

TI-30Xa/30Xa Solar, English

## TI-30Xa

and

# TI-30Xa SOLAR

**Basic Operations** 

#### Scientific Calculators

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#### **Basic Operations**

#### TI-30Xa (battery)

- ON/C turns on the TI-30Xa.
- OFF turns off the TI-30Xa and clears display, settings, and pending operations, but not memory.
- APD<sup>TM</sup> (Automatic Power Down<sup>TM</sup>) turns off the TI-30Xa automatically if no key is pressed for about 5 minutes, but does not clear display, settings, pending operations, or memory.

**Note:** ON/C after APD retrieves display, pending operations, settings, and memory.

#### TI-30Xa Solar

- To turn on the TI-30Xa Solar, expose the solar panel to light and press <u>ON/AC</u>: **Note:** Always press <u>ON/AC</u> to clear the calculator because memory and display may contain incorrect numbers.
- To turn off the TI-30Xa Solar, cover the solar panel with the slide case.

#### 2nd Functions

2nd functions are printed above the keys. 2nd selects the 2nd function of the next key pressed. For example, 2 2nd  $[x^3]$  calculates the cube of 2.

## Results

The calculator can display up to 10 digits plus a minus sign (-9,999,999,999 through 9,999,999) and a 2-digit exponent. Results with more than 10 digits display in scientific notation.

<b>Basic Arithmet</b>	ic	
+ - × ÷	60 + 5 × 12 =	120.
	Completes all pending operation With constant $(\kappa)$ , repeats the operation and value.	ons.
+2-	Changes sign of value just ent	ered.
	1 + 8 += + 12 =	5.
	Parenthetical expression (up to open).   closes all open parentheses.	0 15
π	Pi is calculated with 12 digits (3.14159265359), displayed w digits (3.141592654).	ith 10
	2 × π = 6.28318	35307

Percents	
Percentage (5% of 250)	
250 × 5 2nd [%]	0.05
≡	12.5
Ratio (Ratio of 250 to 5)	
250 ÷ 5 2nd [%]	0.05
	5000.
Add-On (5% add-on of 250)	
250 + 5 2nd [%]	12.5
	262.5
Discount (5% discount of 250)	
250 — 5 (2nd) [%]	12.5
=	237.5

Fractions		
bab/c c	Enters a proper or improper fraction, $\mathbf{b/c}$ ( $\mathbf{b} \leq 6$ digits, $\mathbf{c} \leq 3$ digits). When possible, improper fractions are displayed as mixed numbers.	
	3 a b/c 4 × 3 =	3
	Single-variable functions d decimal results.	isplay
	1 a 1/c 2 x²	0.25
a a 160 b a 160 c	Enters the mixed fraction $\mathbf{a}$ ( $\mathbf{a}$ , $\mathbf{b}$ , $\mathbf{c} \le 3$ digits each, wit digits $\le 8$ ).	
	6 a ½ 4 a ½ 6	6_4_6 6_2_3
2nd [d/c]	Toggles display between a number and an improper fr	
	30 (a)/c) 4 (2nd) (d/c) (2nd) (d/c) (2nd) (d/c)	30
2nd [F → D]	Toggles display between fi decimal.	raction and
	55 a½ 24 2nd [FD] 2.3 2nd [FD]	55 _ 24 291666667 2 _ 7 _ 24

If a result would overflow or if fixed decimal is 0, no fraction to decimal conversion occurs. It is not an error. Denominator must be a whole number ≤999.

Powers and Roots		
8 1/x + 4 1/x =	0.375	
6 x <sup>2</sup> + 2 =	38.	
256 🗤 + 4 🔻 =	18.	
2 2nd [x3] + 2 =	10.	
8 2nd [ <sup>3</sup> √x] + 4 =	6.	
5 yx 3 =	125.	
8 2nd [¾y] 3 =	2.	
	8 f(x) + 4 f(x) = 6 x² + 2 = 256 √x + 4 √x = 2 2nd (x³ + 2 = 8 2nd (∜x) + 4 = 5 yx 3 =	

Logarithm	ic Functions	
LOG	15.32 LOG	1.185258765
	+ 12.45 LOG =	2.280428117
2nd [10 <sup>x</sup> ]	2 2nd [10 <sup>x</sup> ] - 10 x <sup>2</sup> =	0.
LN	15.32 LN	2.729159164
	+ 12.45 LN =	5.250879787
2nd [e <sup>x</sup> ]	.693 [2nd] [e <sup>x</sup> ]	1.999705661
	+ 1 =	2.999705661

(e=2.71828182846)

Angle Units			
DRG	Cycles angle-unit setting between degrees, radians, and grads without affecting displayed number.		
2nd [DRG+]	Cycles (converts) angle-unit setting between degrees, radians, and grads for display, entry, and calculation.		
	45	DEG	45
	2nd [DRG+]	RAD	0.785398163
	2nd [DRG+]	GRAD	50.
	2nd [DRG+]	DEG	45.

#### **DMS**

Enter DMS (Degrees/Minutes/Seconds) values as **D.MMSSs**, using 0s as necessary:

D	degrees (0–7 digits)
	decimal-point separator
MM	minutes (must be 2 digits)
SS	seconds (must be 2 digits)
S	fractional part of a second

For example, enter 48°5'3.5" as 48.05035.

**Note:** Before using a DMS value in a calculation, you must convert it to decimal with [2nd] [DMS-DD].

2nd [DMS-DD]	Interprets display as DMS and converts it to decimal.	
	30.09090 [2nd] [DMS+DD]	30.1525
2nd [DD-DMS]	Temporarily displays cur DMS.	rent value as
	30.1525 [2nd [DD-DMS]	30°09'09"0

## Rectangular to Polar

[2nd] [R-P] converts rectangular coordinates (x,y) to polar coordinates  $(r,\theta)$ .

Convert rectangular coordinates (10,8) to polar.

DRG (if necessary)	DEG	
10 2nd [x=y] 8	DEG	8
[2nd][R r] (display $r$ )	DEG r	12.80624847
$[2nd][X = Y]$ (display $\theta$ )	DEG	38.65980825

# Polar to Rectangular

[P-R] converts polar coordinates  $(r,\theta)$  to rectangular coordinates (x,y).

Convert polar coordinates (5,30) to rectangular.

DRG (if necessary)	DEG	
5 [2nd] [X=y] 30	DEG	30
2nd [P►R] (display x)	DEG x	4.330127019
[2nd][X=y] (display $y$ )	DEG	2.5

# **Trigonometric Functions**

Before using the trigonometric functions ([SIN], [COS], [TAN], [2nd] [SIN-1], [2nd] [COS-1], or [2nd] [TAN-1]), select DEG, RAD, or GRAD with [DRG]. Note: Before using a DMS value in a calculation, you must convert it to decimal with [2nd] [DMS-DD].

DRG (if necessary)	DEG	
90 SIN	DEG	1.
- 30 COS	DEG	0.866025404
	DEG	0.133974596
1 [2nd] [SIN-1]	DEG	90.
5 =	DEG	89.5

## **Hyperbolic Functions**

To access hyperbolic functions, press HYP and then the function (HYP) SIN, HYP COS, HYP TAN, HYP [2nd] [SIN-1], HYP [2nd] [COS-1], HYP [2nd] [TAN-1]).

**Note:** DEG, RAD, or GRAD does not affect hyperbolic calculations.

5 HYP SIN	74.20321058
+ 2 =	76.20321058
5 HYP 2nd [SIN-1]	2.312438341
+ 2 =	4.312438341

One-Variable Statistics		
2nd [CSR]	Clears all statistical data.	
Σ+	Enters a data point.	
2nd [Σ-]	Removes a data point.	
2nd [FRQ]	Adds or removes multiple occurrences of a data point.	
	Enter data point, press $[2nd]$ [FR0], enter frequency (1–99), press $[2nd]$ to add or $[2nd]$ [ $[2nd]$ to remove data points.	
2nd [Σx]	Sum.	
2nd $[\Sigma x^2]$	Sum of squares.	
2nd [x]	Mean.	
2nd [σxn]	Population standard deviation ( <i>n</i> weighting).	
2nd [σxn-1]	Sample standard deviation ( $n$ –1 weighting).	
2nd [n]	Number of data points.	

Find the sum, mean, population standard deviation, and sample standard deviation for the data set: 45, 55, 55, 55, 60, 80. The last data point is erroneously entered as 8, removed with  $[2nd] [\Sigma-]$ , and then correctly entered as 80.

2nd [CSR] (if STAT is displayed)		
45 <u>Σ</u> +	n=	1
55 (2nd [FRQ] 3 (Σ+)	n=	4
60 <u>Σ</u> +	n=	5
8 <u>Σ</u> +	n=	6
8 2nd [Σ-]	n=	5
80 Σ+	n=	6
$[2nd][\Sigma x]$ (sum)		350.
2nd [x] (mean)		58.33333333
$[2nd]$ $[\sigma \times n]$ (deviation, $n$ weighting)		10.67187373
$[2nd]$ $[\sigma xn-1]$ (deviation, $n-1$ weighting	ng)	11.69045194

#### **Probability**

A **combination** is an arrangement of objects in which order is not important, as in a hand of cards. [2nd] [nCr] calculates the number of possible combinations of n items taken r at a time.

Calculate the number of 5-card poker hands that can be dealt from a deck of 52 cards.

52 2nd [nCr] 5 = 2598960.

A **permutation** is an arrangement of objects in which the order is important, as in a race. [2nd] [nPr] calculates the number of possible permutations of n items taken r at a time.

Calculate the number of possible permutations for the 1st-, 2nd-, and 3rd-place finishers (no ties) in an 8-horse race.

8 2nd [nPr] 3 = 336.

A **factorial** is the product of the positive integers from 1 to n. (n must be a positive whole number  $\leq$  69).

Using the digits 1, 3, 7, and 9 only one time each, how many 4-digit numbers can you form?

4 [2nd] [x!] 24.

Clearing and	Correcting
ON/C (battery) CE/C (solar)	Clears value (before operation key) and κ, but not м1, м2, м3, or stat.
ON/C ON/C (battery) CE/C CE/C (solar	Clears display, errors, all pending operations and $\kappa$ , but not $m_1$ , $m_2$ , $m_3$ , or ) STAT.
OFF ON/C (battery)	Clears display, errors, all pending operations, $\kappa$ , and stat, but not M1, M2, and M3. Sets DEG angle units, floating-decimal format.
ON/AC (solar)	Clears display, errors, all pending operations, K, STAT, M1, M2, and M3. Sets DEG angle units, floating-decimal format.
<b>—</b>	Deletes right-most character in display.
$0 \overline{\text{STO}} \; n$	Clears memory $n$ .
2nd [FL0]	Clears sci or ENG notation.
2nd [FIX] .	Clears FIX notation.
2nd [CSR]	Clears all statistical data.

# **Constants (Repeated Operations)**

A constant contains an operation and a value. To establish a constant, press  $[2nd] [\kappa]$  after entering the operation and value. [3mm] repeats the calculation. Another operation, [3mm] (solar), [3mm] (solar), or [3mm] (battery) clears [3mm] (battery) clears [3mm]

8 + 7 2nd [K]	К	7.
	K	15.
5 =	K	12.
6.6 =	K	13.6

## Memory

The calculator has 3 memories. When a memory contains a number other than 0, M1, M2, or M3 displays. To clear a single memory, press 0  $\boxed{\texttt{STO}}$  1, 0  $\boxed{\texttt{STO}}$  2, or 0  $\boxed{\texttt{STO}}$  3. To clear all 3 memories (solar only), press  $\boxed{\texttt{ON/AC}}$ .

STO n	Stores displayed value in memory $n$ , replacing current value.		
	23 STO 1	M1	23.
	+ 2 =	M1	25.
RCL n	Recalls value in I	memory $n$ .	
	(continued)		
	RCL 1	M1	23.
	+ 3 =	M1	26.
2nd [SUM] $n$	Adds displayed v	alue to me	mory $n$ .
	(continued)		
	4 2nd [SUM] 1	M1	4.
	RCL 1	M1	27.
2nd [EXC] <i>n</i>	Exchanges display values.	ayed and n	nemory
	(continued)		
	3 ⋉ 5 ≡	M1	15.
	2nd [EXC] 1	M1	27.
	2nd [EXC] 1	M1	15.

Order of Operations		
1st	Expressions inside parentheses.	
2nd	Single-variable functions that perform the calculation and display the result immediately (square, square root, cube, cube root, trigonometric, factorial, logarithmic, percent, reciprocals, angle conversions).	
3rd	Combinations and permutations.	
4th	Exponentiation and roots.	
5th	Multiplication and division.	
6th	Addition and subtraction.	

The TI-30Xa uses AOS™ (Algebraic Operating System). It stores up to 4 pending operations (2 when **STAT** is displayed).

= completes all operations.

7th

Notation			
2nd [SCI]	Selects scientific not	ation.	
	12345 =		12345.
	2nd [SCI]	SCI	1.2345 <sup>04</sup>
2nd [ENG]	Selects engineering is a multiple of 3).		
	2nd [ENG]	ENG	12.345 <sup>03</sup>
2nd [FLO]	Restores standard no decimal) format.	otation	(floating-
2nd [FIX] n	Sets decimal places retaining notation for (continued)		,,
	2nd [FIX] 2	FIX	12.35 03
	2nd [FIX] 4	FIX	12.3450 <sup>03</sup>
2nd [FIX] .	Removes fixed-decin	nal setti	ing.
EE	Enters exponent.	•	

You can enter a value in floating-decimal, fixed-decimal, or scientific notation, regardless of display format. Display format affects only results.

To enter a number in scientific notation:

- 1. Enter up to 10 digits for base (mantissa). If negative, press [+□-] after entering the mantissa.
- 2. Press EE.
- 3. Enter 1 or 2 digit exponent. If negative, press +== either before or after entering exponent.

Display Indicators		
A value other than 0 in M1, M2, or M3.		
Calculator will access 2nd function (printed above key) of next key pressed.		
Calculator will access hyperbolic function of next key pressed.		
Scientific or engineering notation.		
Fixed-decimal setting.		
Statistical register contains data.		
Specifies angle-unit setting (degrees, radians, or grads). When you turn on the calculator, angle units are degrees.		
x-coordinate of polar to rectangular conversion.		
<i>r</i> -coordinate of rectangular to polar conversion.		
1 or more open parentheses.		
Error has occurred. Clear calculator and begin again.		
Constant is active.		

#### **Error Conditions**

- Number, result, or memory sum x, where  $|x| > 9.99999999999 \times 10^{99}$ .
- More than 4 pending operations (2 when STAT is displayed) or more than 15 open parentheses per pending operation.
- For x!: x not an integer between 0 and 69.
- For  $y^x$ : y and x = 0 or y < 0 and x not an integer.
- For  $\sqrt[x]{y}$ : x = 0 or y < 0 and x not an odd integer.
- Dividing by 0.
- For  $\sqrt{x}$ : x < 0.
- For LOG or LN: x < 0.
- For TAN: x=90°, -90°, 270°, -270°, 450°, etc.
- For SIN<sup>-1</sup> or COS<sup>-1</sup>: |x| > 1.
- For TANH<sup>-1</sup>:  $|x| \ge 1$ .
- For R►P: x or y has exponent > 63.
- For nCr or nPr: n or r are not integers ≥ 0.
- More than 9999 statistical data points.
- Statistical data point x, where  $|x| \ge 1E64$ .
- 2nd [Σ-] to remove the only data point.
- Calculating x̄, σxn, or σxn-1 with no data points or σxn-1 with one data point.
- [2nd] [CSR] with no data points.

## In Case of Difficulty

Review instructions to be certain calculations were performed properly.

#### TI-30Xa (battery)

If the display is blank, check for improperly installed batteries. Press ON/C and try again.

#### TI-30Xa Solar

If the display is blank, expose the solar panel to adequate light. Press  $\boxed{\text{ON/AC}}$  and try again.

# **Battery Replacement (TI-30Xa)**

- 1. Remove slide cover. Place calculator face down.
- Using a small Phillips screwdriver, remove screws from back case.
- Remove back case.
- 4. Remove discharged batteries.

**Caution:** Avoid contact with other calculator components while changing batteries.

- Install new batteries positive side up, as shown on diagram inside case.
- 6. Replace back case, and then replace screws.
- 7. Press OFF ON/C ON/C.

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

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

## **Battery Caution:**

- . Do not ingest battery, Chemical Burn Hazard.
- This product contains a coin or button cell battery. If the coin or button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death.
- Keep new and used batteries away from children.
- Always completely secure the battery compartment. If the battery compartment does not close securely, stop using the product, remove the batteries, and keep them away from children.
- If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.
- Call a local poison control center for treatment information.
- Even used batteries may cause severe injury or death.
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, heat above 140F (60C) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- Ensure the batteries are installed correctly according to polarity (+ and -).
- Do not mix old and new batteries, different brands or types of batteries, such as alkaline, carbon-zinc or rechargeable batteries.
- Risk of fire or explosion if battery is replaced by an incorrect type.
- Remove and immediately recycle or dispose of batteries from equipment not used for an extended period of time according to local regulations. Do NOT dispose of batteries in household trash or incinerate.

# TI Product, Service, and Warranty Information

#### TI Product and Services Information

For more information about TI products and services, contact TI by e-mail or visit the TI calculator home page on the world-wide web.

e-mail address: ti-cares@ti.com

internet address: http://www.ti.com/calc

#### **Service and Warranty Information**

For information about the length and terms of the warranty or about product service, refer to the warranty statement enclosed with this product or contact your local Texas Instruments retailer/distributor.