TEXAS INSTRUMENTS

TI-30X IIB
and
TI-30X IIS

Scientific Calculators

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General Information

Examples: See the last page of these instructions for keystroke examples that demonstrate many of the TI-30X II functions. Examples assume all default settings.

ON turns on the TI-30X II. 2nd [OFF] turns it off and clears the display.

APD™ (Automatic Power Down™) turns off the TI-30X II automatically if no key is pressed for about 5 minutes. Press ON after APD. The display, pending operations, settings, and memory are retained.

2-Line Display: The first line (**Entry Line**) displays an entry of up to 88 digits (or 47 digits for Stat or Constant Entry Line). Entries begin on the left; those with more than 11 digits scroll to the right. Press ◀ and ▶ to scroll the line. Press 2nd ◀ or 2nd ▶ to move the cursor immediately to the beginning or end of the entry.

The second line (**Result Line**) displays a result of up to 10 digits, plus a decimal point, a negative sign, a "**x10**" indicator, and a 2-digit positive or negative exponent. Results that exceed the digit limit are displayed in Scientific Notation.

Indicator	Definition
2nd	2nd function.
HYP	Hyperbolic function.
FIX	Fixed-decimal setting.
SCI, ENG	Scientific or Engineering Notation.
STAT	Statistical mode.
DEG, RAD, GRAD	Angle mode (degrees, radians, or gradients).
K	Constant mode is on.
x10	Precedes the exponent in Scientific or Engineering Notation.
↑ ↓	An entry is stored in memory before and/or after the active screen. Press ⊙ and ⊙ to scroll.
→ ←	An entry or menu displays beyond 11 digits. Press ◀ or ▶ to scroll.

2nd Functions: 2nd displays the **2nd** indicator, and then selects the 2nd function (printed above keys) of the next key pressed. For example, 2nd [√] 25) ENTER calculates the square root of 25 and returns the result, 5.

Menus: Certain TI-30X II keys display menus: MEMVAR, 2nd [RCL], STO▶, 2nd [STAT], STATVAR, 2nd [EXIT STAT], PRB, DRG, °'", 2nd [R▶P], 2nd [SCI/ENG], 2nd [FIX], and 2nd [RESET].

Press ◀ or ▶ to move the cursor and underline a menu item. To return to the previous screen without selecting the item, press CLEAR.

To select a menu item:
• Press ENTER while the item is underlined, or
• For menu items followed by an argument value, enter the argument value while the item is underlined. The item and the argument value are displayed on the previous screen.

Previous Entries ⊙ ⊙

After an expression is evaluated, use ⊙ and ⊙ to scroll through previous entries, which are stored in the TI-30X II memory. You cannot retrieve previous entries while in **STAT** mode. You can edit a previous entry and press ENTER to evaluate the new expression.

Last Answer 2nd[ANS]

The most recently calculated result is stored to the variable **Ans**. **Ans** is retained in memory, even after the TI-30X II is turned off. To recall the value of **Ans**:
• Press 2nd [ANS] (**Ans** displays on the screen), or
• Press any operations key (+, −, x², etc.) as the first part of an entry. **Ans** and the operator are both displayed.

Order of Operations

The TI-30X II uses EOS™ (Equation Operating System) to evaluate expressions.

1st	Expressions inside parentheses.
2nd	Functions that need a **)** and precede the argument, such as **sin**, **log**, and all **R↔P** menu items.
3rd	Fractions.
4th	Functions that are entered after the argument, such as **x²** and angle unit modifiers (° ' " ʳ ᵍ).
5th	Exponentiation **(^)** and roots (ˣ√).
6th	Negation (⁻).
7th	Permutations (**nPr**) and combinations (**nCr**).
8th	Multiplication, implied multiplication, division.
9th	Addition and subtraction.
10th	Conversions (A $\mathbf{^b/_c}$↔$\mathbf{d/_e}$, F↔D, ▶DMS).
11th	ENTER completes all operations and closes all open parentheses.

Clearing and Correcting

CLEAR	Clears an error message.
	Clears characters on entry line.
	Moves the cursor to last entry in history once display is clear.
DEL	Deletes the character at the cursor. Deletes all characters to the right when you hold down DEL; then, deletes 1 character to the left of the cursor each time you press DEL.
2nd [INS]	Inserts a character at the cursor.
2nd [CLRVAR]	Clears all memory variables.
2nd [STAT] CLRDATA	Clears all data points without exiting **STAT** mode.
2nd [EXIT STAT] **Y**	Clears all data points and exits **STAT** mode.
2nd [RESET] **Y** or ON & CLEAR	Resets the TI-30X II. Returns unit to default settings; clears memory variables, pending operations, all entries in history, and statistical data; clears constant mode and **Ans**.

Fractions Aᵇ/c 2nd[F↔D] 2nd[Aᵇ/c↔d/e]

Fractional calculations can display fractional or decimal results. Results are automatically simplified.
• Aᵇ/c enters a fraction. Press Aᵇ/c between whole number, numerator, and denominator. The unit, numerator, and denominator must be positive integers.
• 2nd [F↔D] converts between fractions and decimals.
• 2nd [Aᵇ/c↔d/e] converts between mixed numbers and simple fractions.

Pi π

π=3.141592653590 for calculations.
π=3.141592654 for display.

Angle Modes DRG °'"

DRG displays a menu to specify the Angle mode as degrees, radians, or gradients.

°'" displays a menu to specify the Angle unit modifier— degrees (°), radians (ʳ), gradients (ᵍ), or DMS (° ' "). It also lets you convert an angle to DMS Notation (▶DMS).

To set the Angle mode for any part of an entry:
• Select the Angle mode. Entries are interpreted and results displayed according to the Angle mode, or

• Select a unit modifier (° ' ") for any part of an entry. Entries with unit modifiers are interpreted accordingly, overriding the Angle mode.

To convert an entry:
• Set the Angle mode to the unit you want to convert to. Then use a unit modifier to designate the unit to convert from. (Angles of trigonometric functions convert values inside parentheses first.), or
• Select ▶DMS, which converts an entry to DMS (° ' ") Notation.

Trigonometry SIN COS TAN 2nd[SIN⁻¹][COS⁻¹][TAN⁻¹]

Enter trigonometric functions (sin, cos, tan, sin⁻¹, cos⁻¹, tan⁻¹), just as you would write them. Set the desired Angle mode before starting trigonometric calculations.

Hyperbolics 2nd[HYP]

2nd [HYP] displays the **HYP** indicator and accesses the hyperbolic function of the next trigonometry key that you press. Angle modes do not affect hyperbolic calculations.

Logarithms LOG LN 2nd[10ˣ][eˣ]

LOG yields the common logarithm of a number.
LN yields the logarithm of a number to the base e (e=2.819291929).
2nd [10ˣ] raises 10 to the power you specify.
2nd [eˣ] raises e to the power you specify.

Rectangular↔Polar 2nd[R▶P]

2nd [R▶P] displays a menu to convert rectangular coordinates (x,y) to polar coordinates (r,θ) or vice versa. Set Angle mode, as necessary, before starting calculations.

Constants 2nd[K]

2nd [K] turns Constant mode on and lets you define a constant.

To store an operation to **K** and recall it:
1. Press 2nd[K].
2. Enter any combination of numbers, operators, and/or values, up to 44 characters, beginning with an operator.
3. Press ENTER to save the operation. **K** displays in the indicator line.
4. Each subsequent time you press ENTER, the TI-30X II recalls the stored operation and applies it to the last answer or the current entry.

Press 2nd [K] again to turn Constant mode off.

Memory MEMVAR STO▶ 2nd[RCL][CLRVAR]

The TI-30X II has 5 memory variables—**A**, **B**, **C**, **D**, and **E**. You can store a real number or an expression that results in a real number to a memory variable.
• MEMVAR accesses the menu of variables.
• STO▶ lets you store values to variables.
• 2nd [RCL] recalls the values of variables.
• 2nd [CLRVAR] clears all variable values.

Notation 2nd[FIX] 2nd[SCI/ENG] 2nd[EE]

2nd [FIX] displays the **Decimal Notation** mode menu. These modes affect *only* the display of results. **F** (default) restores standard notation (floating-decimal) format. **0123456789** sets decimal places to *n* (0–9), retaining numeric notation mode format.

2nd [SCI/ENG] displays the **Numeric Notation** mode menu. These modes affect *only* the display of results.
• FLO (default): Floating Notation, with digits to the left and right of the decimal
• SCI: Scientific Notation
• ENG: Engineering Notation (exponent is a multiple of 3)

2nd [EE] enters a value in **Scientific Notation**, regardless of the numeric notation mode. Press ⊟ before entering a negative exponent.

Statistics 2nd [STAT] [EXIT STAT] [DATA] [STATVAR]

1-VAR analyzes statistical data from 1 data set with 1 measured variable, *x*. **2-VAR** stats analyzes paired data from 2 data sets with 2 measured variables—*x*, the independent variable, and *y*, the dependent variable. You can enter up to 42 data sets.

To define statistical data points:
1. Press [2nd] [STAT]. Select **1-VAR** or **2-VAR** and press [ENTER]. The **STAT** indicator displays.
2. Press [DATA].
3. Enter a value for **X₁**.
4. Press ⊝.
   - In **1-VAR** stat mode, enter the frequency of occurrence (**FRQ**) of the data point. **FRQ** default=1. If **FRQ**=0, the data point is ignored.
   - In **2-VAR** stat mode, enter the value for **Y₁** and press [ENTER].
5. Repeat steps 3 and 4 until all data points are entered. You must press [ENTER] or ⊝ to save the last data point or **FRQ** value entered. If you add or delete data points, the TI-30X Ⅱ automatically reorders the list.
6. When all points and frequencies are entered:
   - Press [STATVAR] to display the menu of variables (see table for definitions) and their current values, or
   - Press [DATA] to return to the blank **STAT** screen. You can do calculations with data variables ($\overline{x}$, $\overline{y}$, etc.). Select a variable from the [STATVAR] menu and then press [ENTER] to evaluate the calculation.
7. When finished:
   - Press [2nd] [STAT] and select **CLRDATA** to clear all data points without exiting **STAT** mode, or
   - Press [2nd] [EXIT STAT] [ENTER] to clear all data points, variable and **FRQ** values, and to exit **STAT** mode (**STAT** indicator turns off).

Variables	Definition
n	Number of *x* or (*x*,*y*) data points.
$\overline{x}$ or $\overline{y}$	Mean of all *x* or *y* values.
Sx or Sy	Sample standard deviation of *x* or *y*.
σx or σy	Population standard deviation of *x* or *y*.
Σx or Σy	Sum of all *x* or *y* values.
Σx² or Σy²	Sum of all x^2 or y^2 values.
Σxy	Sum of (*x*✳*y*) for all *xy* pairs.
a	Linear regression slope.
b	Linear regression *y*-intercept.
r	Correlation coefficient.
x′ (2-VAR)	Uses *a* and *b* to calculate predicted *x* value when you input a *y* value.
y′ (2-VAR)	Uses *a* and *b* to calculate predicted *y* value when you input an *x* value.

Probability [PRB]

nPr	Calculates the number of possible **permutations** of *n* items taken *r* at a time, given *n* and *r*. The order of objects is important, as in a race.
nCr	Calculates the number of possible **combinations** of *n* items taken *r* at a time, given *n* and *r*. The order of objects is not important, as in a hand of cards.
!	A **factorial** is the product of the positive integers from 1 to *n*. *n* must be a positive whole number ≤ 69.
RAND	Generates a random real number between 0 and 1. To control a sequence of random numbers, store an integer (seed value) ≥ 0 to **rand**. The seed value changes randomly every time a random number is generated.
RANDI	Generates a random integer between 2 integers, *A* and *B*, where *A* ≤ **RANDI** ≤ *B*. Separate the 2 integers with a comma.

Errors

ARGUMENT — A function does not have the correct number of arguments.

DIVIDE BY 0 —
- You attempted to divide by 0.
- In statistics, n=1.

DOMAIN — You specified an argument to a function outside the valid range. For example:
- For x√: x = 0 or y < 0 and x not an odd integer.
- For yx: y and x = 0; y < 0 and x not an integer.
- For √x: x < 0.
- For LOG or LN: x ≤ 0.
- For TAN: x = 90°, -90°, 270°, -270°, 450°, etc.
- For SIN⁻¹ or COS⁻¹: |x| > 1.
- For nCr or nPr: n or r are not integers ≥ 0.
- For x!: x is not an integer between 0 and 69.

EQUATION LENGTH ERROR — An entry exceeds the digit limits (88 for Entry Line and 47 for Stat or Constant Entry lines); for example, combining an entry with a constant that exceeds the limit.

FRQ DOMAIN — **FRQ** value (in **1-VAR** stats) < 0 or >99, or not an integer.

OVERFLOW — |θ| ≥ 1E10, where θ is an angle in a trig, hyperbolic, or **R▸Pr(** function.

STAT —
- Pressing [STATVAR] with no defined data points.
- When not in STAT mode, pressing [DATA], [STATVAR], or [2nd] [EXIT STAT].

SYNTAX — The command contains a syntax error: entering more than 23 pending operations or 8 pending values; or having misplaced functions, arguments, parentheses, or commas.

Battery Replacement

1. Using a small Phillips screwdriver, remove screws from back case.
2. Remove protective cover. Starting from the bottom, carefully separate front from back. Caution: Be careful not to damage any internal parts.
3. Using a small Phillips screwdriver (if necessary), remove old battery; replace with new one.

   Caution: Avoid contact with other TI-30X Ⅱ components while changing the battery.
4. If necessary, press [ON] and [CLEAR] at the same time to reset the TI-30X Ⅱ (clears memory and all settings).

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

In Case of Difficulty

Review instructions to be certain calculations were performed properly.

Press [ON] and [CLEAR] at the same time. This clears all memory and settings.

Check the battery to ensure that it is fresh and properly installed.

Change the battery when:
- [ON] does not turn the unit on, or
- The screen goes blank, or
- You get unexpected results.

To continue using the **TI-30X ⅡS (Battery/Solar)*** until you can change the battery:
1. Expose the solar panel to brighter light.
2. Press [ON] and [CLEAR] at the same time to reset the calculator. This clears all settings and memory.

* Operates in well-lit areas using solar cell. Operates in other light settings using battery.

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For general questions, contact Texas Instruments Customer Support:

phone:	**1-800-TI-CARES**
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Arrow keys ⊙ ⊙ ◉ ◉

▲ ▼	1 + 1 ENTER	1+1 ↑ 2. DEG
	2 + 2 ENTER	2+2 ↑ 4. DEG
	3 + 3 ENTER	3+3 ↑ 6. DEG
	4 + 4 ENTER	4+4 ↑ 8. DEG
	⊙ ⊙ ⊙	2+2 ↕ DEG
◄ ►	2nd ◉ + 2 ENTER	2+2+2 ↑ 6. DEG

2nd [ANS]

ANS	3 × 3 ENTER	3*3 ↑ 9. DEG
	× 3 ENTER	Ans*3 ↑ 27. DEG
	3 2nd [ˣ√⁻] 2nd [ANS] ENTER	3ˣ√Ans ↑ 3. DEG

+ − × ÷ (−) ( ) ENTER

+ × ÷ −	6 0 + 5 × 1 2 ENTER	60+5*12 ↑ 120. DEG
(−)	1 + (−) 8 + 1 2 ENTER	1+⁻8+12 ↑ 5. DEG
( )	2nd [√⁻] 4) ENTER	√(4) ↑ 2. DEG
	4 × (2 + 3) ENTER	4*(2+3) ↑ 20. DEG
	4 (2 + 3) ENTER	4(2+3) ↑ 20. DEG

2nd [%]

| % | 5 2nd [%] × 2 5 0 ENTER | 5%*250 ↑
 12.5
 DEG |

Aᵇ/ᵈ   2nd [Aᵇ/ᶜ↔ᵈ/ₑ]   2nd [F↔D]

$-6\,{}^4\!/_6 + 2 = -4\,{}^2\!/_3$

| A ᵇ/ᶜ | (−) 6 Aᵇ/ᶜ 4 Aᵇ/ᶜ 6 + 2 ENTER | ⁻6⌐4⌐6 + 2 ↑
 -4⌐2/3
 DEG |

$1/2 × \pi = 1.570796327$

| A ᵇ/ᶜ | 1 Aᵇ/ᶜ 2 × π ENTER | 1⌐2*π ↑
 1.570796327
 DEG |

$9/2 \rightarrow 4\,{}^1\!/_2$

| A ᵇ/ᶜ↔ᵈ/ₑ | 9 Aᵇ/ᶜ 2 2nd [Aᵇ/ᶜ↔ᵈ/ₑ] ENTER | 9⌐2▸Aᵇ/ᶜ↔ᵈ/ₑ ↑
 4⌐1/2
 DEG |

$4\,{}^1\!/_2 \rightarrow .5$

| F↔D | 4 Aᵇ/ᶜ 1 Aᵇ/ᶜ 2 2nd [F↔D] ENTER | 4⌐1⌐2▸F↔D ↑
 4.5
 DEG |

x⁻¹   x²   2nd [√⁻]   ^   2nd [ˣ√⁻]

x⁻¹	2 × (1 Aᵇ/ᶜ 2) x⁻¹ ENTER	2*(1⌐2)⁻¹ ↑ 4. DEG
x²	2 x² + 2 ENTER	2²+2 ↑ 6. DEG
√	2nd [√⁻] 2 5) ENTER	√(25) ↑ 5. DEG
^	5 ^ 3 ENTER	5^3 ↑ 125. DEG
ˣ√	3 2nd [ˣ√⁻] 8 ENTER	3 ˣ√ 8 ↑ 2. DEG

LOG   LN   2nd [10ˣ]   2nd [eˣ]

LOG	LOG 1) ENTER	log(1) ↑ 0. DEG
LN	LN 1 5) × 2 ENTER	ln(15)*2 ↑ 5.416100402 DEG
10ˣ	2nd [10ˣ] 2) − 1 0 x² ENTER	10^(2)−10² ↑ 0. DEG
eˣ	2nd [eˣ] . 5) ENTER	e^(.5) ↑ 1.648721271 DEG

$e = 2.71828182846$

π

| π | 2 × π ENTER | 2*π ↑
 6.283185307
 DEG |

DRG   °'"

DRG	CLEAR	↑ DEG
	DRG ◉	DEG RAD GRD DEG
	ENTER	↑ RAD
°'"	SIN 30 °'"	°'" r g → _ RAD
	ENTER) ENTER	sin(30°) →↑ 0.5 RAD
DRG	CLEAR DRG ◉	DEG RAD GRD RAD
°'"	ENTER 2 π °'" ◉ ◉ ◉	°'" r g → DEG
	ENTER ENTER	2πʳ ↑ 360 DEG
°'"	1 . 5 °'" ◉	← ▸DMS DEG
	ENTER ENTER	1.5 ▸DMS ↑ 1°30'0" DEG

SIN   COS   TAN
2nd [SIN⁻¹]   2nd [COS⁻¹]   2nd [TAN⁻¹]

TAN	TAN 45) ENTER	tan(45) ↑ 1. DEG
TAN⁻¹	2nd [TAN⁻¹] 1) ENTER	tan⁻¹(1) ↑ 45 DEG
COS	5 × COS 75) ENTER	5*cos(75) →↑ 1.294095226 DEG

2nd [HYP]

DRG	DRG ◉	DEG RAD GRD DEG
HYP	ENTER 2nd [HYP] SIN 5) + 2 ENTER	sinh(5)+2 ↑ 76.20321058 DEG
	⊙ 2nd [HYP] 2nd [SIN⁻¹] ENTER	sinh⁻¹(5)+2 ↑ 4.312438341 DEG

2nd [R↔P]

R↔P	2nd [R↔P]	R▸Pr R▸Pθ → DEG
	5 2nd [,] 30) ENTER	R▸Pr (5,30) ↑ 30.41381265 DEG
	⊙ 2nd [R↔P] ◉	R▸Pr R▸Pθ → DEG
	ENTER ENTER	R▸Pθ (5,30) ↑ 80.53767779 DEG

2nd [K]

K		
	2nd [K]	**K=** DEG
	× 2 + 3 ENTER	**K=*2+3** DEG K
	4 ENTER	**4*2+3** ▲ **11.** DEG K
	6 ENTER	**6*2+3** ▲ **15.** DEG K
	2nd [K] 2nd [K] CLEAR x^2 ENTER	**K=^{2}** DEG K
	5 ENTER	**5^2** ▲ **25.** DEG K
	2 0 ENTER	**20^2** ▲ **400.** DEG K
	2nd [K] 1 + 1 ENTER	**1+1** ▲ **2.** DEG

2nd [CLRVAR] STO▸ 2nd [RCL] MEMVAR

CLRVAR	2nd [CLRVAR]	DEG
STO ▸	1 5 STO▸	**→A B C D E→** DEG
	ENTER	**15→A** ▲ **15.** DEG
	π	**π** ▲ DEG
RCL	2nd [RCL]	**A B C D E** **15.** DEG
	ENTER x^2 ENTER	**π15^2** ▲ **706.8583471** DEG
	STO▸ ▶	**→A B C D E→** DEG
	ENTER	**Ans→B** ▲ **706.8583471** DEG
MEM VAR	MEMVAR ▶	**A B C D E** **706.8583471** DEG
	ENTER ÷ 4 ENTER	**B/4** ▲ **176.7145868** DEG

2nd [FIX] 2nd [SCI/ENG] 2nd [EE]

FIX		
	π ENTER	**π** ▲ **3.141592654** DEG
	2nd [FIX]	**F0123456789**
	2	**π** ▲ **3.14** FIX DEG
	2nd [FIX] ·	**π** ▲ **3.141592654** DEG
SCI/ENG	1 2 3 4 5	**12345** ▲ DEG
	2nd [SCI/ENG] ▶	**FLO SCI ENG** DEG
	ENTER ENTER	**12345** ▲ **1.2345 x10 ^{04}** SCI DEG
	2nd [SCI/ENG] ▶	**FLO SCI ENG**
	ENTER	**12345** ▲ **12.345 x10 ^{03}** ENG DEG
EE	1 . 2 3 4 2nd [EE] (−) 6 5 ENTER	**1.234 E⁻65** ▲ **12.34 x10 $^{-66}$** ENG DEG

2nd [STAT] DATA STATVAR 2nd [EXIT STAT]

1-VAR: {45, 55, 55, 55}

STAT	2nd [STAT]	**1–VAR 2–VAR→** DEG
DATA	ENTER DATA 4 5	**X₁=45** ↕ STAT DEG
	⊝	**FRQ=1** ↕ STAT DEG
	⊝ 5 5 ⊝	**X₂=55** ↕ STAT DEG
	⊝ 3 ENTER	**FRQ=3** ↕ **3.** STAT DEG
STAT VAR	STATVAR ▶ ▶ ▶	**n x̄ Sx σx →** **4.330127019** STAT DEG
	× 2 ENTER	**σx*2** **8.660254038** STAT DEG
STAT	2nd [STAT] ◀	**← CLRDATA** STAT DEG
	ENTER	STAT DEG

2-VAR: (45,30); (55,25); x′(45)

STAT	2nd [STAT] ▶	**1–VAR 2–VAR→** DEG
DATA	ENTER DATA 4 5	**X₁=45** ↕ STAT DEG
	⊝ 3 0	**Y₁=30** ↕ STAT DEG
	⊝ 5 5	**X₂=55** ↕ STAT DEG
	⊝ 2 5	**Y₂=25** ↕ STAT DEG
STAT VAR	⊝ STATVAR ◀ ◀	**← x′ y′** STAT DEG
	4 5) ENTER	**x′(45)** **15.** STAT DEG
EXIT STAT	2nd [EXIT STAT]	**EXIT ST: Y N** STAT DEG
	ENTER	DEG

PRB

nPr	8	8 ⬆ DEG	
	PRB	nPr nCr ! → DEG	
	3 ENTER	8 nPr 3 ⬆ 336. DEG	
nCr	5 2	52 ⬆ DEG	
	PRB ◮	nPr nCr ! → DEG	
	5 ENTER	52 nCr 5 ⬆ 2598960. DEG	
!	4	4 ⬆ DEG	
	PRB ◮ ◮	nPr nCr ! → DEG	
	ENTER ENTER	4! ⬆ 24. DEG	
STO▶rand	5 STO▶ ◭	← rand 660000. DEG	
	ENTER	5→rand ⬆ 5. DEG	
RAND	PRB ◭ ◭	← RAND RANDI DEG	
	ENTER ENTER	RAND ⬆ .000093165 DEG	
RANDI	PRB ◭	← RAND RANDI DEG	
	3 2nd [,] 5 [)] ENTER	RANDI(3,5) ⬆ 4. DEG	

TEXAS INSTRUMENTS