Basic Calculations
- Use the COMP mode for basic calculations.
  - Example 1: 23x5.4x53
    23 \[ \times \] 5.4 \[ \times \] 53 \[ = \] -35.5
  - Example 2: \( 66 \times (12) + (4) - (2.5) \)
    66 \[ \times \] 12 \[ + \] 4 \[ - \] 2.5 \[ = \] 265.8
  - Example 3: 2 \[ \times \] 3 \[ \times \] (1 \times 10^9) \[ \times \] 2 \[ \times \] 3 \[ \times \] 1 \[ \times \] 10^9 \[ = \] 0.6656565657
  - Example 4: 7 \[ \times \] 8 \[ \times \] 4 \[ \times \] 5 \[ = \] 36
  - Example 5: \( \frac{6}{3} \times \frac{5}{3} \) = 0.3
    6 \[ \div \] 3 \[ \times \] 5 \[ \div \] 3 \[ = \] 0.3
  - Example 6: 2 \[ \times \] (7 \[ \times \] 8 \[ + \] 6 \[ \times \] 4 \[ + \] 3 \[ \times \] 1) = 122
    2 \[ \times \] 7 \[ \times \] 8 \[ + \] 6 \[ \times \] 4 \[ + \] 3 \[ \times \] 1 \[ = \] 122
  - You can skip all \( \sqrt { \ } \) operations before the \( \sqrt { \ } \) key.
  - Example 7: \( \frac{4}{3} \times 7 \times 3 \times 5 \)
    4 \[ \div \] 3 \[ \times \] 7 \[ \times \] 3 \[ \times \] 5 \[ = \] 82.997756

Constant Calculations
- Press \( \text{RCL} \) \[ \times \] twice after inputting a number to make that number a constant.
- \( \times \) is on the display while a constant is being used.
- Use the COMP mode for constant calculations.
  - Example 1: 2.3+3, then 2.3+6
    \( (2.3+3) \)
    2.3 \[ \times \] 3 \[ = \] 6.9
  - Example 2: 12×2.3, then 12×(−9)
    \( (12 \times 2.3) \)
    12 \[ \times \] 2.3 \[ = \] 27.6
    \( (12 \times (−9)) \)
    9 \[ \times \] (−9) \[ = \] −108
  - Example 3: 17+17+17+17+68
    \( (17 + 17 + 17 + 17) \)
    17 \[ \times \] 4 \[ = \] 68
    \( +68 \)
    68 \[ = \] 84
  - Example 4: 1.7×6,3521
    \( (1.7 \times 6.3521) \)
    1.7 \[ \times \] 6.3521 \[ = \] 2.283
    \( (1.7 \times 6.3521) \)
    1.7 \[ \times \] 6.3521 \[ = \] 4.913
    \( (1.7 \times 6.3521) \)
    1.7 \[ \times \] 6.3521 \[ = \] 8.3521

Memory Calculations
- Use the COMP mode for memory calculations.
- Use \( \text{AMEM} \), \( \text{BMEM} \), and \( \text{CMEM} \) for memory calculations. \( \text{AMEM} \) replaces current memory contents.
- \( \text{AMEM} \) appears when there is a value in memory.
- To clear memory, press \( \text{CLR} \) \[ ON/AC \] \[ 0 \] \[ ENTER \].
  - Example 1: \((53+6) \times (23-8) \times (69+2) \times (96-4) = 210,755 \)
    \( (53+6) \times (23-8) \times (69+2) \times (96-4) = 210,755 \)
    53 \[ \times \] 6 \[ \times \] 23 \[ \times \] 8 \[ \times \] 69 \[ \times \] 2 \[ \times \] 96 \[ \times \] 4 \[ = \] 210,755
  - Example 2: To calculate the following using memory as shown:
    \[ 7 \times 7 + (2 \times 3) \times (2 \times 3) \times (2 \times 3) \times (2 \times 3) \times (2 \times 3) \times 13 \]
    7 \[ \times \] 7 \[ \times \] (2 \[ \times \] 3) \[ \times \] (2 \[ \times \] 3) \[ \times \] (2 \[ \times \] 3) \[ \times \] (2 \[ \times \] 3) \[ \times \] (2 \[ \times \] 3) \[ \times \] 13 \[ = \] 13
  - Example 3: To calculate the following using memory and a constant: \((12 \times 3) \times (45 \times 5) \times (17 \times 3) \times (13)\)
    \( (12 \times 3) \times (45 \times 5) \times (17 \times 3) \times (13) \)
    3 \[ \times \] 12 \[ \times \] 45 \[ \times \] 5 \[ \times \] 17 \[ \times \] 3 \[ \times \] 13 \[ = \] 135
    \( (12 \times 3) \times (45 \times 5) \times (17 \times 3) \times (13) \)
    3 \[ \times \] 12 \[ \times \] 45 \[ \times \] 5 \[ \times \] 17 \[ \times \] 3 \[ \times \] 13 \[ = \] 135
    \( (12 \times 3) \times (45 \times 5) \times (17 \times 3) \times (13) \)
    3 \[ \times \] 12 \[ \times \] 45 \[ \times \] 5 \[ \times \] 17 \[ \times \] 3 \[ \times \] 13 \[ = \] 135

Fraction Calculations
- Use COMP mode for fraction calculations.
- Total number of digits (including division marks) cannot exceed 10.
  - Example 1: \( \frac{4}{5} \times \frac{7}{10} \)
    \( \frac{4}{5} \times \frac{7}{10} = \frac{14}{25} \)

Handling Precautions
- Be sure to press the \( \text{RCL} \) \[ \times \] before using the calculator.
- Your calculator is made up of precision components. Never try to take it apart.
- Avoid drooping your calculator and otherwise subjecting it to strong impact.
- Do not store the calculator or leave it in areas exposed to high temperature or humidity, or large amounts of dust. When exposed to low temperature, the calculator may require more time to display results and may even fail to operate. Correct operation will resume once the calculator is brought back to normal temperature.
- The display will go blank and keys will not operate during calculations. When you are operating the keyboard, be sure to watch the display to make sure that all your key operations are being performed correctly.
- Avoid using volatile liquids such as thinner or benzine to clean the unit. Wipe it with a soft cloth, or with a cloth that has been dipped in a solution of water and a neutral detergent and wrung out.
- In no event will the manufacturer and its suppliers be liable to you or any other person for any damages, expenses, lost profits, lost savings, or any other damages arising out of malfunction, repairs, or insufficient life. The user should prepare physical records of data to protect against such data loss.
- Never dispose of the liquid crystal panel, or other components by burning them.
- Before assuming malfunction of the unit, be sure to carefully read this manual and ensure that the problem is not due to operational error.
- The contents of this manual are subject to change without notice.
- No part of this manual may be reproduced in any form without the express written consent of the manufacturer.
- Be sure to keep all user documentation handy for future reference.

Modes

<table>
<thead>
<tr>
<th>Application</th>
<th>Key Operation</th>
<th>Mode Name*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard deviation calculations</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Normal calculations</td>
<td>COMP</td>
<td></td>
</tr>
<tr>
<td>Calculations using degrees</td>
<td>DEN</td>
<td></td>
</tr>
<tr>
<td>Calculations using radians</td>
<td>RAD</td>
<td></td>
</tr>
<tr>
<td>Calculations using grads</td>
<td>GRA</td>
<td></td>
</tr>
<tr>
<td>Number of decimal place</td>
<td>FIX</td>
<td></td>
</tr>
<tr>
<td>specification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of significant digit</td>
<td>SCI</td>
<td></td>
</tr>
<tr>
<td>specification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cansels FIX and SCI settings</td>
<td>NORM</td>
<td></td>
</tr>
</tbody>
</table>
**Percentage Calculations**

- **Example 1:** To calculate 12% of 1800.
  
  \[ 1.2 \times 1800 = 2160 \]

- **Example 2:** To calculate 19% of 2500.
  
  \[ 0.19 \times 2500 = 475 \]

- **Example 3:** To add 10% onto 2500.
  
  \[ 0.10 \times 2500 = 250 \]

- **Example 4:** To find 80% of 500.
  
  \[ 0.80 \times 500 = 400 \]

**Scientific Function Calculations**

- **Example 1:** \(\frac{14.25\times360^\circ}{2\pi} = 25\text{ m}^2\) \(\text{m}^2\)

- **Example 2:** \(\log_2 128 = 7\)

- **Example 3:** \(10^4 = 10,000\)

**Exponential Functions**

- **Example 1:** \(1.04 \times 1.04 = 1.0816\)

**Trigonometric/Inverse Trigonometric Functions**

- **Example 1:** sin \(30^\circ\)

- **Example 2:** cos \(60^\circ\)

**Hyperbolic Functions**

- **Example 1:** sinh \(3.0\)

- **Example 2:** cosh \(3.0\)

- **Example 3:** sinh \(x\) = \(\frac{e^x - e^{-x}}{2}\)

- **Example 4:** cosh \(x\) = \(\frac{e^x + e^{-x}}{2}\)

**Common and Natural Logarithms, Exponents**

- **Example 1:** \(\log_{10} 1.23\)

- **Example 2:** \(\log_{10} 0.90\)

- **Example 3:** \(\log_{10} 6.4\)

**Calculus**

- **Example 1:** \(\int 2x^2 \, dx = \frac{2x^3}{3}\)

- **Example 2:** \(\frac{d}{dx} (x^3) = 3x^2\)

**Permutation**

- **Example 1:** To determine how many different 4-digit values can be produced using the numbers 1 through 7.

**Combination**

- **Example 1:** To determine how many different 4-member groups can be organized from a group of 10 individuals.
### Statistical Calculations (SD Mode)
- Press [SD] to enter the SD mode for statistical calculations with standard deviation.
- If SD or SD clarity is on the display, press [CLEAR] first.
- Data input always starts with [SD] input.
- Example: To calculate n-, x̄, s⁻¹, x, and s² for the following data: 52, 54, 53, 56, 53, 53, 56, 54, 52

<table>
<thead>
<tr>
<th>Class</th>
<th>Data</th>
<th>n</th>
<th>x̄</th>
<th>s⁻¹</th>
<th>x</th>
<th>s²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>52</td>
<td>9</td>
<td>54.4</td>
<td>1.58</td>
<td>54</td>
<td>24.0</td>
</tr>
<tr>
<td>1-2</td>
<td>54</td>
<td>9</td>
<td>54.4</td>
<td>1.58</td>
<td>54</td>
<td>24.0</td>
</tr>
<tr>
<td>1-3</td>
<td>53</td>
<td>9</td>
<td>54.4</td>
<td>1.58</td>
<td>54</td>
<td>24.0</td>
</tr>
<tr>
<td>1-4</td>
<td>56</td>
<td>9</td>
<td>54.4</td>
<td>1.58</td>
<td>54</td>
<td>24.0</td>
</tr>
<tr>
<td>1-5</td>
<td>53</td>
<td>9</td>
<td>54.4</td>
<td>1.58</td>
<td>54</td>
<td>24.0</td>
</tr>
<tr>
<td>1-6</td>
<td>53</td>
<td>9</td>
<td>54.4</td>
<td>1.58</td>
<td>54</td>
<td>24.0</td>
</tr>
<tr>
<td>1-7</td>
<td>56</td>
<td>9</td>
<td>53</td>
<td>1.58</td>
<td>54</td>
<td>24.0</td>
</tr>
<tr>
<td>1-8</td>
<td>53</td>
<td>9</td>
<td>54.4</td>
<td>1.58</td>
<td>54</td>
<td>24.0</td>
</tr>
<tr>
<td>1-9</td>
<td>52</td>
<td>9</td>
<td>54.4</td>
<td>1.58</td>
<td>54</td>
<td>24.0</td>
</tr>
</tbody>
</table>

### Exponential Display Formats
This calculator can display up to 10 digits. Larger values are automatically displayed using exponential notation. In the case of decimal values, you can choose between two formats that determine how and where exponential notation is used.

- **NORM 1** With NORM 1, exponential notation is automatically used for integer values with more than 10 digits and decimal values with more than three decimal places.
- **NORM 2** With NORM 2, exponential notation is automatically used for integer values with more than 10 digits and decimal values with more than three decimal places.

To switch between NORM 1 and NORM 2
- Press [MODE]. There is no indication on the display of which format is currently in effect, but you can determine the setting by performing the following calculation:

\[ 1 \times 10^{10} \times 0.005 = 0.005 \]

All of the examples in this manual show calculation results using the NORM 1 format.

### When you have a problem....
If calculation results are not what you expect or if an error occurs, perform the following steps:
1. Press [SHIFT] [COSD] (DEG mode)
2. Press [MODE]
3. Press [X] (NORM mode)
4. Check the formula you are working with to confirm it is correct.
5. Enter the correct modes to perform the calculation and try again.

### Technical Information
- **General**
  - All clear: [AC]
  - Arithmetic calculations: [+], [-], [×], [÷]

- **Basics**
  - Clear (clears memory): [C]
  - Number input: 
    - Decimal point: [.] or [\(\times 10^n\)]
    - Power on: All reset: [AC]
    - Sign change: [C]

- **Memory**
  - Memory to memory transfer: [M+]
  - Memory minus: [M-]
  - Memory plus: [M+] or [M+] [M-]
  - Memory recall: [MR]

- **Special**
  - Display/memory swap: [÷]
  - Exponent: [EXP]
  - Internal rounding: [INT]
  - Parameters: 
    - PI: [3.1415926536]
    - Select mode: [MODE]
  - Sine function: [SIN]
  - Shits key functions: [SHIFT]

- **Scientific Functions**
  - Arc cosine: [ACOS]
  - Arc sine: [ASIN]
  - Arc tangent: [ATAN]
  - Common antilogarithm: [LOG]
  - Common logarithm: [LOG]
  - Convert to degrees: [°]
  - Convert to grade: [GRD]
  - Convert to radian: [RAD]
  - Cosine: [COS]
  - Cube: [× 3]
  - Cube root: [√]
  - Engineering: [ENG]
  - Factorial: [× (n!)]
  - Fraction: [Frac]
  - Hyperbolic: [HYP]
  - Natural antilogarithm: [LN]
  - Natural logarithm: [LN]
  - Percent: [× 100]
  - Polar to rectangular: [R→P]
  - Power: [\(^n\)]
  - Random number: [RND]
  - Reciprocal: [1/x]
  - Rectangular to Polar: [P→R]

- **Statistical Calculation**
  - Data delete: [DEL]
  - Data input: [DATA]
  - Number of data: [DATA]
  - Population standard deviation: [SD]
  - Sample standard deviation: [S.D.]
  - Statistical register clear: [CL][STAT]
  - Sum of squares of values: [ΣX²]
  - Sum of values: [ΣX]

- **Exponential Display Formats**
  - NORM 1: With NORM 1, exponential notation is automatically used for integer values with more than 10 digits and decimal values with more than three decimal places.
  - NORM 2: With NORM 2, exponential notation is automatically used for integer values with more than 10 digits and decimal values with more than three decimal places.

### Order of Operations and Levels
Operations are performed in the following order of precedence:
1. Functions
   - 1. [÷], [×], [\(^n\)]
   - 2. [\(\rightarrow\)], [\(\leftarrow\)], [\(\times 10^n\)]
   - 3. +, -

2. Operations with the same precedence are performed from left to right, with operations appearing in parentheses first. If parentheses are nested, the operations enclosed in the innermost set of parentheses are performed first.

3. Round-off, invalid input, and overflow levels. If overflow occurs, the display shows an error message. If the display shows an error message, try again.
The table below shows how registers contents following the above input.

<table>
<thead>
<tr>
<th>Register</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>4</td>
</tr>
<tr>
<td>Lz</td>
<td>5 x +</td>
</tr>
<tr>
<td>Lw</td>
<td>4 x</td>
</tr>
<tr>
<td>Ld</td>
<td>0, 3 x</td>
</tr>
<tr>
<td>Lc</td>
<td>5 x</td>
</tr>
<tr>
<td>La</td>
<td></td>
</tr>
<tr>
<td>Lb</td>
<td></td>
</tr>
</tbody>
</table>

### Formulas and Ranges

The following are the formulas and ranges that are applied to various calculations that can be performed using this calculator.

#### Coordinate Transformation

- With polar coordinates, can be calculated within a range of $\pm 90^\circ$ or $\pm 180^\circ$. The calculation range is the same for radians and grads.

#### Permutation

- Input range: $x = r \geq 0$ (r: Integer)

- Formula: $P(n, r) = \frac{n!}{(n-r)!}$

#### Combination

- Input range: $x = n \geq r$ (n, r: Integer)

- Formula: $C(n, r) = \frac{n!}{r!(n-r)!}$

#### Population Standard Deviation

- Formula: $\sigma = \sqrt{\frac{\sum (x - \mu)^2}{N}}$

#### Sample Standard Deviation

- Formula: $s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$

#### Arithmetic Mean

- Formula: $\bar{x} = \frac{\sum x}{n}$

### Input Ranges

<table>
<thead>
<tr>
<th>Function</th>
<th>Input Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>$-1 \leq x &lt; 1 \times 10^{10}$</td>
</tr>
<tr>
<td>y</td>
<td>$-1 \times 10^{9} \leq y &lt; 1 \times 10^{9}$</td>
</tr>
<tr>
<td>z</td>
<td>$-1 \times 10^{9} \leq z &lt; 1 \times 10^{9}$</td>
</tr>
<tr>
<td>P</td>
<td>$-1 \times 10^{9} \leq P &lt; 1 \times 10^{9}$</td>
</tr>
<tr>
<td>T</td>
<td>$-1 \times 10^{9} \leq T &lt; 1 \times 10^{9}$</td>
</tr>
<tr>
<td>f</td>
<td>$-1 \times 10^{9} \leq f &lt; 1 \times 10^{9}$</td>
</tr>
<tr>
<td>c</td>
<td>$-1 \times 10^{9} \leq c &lt; 1 \times 10^{9}$</td>
</tr>
<tr>
<td>T/2</td>
<td>$0 \leq T &lt; 1 \times 10^{9}$</td>
</tr>
<tr>
<td>f/2</td>
<td>$0 \leq f &lt; 1 \times 10^{9}$</td>
</tr>
<tr>
<td>R</td>
<td>$0 \leq R &lt; 1 \times 10^{9}$</td>
</tr>
<tr>
<td>V</td>
<td>$0 \leq V &lt; 1 \times 10^{9}$</td>
</tr>
</tbody>
</table>

### For a single calculation, calculation error is $\pm 1$ at the 10th digit. (In the case of exponential display, calculation errors $\pm 1$ at the last significant digit.) Errors are cumulative in the case of successive calculations, which can also cause them to become large. (This is also true of internal consecutive calculations that are performed in the case of $x^y$, $y^x$, $x^y$, $x+y$, $x-y$, $x-y$, etc.)

In the vicinity of a function’s singular point and point of inflection, errors are cumulative and may become large.

#### Calculation Capacity

- Input/Basic Calculations: 10-digit mantissa, plus 2-digit exponent up to $10^{499}$

#### Specifications

- **Power Supply:** Solar cell
- **Operating Temperature:** $0^\circ C$ to $40^\circ C$ ($32^\circ F$ to $104^\circ F$)
- **Dimensions:** 10-1/8 X 7-3/16 X 6-1/8 (25 X 182 X 158.5 mm)
- **Weight:** 60g (2.1oz)

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This mark applies in EU countries only.

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