadecimal Mode Key Sequence

This key sequence selects the hexadecimal mode and shows the **HEX** indicator. In this mode, you can only perform arithmetic operations with hexadecimal numbers (integers only).

When you press MODE HEX, the integer portion of the number in the display is automatically converted to its hexadecimal equivalent. (If you attempt to convert a number that is outside the range of hexadecimal numbers, an error condition occurs.)

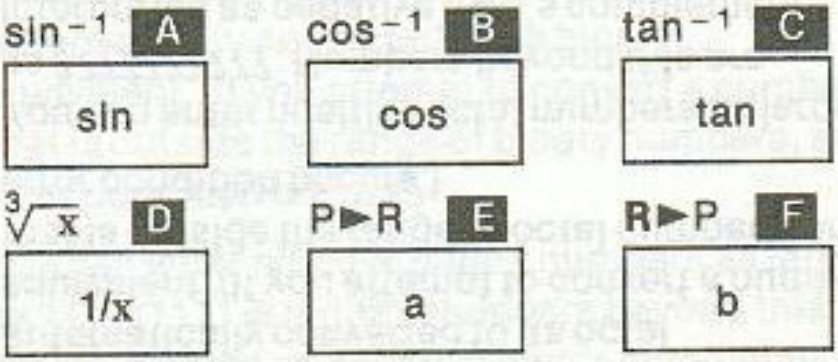
(continued)

MODE HEX (Continued)

You can enter positive hexadecimal numbers as large as 2540BE3FF. Numbers from FDABF41C01 through FFFFFFFFFF are interpreted as negative (two's complement) numbers.

Note: Hexadecimal numbers between 2540BE3FF and FDABF41C01 are equivalent to decimal values that are outside the range of the calculator. An attempted calculation with these numbers causes an error condition.

To enter the hexadecimal digits A through F, use the keys shown below. In the hexadecimal mode, the calculator reassigns these six keys so that the letters A through F are their only functions.



Although B and D are shown as uppercase letters on the keyboard, they are displayed as lowercase **b** and **d**. If you enter ABCD, for example, the display shows **AbCd**.

Two's Complement

To display the two's complement of the number in the display, press +/−.

When an error condition occurs, an **E** appears in the left side of the display. The calculator will not accept a keyboard entry until you press [ON/C] to clear the error condition. (Pressing [ON/C] twice clears the condition and all pending operations.)

General Error Conditions

The error conditions listed in this section can occur in most calculator modes. Errors occur when you attempt to:

- Calculate a result larger than $\pm 9.999999999 \times 10^{99}$.
- Divide a number by zero.
- Use more than 15 levels of open parentheses or more than six pending operations. (You can use only three pending operations in the statistics mode.)
- Calculate [log], [lnx], or [1/x] of zero.
- Calculate [log], [lnx], or [2nd] [$\sqrt{x}$] of a negative number.
- Use [2nd] [$\sqrt[x]{y}$] to find an even root of a negative number.
- Use [y^x] to raise zero to the 0th power, or use [2nd] [$\sqrt[x]{y}$] to calculate the 0th root of any number.

(continued)

General Error Conditions (Continued)

- Use [2nd] [R►P] when both x and y are zero or when the sum of the squares of x and y exceeds the upper limit of the calculator.
- Calculate [tan] of 90° or 270°, π/2 or 3π/2 radians, 100 or 300 grads, or their rotational multiples, such as 450°.
- Calculate [2nd] [$\sin^{-1}$] or [2nd] [$\cos^{-1}$] when the absolute value of the displayed number is greater than 1.
- Calculate [2nd] [hyp^{-1}] [tan] when the absolute value of the displayed number is greater than or equal to 1.
- Calculate [2nd] [x!] of a number that is not a positive integer less than or equal to 69.
- Use [2nd] [nPr] or [2nd] [nCr] when n and r are not positive integers, or when r is not less than or equal to n.

Statistical Error Conditions

The error conditions listed in this section occur only when the calculator is in the statistics mode. Errors occur when you attempt to:

- Use [Σ+] to enter a data value (x) such that $|x| < 1 \times 10^{50}$.
- Use [2nd] [Σ−] when there are no data values in the statistical registers.
- Calculate [2nd] [$\bar{x}$], [2nd] [σn], or [2nd] [$\sigma n-1$] when there are no data values.
- Calculate [2nd] [$\sigma n-1$] with only one data value.
- Use more than three pending operations.

Number Mode Error Conditions

The error conditions listed in this section occur only when the calculator is in the binary, octal, or hexadecimal number mode. Errors occur when you attempt to:

- Calculate a result that is outside the calculator's range for that number mode.
- Use [MODE] [BIN], [MODE] [OCT], or [MODE] [HEX] to convert a number that is outside the calculator's range for that number mode.

Battery Replacement

Note: Your calculator cannot hold data in memory when the batteries are removed or become discharged.

The TI-35 PLUS uses two of any of the following batteries. For up to 1000 hours of operation use: Panasonic LR-44, Ray-O-Vac RW-82, Union Carbide (Eveready) A-76, or the equivalent. For up to 2500 hours of operation use: Mallory 10L14 or D357, Union Carbide (Eveready) 357, Panasonic WL-14, Toshiba G-13, Ray-O-Vac RW-42, or the equivalent.

To replace the batteries:

1. Turn the calculator off. Place a small screwdriver, paper clip, or other instrument into the slot and gently lift the battery cover.

2. Remove the discharged batteries and install new ones as shown.
   - Be careful not to crease the film contacts while installing the new batteries.
   - Be sure the film contacts are positioned to lie on top of the new batteries after the batteries are installed.
3. Replace the cover, top edge first, and then gently press until the bottom of the cover snaps into place.
4. Press the ON/C key twice. The display shows **0.** and **DEG** and the calculator is ready to be used.

Caution: Dispose of old batteries properly. Do not incinerate the batteries or leave them where a child can find them.

In Case of Difficulty

If the calculator does not respond as you expect, it may be in a special mode. Press [MODE] [DEC] [2nd] [FD] [2nd] [FIX] [·] to restore the calculator to normal settings.

1. If the digits fail to appear in the display, check for improperly inserted or discharged batteries.
2. Press [OFF]. Then press [ON/C] and try the calculation again. Review the operating instructions to be certain the calculations were performed properly.
3. When batteries are inserted into the calculator and the display does not reset, pressing [OFF] [ON/C] [ON/C] and [STO] should reset the display and prepare the calculator for use.

Service and General Information

If you have questions about service or the general use of your calculator, please call Consumer Relations at:

1-806-747-1882.

If you have technical questions about the operation of the calculator, call 1-806-741-2663. Please note that these are toll numbers, and collect calls are not accepted.

You may also write to the following address:

Texas Instruments Incorporated
Consumer Relations
P.O. Box 53
Lubbock, Texas 79408

For general information about using the calculator, please contact Consumer Relations before returning the calculator for service.

Returning Your Calculator for Service

A defective calculator will be either repaired or replaced with the same or comparable reconditioned model (at TI's option) when it is returned, postage prepaid, to a Texas Instruments Service Facility.

Texas Instruments cannot assume responsibility for loss or damage during incoming shipment. For your protection, carefully package the calculator for shipment and insure it with the carrier. Be sure to enclose the following items with your calculator:

- Your full return address
- Any accessories related to the problem
- A note describing the problem you experienced
- A copy of your sales receipt or other proof of purchase to determine warranty status

Please ship the calculator postage prepaid; COD shipments cannot be accepted.

In-Warranty Service

For a calculator covered under the warranty period, no charge is made for service.

Out-of-Warranty Service

A flat-rate charge by model is made for out-of-warranty service. To obtain the service charge for a particular model, call Consumer Relations **before** returning the product for service. (We cannot hold products in the Service Facility while providing charge information.)

Texas Instruments Service Facilities

U.S. Residents
(U.S. Postal Service)
Texas Instruments
P.O. Box 2500
Lubbock, Texas 79408

U.S. Residents
(other carriers)
Texas Instruments
2305 N. University
Lubbock, Texas 79408

Canadian Residents Only
Texas Instruments
41 Shelley Road
Richmond Hill, Ontario L4C 5G4

One-Year Limited Warranty

This Texas Instruments electronic calculator warranty extends to the original consumer purchaser of the product.

Warranty Duration: This calculator is warranted to the original consumer purchaser for a period of one (1) year from the original purchase date.

Warranty Coverage: This calculator is warranted against defective materials or workmanship. **This warranty is void if the product has been damaged by accident, unreasonable use, neglect, improper service, or other causes not arising out of defects in material or workmanship.**

Warranty Disclaimers: Any implied warranties arising out of this sale, including but not limited to the implied warranties of merchantability and fitness for a particular purpose, are limited in duration to the above one-year period. Texas Instruments shall not be liable for loss of use of the calculator or other incidental or consequential costs, expenses, or damages incurred by the consumer or any other user.

Some states do not allow the exclusion or limitations of implied warranties or consequential damages, so the above limitations or exclusions may not apply to you.

Legal Remedies: This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

Warranty Performance: During the above one-year warranty period, your TI calculator will be either repaired or replaced with a reconditioned comparable model (at TI's option) when the product is returned, postage prepaid, to a Texas Instruments Service Facility.

The repaired or replacement calculator will be in warranty for the remainder of the original warranty period or for six months, whichever is longer. Other than the postage requirement, no charge will be made for such repair or replacement.

Texas Instruments strongly recommends that you insure the product for value prior to mailing.

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