

Fraction Calculations

- A decimal number, variable, or exponent cannot be entered as a fraction.
- In all cases, a total of up to 10 digits including integer, numerator, denominator and the symbol ($\frac{\Box}{\Box}$) can be entered.
- If the number of digits to be displayed is greater than 10, the number is converted to and displayed as a decimal number.

$3\frac{1}{2} + \frac{4}{3} = [\frac{a^b}{c}]$	ON/C 3 $[\frac{a^b}{c}]$ 1 $[\frac{a^b}{c}]$ 2 $+$	
$\rightarrow [a.xxx]$	4 $[\frac{a^b}{c}]$ 3 $=$	4 ၄5၄6*
$\rightarrow [d/c]$	$[\frac{a^b}{c}]$	4.83333333
	2ndF $\frac{d}{c}$	29၄6
$10^{\frac{2}{3}} =$	2ndF 10^x 2 $[\frac{a^b}{c}]$ 3 $=$	4.641588834
$1.25 + \frac{2}{5} = [a.xxx]$	1.25 $+$ 2 $[\frac{a^b}{c}]$ 5 $=$	1.65
$\rightarrow [\frac{a^b}{c}]$	$[\frac{a^b}{c}]$	1၄13၄20
$* 4၄5၄6 = 4\frac{5}{6}$		

Time, Decimal and Sexagesimal Calculations

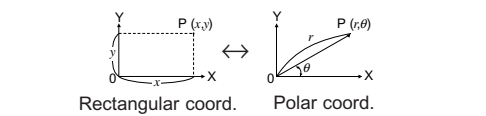
Conversion between decimal and sexagesimal numbers can be performed. In addition, the four basic arithmetic operations and memory calculations can be carried out using the sexagesimal system.

12°39'18"05	ON/C 12 $\text{D}^{\circ}\text{M}'\text{S}$ 39 $\text{D}^{\circ}\text{M}'\text{S}$ 18.05 $\text{D}^{\circ}\text{M}'\text{S}$	
$\rightarrow [10]$	2ndF $\leftrightarrow \text{DEG}$	12.65501389
123.678 $\rightarrow [60]$	123.678 2ndF $\leftrightarrow \text{DEG}$	123°40'40.80
3h30m45s +	3 $\text{D}^{\circ}\text{M}'\text{S}$ 30 $\text{D}^{\circ}\text{M}'\text{S}$ 45 $\text{D}^{\circ}\text{M}'\text{S}$ $+$ 6 $\text{D}^{\circ}\text{M}'\text{S}$	
6h45m36s = [60]	45 $\text{D}^{\circ}\text{M}'\text{S}$ 36 $\text{D}^{\circ}\text{M}'\text{S}$ $=$	10°16'21.00
3h45m –	3 $\text{D}^{\circ}\text{M}'\text{S}$ 45 $\text{D}^{\circ}\text{M}'\text{S}$ $-$ 1.69 $=$	
1.69h = [60]	2ndF $\leftrightarrow \text{DEG}$	2°03'36.00
sin62°12'24" = [10]	\sin 62 $\text{D}^{\circ}\text{M}'\text{S}$ 12 $\text{D}^{\circ}\text{M}'\text{S}$ 24 $\text{D}^{\circ}\text{M}'\text{S}$ $=$	0.884635235

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Coordinate Conversions

- Before performing a calculation, select the angular unit. (See page 6)



- The calculation result is automatically stored in memories X and Y.
Value of r or x: X memory
Value of θ or y: Y memory

$\begin{cases} x = 6 \\ y = 4 \end{cases} \rightarrow \begin{cases} r = \\ \theta = [^\circ] \end{cases}$	ON/C 6 2ndF \cdot 4	
	2ndF $\rightarrow r\theta$ $[r]$	7.211102551
	2ndF \leftrightarrow $[\theta]$	33.69006753
	2ndF \leftrightarrow $[r]$	7.211102551
$\begin{cases} r = 14 \\ \theta = 36[^\circ] \end{cases} \rightarrow \begin{cases} x = \\ y = \end{cases}$	14 2ndF \cdot 36	
	2ndF $\rightarrow xy$ $[x]$	11.32623792
	2ndF \leftrightarrow $[y]$	8.228993532
	2ndF \leftrightarrow $[x]$	11.32623792

STATISTICAL CALCULATIONS

Press 2ndF MODE 1 to select statistics mode. The following statistics can be obtained:

\bar{x}	Mean of samples (x data)
sx	Sample standard deviation (x data)
σx	Population standard deviation (x data)
n	Number of samples
Σx	Sum of samples (x data)
Σx^2	Sum of squares of samples (x data)

BATTERY REPLACEMENT

Notes on Battery Replacement

Improper handling of batteries can cause electrolyte leakage or explosion. Be sure to observe the following handling rules:

- Replace both batteries at the same time.
- Do not mix new and old batteries.
- Make sure the new batteries are the correct type (LR44).
- When installing, orient each battery properly as indicated in the calculator.
- Batteries are factory-installed before shipment, and may be exhausted before they reach the service life stated in the specifications.

When to Replace the Batteries

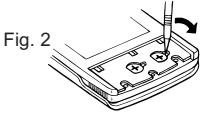
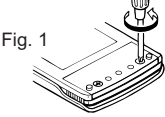
If the display has poor contrast, the batteries require replacement.

Caution

- Keep batteries out of the reach of children.
- Exhausted batteries left in the calculator may leak and damage the calculator.
- Explosion risk may be caused by incorrect handling.
- Batteries must be replaced only with others of the same type.
- Do not throw batteries into a fire as they may explode.

Replacement Procedure

- Turn the power off by pressing 2ndF OFF .
- Loosen both screws and remove the battery cover. (Fig. 1)



- Remove the used batteries then replace with two fresh batteries with the positive sides (+) facing up. (Fig. 2)

Entered data are kept in memory until 2ndF CA or 2ndF MODE 1 are pressed. Before entering new data, clear the memory contents.

[Data Entry]

Data DATA
Data $\text{FREQ}(\text{.})$ frequency DATA (To enter multiples of the same data)

[Data Correction]

Correction prior to pressing DATA :
Delete incorrect data with ON/C .

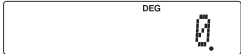
Correction after pressing DATA :
Press \rightarrow to confirm the latest entry and press 2ndF CD to delete it.

Score		
95	2ndF MODE 1	0.
80	95 DATA	1.
80	80 DATA	2.
75	DATA	3.
75	75 $\text{FREQ}(\text{.})$ 3 DATA	6.
50	50 DATA	7.
\bar{x} =	RCL \bar{x}	75.71428571
σx =	RCL σx	12.37179148
Σx =	RCL Σx	530.
Σx^2 =	RCL Σx^2	41200.
sx =	RCL sx	13.3630621
sx^2 =	2ndF x^2 $=$	178.5714286

Statistical Calculation Formulas

$$\bar{x} = \frac{\Sigma x}{n} \quad \sigma x = \sqrt{\frac{\Sigma x^2 - n\bar{x}^2}{n}}$$
$$sx = \sqrt{\frac{\Sigma x^2 - n\bar{x}^2}{n - 1}} \quad \Sigma x = x_1 + x_2 + \dots + x_n$$
$$\Sigma x^2 = x_1^2 + x_2^2 + \dots + x_n^2 \quad (n: \text{Number of samples})$$

- Replace the battery cover and screws.
- Press the RESET switch (on the back).
- Make sure that the display appears as shown below. If the display does not appear as shown, reinstall the batteries and check the display once again.



Automatic Power Off Function

This calculator will turn itself off to save battery power if no key is pressed for approximately 10 minutes.

SPECIFICATIONS

Calculations:	Scientific calculations, statistical calculations, etc.
Internal calculations:	Mantissas of up to 12 digits
Pending operations:	16 calculations 8 numeric values (4 numeric values in STAT mode)
Power source:	3V \approx (DC): Alkaline batteries (LR44) \times 2
Power consumption:	0.0006 W
Operating time:	Approx. 2500 hours when continuously displaying 55555. at 25°C. Varies according to use and other factors.
Operating temperature:	0°C – 40°C
External dimensions:	71.5 mm (W) \times 124 mm (D) \times 9.5 mm (H) 2-13/16" (W) \times 4-7/8" (D) \times 3/8" (H)
Weight:	Approx. 57 g 0.126 lb (Including batteries)
Accessories:	Batteries \times 2 (installed), operation manual, and hard case

- In the statistical calculation formulas, an error will occur when:
- the absolute value of the intermediate result or calculation result is equal to or greater than 1×10^{100} .
 - the denominator is zero.
 - an attempt is made to take the square root of a negative number.

ERROR AND CALCULATION RANGES

1. Errors

An error will occur if an operation exceeds the calculation ranges, or if a mathematically illegal operation is attempted. When an error occurs, pressing \leftarrow (or \rightarrow) automatically moves the cursor back to the place in the equation where the error occurred. Edit the equation (see page 4) or press ON/C to clear the equation.

2. Error Codes and Error Types

Syntax error (Error 1):

- An attempt was made to perform an invalid operation. Ex. 2 2ndF $\rightarrow r\theta$

Calculation error (Error 2):

- The absolute value of an intermediate or final calculation result equals or exceeds 10^{100} .
- An attempt was made to divide by 0.
- The calculation ranges were exceeded while performing calculations.

Depth error (Error 3):

- The available number of buffers was exceeded. (There are 8 buffers* for numeric values and 16 buffers for calculation instructions). *4 buffers in STAT mode.

Equation too long (Error 4):

- The equation exceeded its maximum input buffer (159 characters). An equation must be shorter than 159 characters.

3. Calculation Ranges

- Within the ranges specified below, this calculator is accurate to ± 1 in the least significant digit of the mantissa. When performing continuous calculations (including chain calculations), errors accumulate leading to reduced accuracy.
- Calculation ranges
 $\pm 10^{99} \sim \pm 9.999999999 \times 10^{99}$ and 0.

If the absolute value of an entry or a final or intermediate result of a calculation is less than 10^{-99} , the value is considered to be 0 in calculations and in the display.

Function	Dynamic range
$\sin x, \cos x, \tan x$	DEG: $ x < 10^{10}$ ($\tan x: x \neq 90 (2n-1)^\circ$) RAD: $ x < \frac{\pi}{180} \times 10^{10}$ ($\tan x: x \neq \frac{\pi}{2} (2n-1)$) GRAD: $ x < \frac{10}{9} \times 10^{10}$ ($\tan x: x \neq 100 (2n-1)^\circ$)
$\sin^{-1}x, \cos^{-1}x$	$ x \leq 1$
$\tan^{-1}x, \sqrt[n]{x}$	$ x < 10^{100}$
$\ln x, \log x$	$10^{-99} \leq x < 10^{100}$
y^x	<ul style="list-style-type: none">$y > 0$: $-10^{100} < x \log y < 100$$y = 0$: $0 < x < 10^{100}$$y < 0$: $x = n (0 < x < 1: \frac{1}{x} = 2n-1, x \neq 0)^*$, $-10^{100} < x \log y < 100$
$\sqrt[n]{y}$	<ul style="list-style-type: none">$y > 0$: $-10^{100} < \frac{1}{x} \log y < 100 (x \neq 0)$$y = 0$: $0 < x < 10^{100}$$y < 0$: $x = 2n-1$ $(0 < x < 1: \frac{1}{x} = n, x \neq 0)^*$, $-10^{100} < \frac{1}{x} \log y < 100$
e^x	$-10^{100} < x \leq 230.2585092$
10^x	$-10^{100} < x < 100$

This equipment complies with the requirements of Directive 89/336/EEC as amended by 93/68/EEC.
Dieses Gerät entspricht den Anforderungen der EG-Richtlinie 89/336/EWG mit Änderung 93/68/EWG.
Ce matériel répond aux exigences contenues dans la directive 89/336/CEE modifiée par la directive 93/68/CEE.
Dit apparaat voldoet aan de eisen van de richtlijn 89/336/EEG, gewijzigd door 93/68/EEG.
Dette udstyr overholder kravene i direktiv nr. 89/336/EEC med tillæg nr. 93/68/EEC.
Quest' apparecchio è conforme ai requisiti della direttiva 89/336/EEC come emendata dalla direttiva 93/68/EEC.
Η εγκατάσταση αυτή ανταποκρίνεται στις απαιτήσεις των οδηγιών της Ευρωπαϊκής Ένωσης 89/336/EOK, όπως ο κανονισμός αυτός συμπληρώθηκε από την οδηγία 93/68/EOK.
Este equipamento obedece às exigências da directiva 89/336/CEE na sua versão corrigida pela directiva 93/68/CEE.
Este aparato satisface las exigencias de la Directiva 89/336/CEE modificada por medio de la 93/68/CEE.
Denna utrustning uppfyller kraven enligt riktlinjen 89/336/EEC så som kompletteras av 93/68/EEC.
Dette produktet oppfyller betingelsene i direktivet 89/336/EEC i endringen 93/68/EEC.
Tämä laite täyttää direktiivin 89/336/EEC vaatimukset, jota on muutettu direktiivillä 93/68/EEC.