

TI-30Xa SOLAR School Edition

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Basic Operations

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. $\boxed{2nd}$ selects the 2nd function of the next key pressed. For example, 2 $\boxed{2nd}$ $[x^3]$ 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.

+ - × ÷	60 + 5 × 12 =	120.
_	Completes all pending operation With constant (K), repeats the operation and value.	ns.
_	Changes sign of value just ente	ered. 5.
	Parenthetical expression (up to open). closes all open parentheses.	15
_	Pi is calculated with 12 digits (3.14159265359), displayed widigits (3.141592654).	th 10
	2 × π = 6.28318	5307

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

Powers and Roots		
1/X	8 1/x + 4 1/x =	0.375
χ²	6 x ² + 2 =	38.
√X	256 √x + 4 √x =	18.
2nd [x3]	2 2nd [x3] + 2 =	10.
2nd [∛x]	8 2nd [∛x] + 4 =	6.
уx	5 yx 3 =	125.
2nd [¾y]	8 2nd [∜y] 3 =	2.

Logarithmic	Functions	
LOG	15.32 LOG	1.185258765
	+ 12.45 LOG =	2.280428117
2nd [10 ^x]	2 2nd [10 ^x] - 10 x ² =	0.
LN	15.32 LN	2.729159164
	+ 12.45 LN =	5.250879787
2nd [e ^x]	.693 [2nd] [e ^x]	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 dig its)
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 curre DMS.	ent value as
	30.1525 [2nd] [DD+DMS]	30°09'09"0

Rectangular to Polar

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

Convert rectangular coordinates (10,8) to polar.

DRG (if necessary)	DEG	
10 2nd [x=y] 8	DEG	8
2nd [R►P] (display r)	DEG r	12.80624847
2nd [X=y] (display θ)	DEG	38.65980825

Polar to Rectangular

2nd [P-R] converts polar coordinates (r,θ) 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 $[2nd]$ [FRQ], enter frequency (1–99), press $[\Sigma+]$ to add or $[2nd]$ $[\Sigma-]$ 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 Σ+	n=	5
8 <u>Σ</u> +	n=	6
8 [2nd] [Σ-]	n=	5
80 <u>Σ</u> +	n=	6
$[2nd] [\Sigma x] (sum)$		350.
2nd [x̄] (mean)		58.33333333
$[2nd]$ $[\sigma xn]$ (deviation, n weighting)		10.67187373
$[2nd]$ $[\sigma_{X}$ n-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.



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

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				
CE/C	Clears value (before operation key) and κ , but not m_1 , m_2 , m_3 , or stat.			
CE/C CE/C	Clears display, errors, all pending operations and κ , but not $M1$, $M2$, $M3$, or STAT.			
OFF ON/C (battery)	Clears display, errors, all pending operations, κ , and stat, but not M1, M2, and M3. Sets DEG angle units, floating-decimal format.			
ON/AC	Clears display, errors, all pending operations, K, STAT, M1, M2, and M3. Sets DEG angle units, floating-decimal format.			
0 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][K] after entering the operation and value. [=] repeats the calculation. Another operation, [ON/AC] or [CE/C], clears K.

8 + 7 2nd [K]	К	7.
	K	15.
5 =	К	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 $\,$ STO 1, 0 $\,$ STO 2, or 0 $\,$ STO 3. To clear all 3 memories, press $\,$ ON/AC.

STO n	Storee dienlayed	value in me	mony
(310) <i>n</i>	Stores displayed value in memory n , replacing current value.		
	23 STO 1	M1	23.
	+ 2 =	M1	25.
RCL n	Recalls value in r	memory n .	,
	(continued)		
	RCL 1	M1	23.
	+ 3 =	M1	26.
2nd [SUM] n	Adds displayed value to memory		
	n.		
	(continued)		
	4 [2nd] [SUM] 1	M1	4.
	RCL 1	M1	27.
2nd [EXC] n	Exchanges displa	Exchanges displayed and memory	
	values.		
	(continued)		
	3 × 5 =	M1	15.
	2nd [EXC] 1	M1	27.
	2nd [EXC] 1	M1	15.

Orde	r 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.
7th	completes all operations.

The TI-30Xa uses AOS $^{\text{TM}}$ (Algebraic Operating System). It stores up to 4 pending operations (2 when STAT is displayed).

Notation			
2nd [SCI]	Selects scientific nota	ation.	
	12345 =		12345.
	2nd [SCI]	SCI	1.2345 ⁰⁴
2nd [ENG]	Selects engineering r	notation	(exponent
	is a multiple of 3).		
	[2nd] [ENG]	ENG	12.345 ⁰³
2nd [FL0]	Restores standard no	tation (floating-
	decimal) format.		
$[2 ext{nd}]$ $[FIX]$ n	Sets decimal places t	,	-9),
	retaining notation forr	nat.	
	2nd [FIX] 2	FIX	12.35 ⁰³
	2nd [FIX] 4	FIX	12.3450 ⁰³
2nd [FIX] •	Removes fixed-decim	nal setti	ng.
EE	Enters exponent.		

You can enter a value in floating-decimal, fixeddecimal, 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 +2- after entering the mantissa.
- 2. Press EE.
- 3. Enter 1 or 2 digit exponent. If negative, press either before or after entering exponent.

1.2345 +== EE +== 65	-1.2345 -65

Display In	Display Indicators				
M1, M2, Or M3	A value other than 0 in M1, M2, or M3.				
2nd	Calculator will access 2nd function (printed above key) of next key pressed.				
НҮР	Calculator will access hyperbolic function of next key pressed.				
SCI OF ENG	Scientific or engineering notation.				
FIX	Fixed-decimal setting.				
STAT	Statistical register contains data.				
DEG, RAD, Or GRAD	Specifies angle-unit setting (degrees, radians, or grads). When you turn on the calculator, angle units are degrees.				
х	<i>x</i> -coordinate of polar to rectangular conversion.				
r	<i>r</i> -coordinate of rectangular to polar conversion.				
()	1 or more open parentheses.				
Error	Error has occurred. Clear calculator and begin again.				
K	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*: 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: $x \le 0$.
- For TAN: x=90°, -90°, 270°, -270°, 450°, etc.
- For SIN⁻¹ or COS⁻¹: |x| > 1.
- For TANH⁻¹: $|x| \ge 1$.
- 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 Solar

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

Service Information

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KnowledgeBase

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and E-mail Inquires:

Phone: 1.800.TI.CARES (1.800.842.2737)

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TI-30Xa Solar School Edition

CE/C		st entry and error.		
CE/C CE/C		splay and operation		
ON/AC		I, including memory		
2nd [FIX] n		play to n decimal play		
		s fixed decimal setti		
2nd [SCI] 2nd [ENG]		ntific display forma ineering display for		
2nd) [FLO]		ting-decimal display		
+2-		sign of last numbe		
Memory	Orlanges	sign of last numbe	rentereu	
	(a has thre	ee memories.		
STO n		splayed value in me	emorv n.	
RCL n		alue stored in mem		play.
		played value to me		-
2nd [EXC] n	Exchang	es displayed and m	emory va	lues.
Math oper	ations			
$2 \times 3^2 = ?$		2 × 3 x² =		18.
5 ^{1.83 + 3}		5 [yx]		5.
		(1.83 + 3)		4.83
		≡	2376.97	
5√7		7 2nd [∛y] 5 =	1.47577	3162
Reciprocal		3.2 1/x	0.	3125
9% add-on	453	453 + 9 2nd [%]		40.77
		=	49	93.77
ln 2		2 LN	0.69314	7181
log 2		2 LOG	0.30102	9996
e ^{1.5}		1.5 [2nd] [e ^x]	4.4816	8907
Constants	•			
	res opera	tion and value in K.		
16×3.25		16 × 3.25 2nd [K] 🗏	52.
12 × 3.25		12 =		39.
24×3.25		24 🖃		78.

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Trig and Hyperbolic Operations			
DRG displays DEG, RAD, GRAD; 2nd [DRG+] converts.			
Examples in DEG, FIX	X 3.		
sin 30°	30 SIN		0.500
sin ⁻¹ .7	.7 [2nd] [SIN-1]		44.427
(8,-6) R▶P, disp. r	8 [2nd [X=y] 6 +C- [2	nd [R+P]	10.000
disp. θ	2nd [X=y]		-36.870
(9,83°) P▶R, disp. x	9 [2nd] [X=y] 83 [2nd]	[P•R]	1.097
disp. y	2nd [x=y]		8.933
sinh 25	25 HYP SIN		3.600 ¹⁰
cosh ⁻¹ 2.3	2.3 HYP 2nd [COS-1]]	1.475
Degree/Minute/Seco	ond and Decimal A	Angles	
5°10'01.20" to dec.	5.100120 [2nd] [DMS	S-DD]	5.167
5.167° to DMS	5.167 [2nd [DD+DMS]	5°1	0'01"20
Statistics and Proba	ability		
Permutations	52 2nd [nPr] 5 =	3118	375200.
Combinations	52 [2nd] [nCr] 5 =	2	598960.
Factorial: 4!	4 [2nd] [x!]		24.
2nd [CSR] clears all st	atistical data if STAT	Γ is dis	played.
Data point = 9	9 Σ+	n=	1
2 data points = 4	4 [2nd] [FRQ] 2		Fr 02
	Σ+	n=	3
Data point = 5	5 Σ+	n=	4
Mean	2nd [x]		5.5
Sample std. dev.	2nd [σxn-1]	2.380	476143
Change 9 to 11	9 [2nd] [Σ-]	n=	3
	11 Σ+	n=	4
Mean	[2nd] [x]		6.