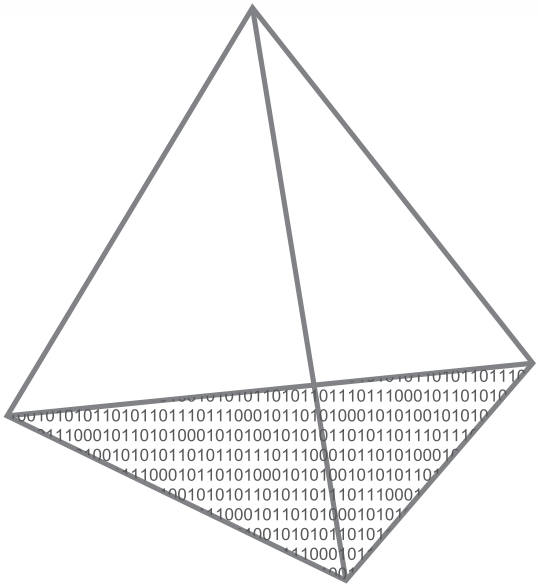
SHARP

Calculator Operation Guide



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HOW TO OPERATE

≈Read Before Using≈

1. KEY LAYOUT

① ON/C, OFF key

ON/C <Power on>

2nd F OFF <Power off>
Written in orange above the ON/C key

② 2nd function key

2nd F Pressing this key will enable the functions written in orange above the calculator buttons.

③ Drill mode, HOME keys

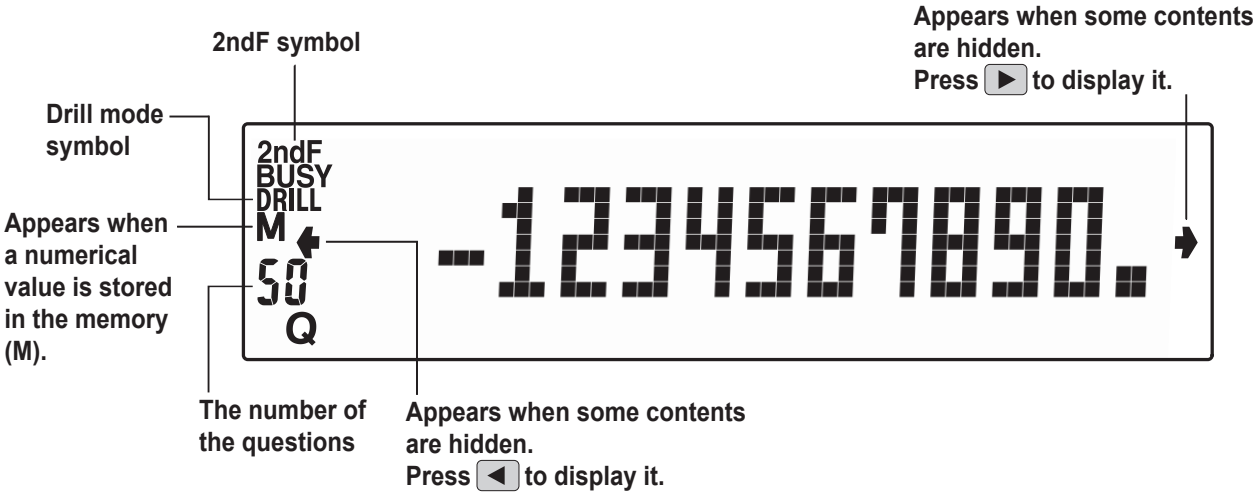
DRILL Pressing this key will perform the Drill functions.

2nd F HOME Pressing this key will return to the NORMAL mode.

2. RESET SWITCH

If the calculator fails to operate normally, press the reset switch on the front to reinitialize the unit with the tip of a ball-point pen or similar object.

3. DISPLAY PATTERN



4. CHANGE RESULT DISPLAY

In fraction and division calculations, conversion of the calculation result can be performed by pressing CHANGE.

When you press CHANGE in fraction calculations, the calculation result will cycle through the following display styles.

- ① Mixed fraction → ② Improper fraction → ③ Decimal numbers → ①
- ① Proper fraction → ② Decimal numbers → ①

When you press CHANGE in division calculations, the calculation result will cycle through the following display styles.

- ① Decimal numbers → ② Mixed fraction → ③ Improper fraction → ①
- ① Decimal numbers → ② Proper fraction → ①

<Example 1> $3\frac{1}{2} + \frac{5}{7} =$

Operation	Display
ON/C 3 2nd F a b/c 1 ▶ 2 ▶	$3\frac{1}{2}$
+ 5 $\frac{a}{b}$ 7 ▶	$3\frac{1}{2}+\frac{5}{7}$
=	$4\frac{3}{14}$
CHANGE	$\frac{59}{14}$
CHANGE	4.214285714
CHANGE	$4\frac{3}{14}$

<Example 2> 7 ÷ 5 =

Operation	Display
7 ÷ 5 =	1.4
CHANGE	$1\frac{2}{5}$
CHANGE	$\frac{7}{5}$
CHANGE	1.4

ON/OFF, Entry Correction Keys

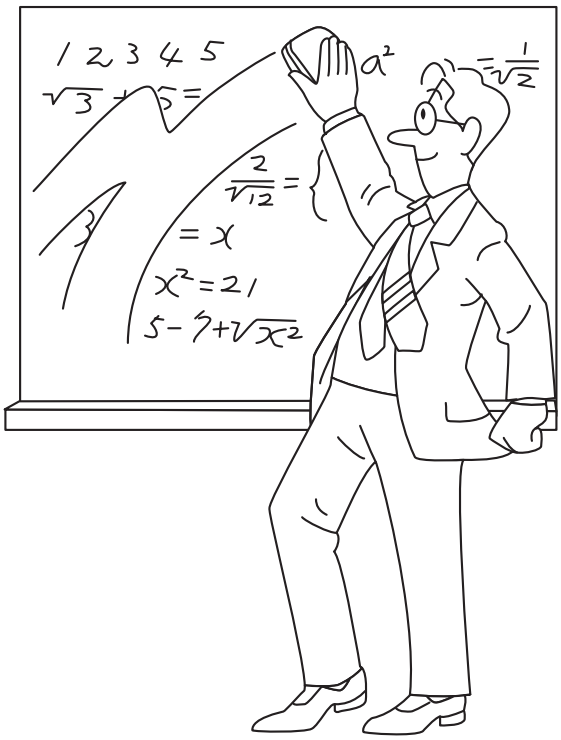
ON/C OFF ◀ ▶ BACK SPACE

ON/C Turns the calculator on or clears the entries.

OFF Turns the calculator off.

◀ ▶ These keys are useful for editing equations. The ◀ key moves the cursor to the left, and the ▶ key moves the cursor to the right.

BACK SPACE The BACK SPACE key deletes the symbol or number at the left of the cursor.



Numerical Value Entry Keys

0 - 9 . (-) π

0 - 9 Numeric keys for entering numeric values.

. Decimal point key. Enters a decimal point.

(-) Enters the minus symbol (negative numbers).

π Enters π (3.14159...).
The constant π is the ratio of the circumference of a circle to its diameter.

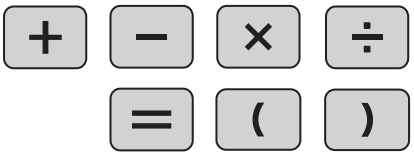
<Example> Provided the Earth is moving around the Sun in a circular orbit, calculate how many kilometers it travels in one year.

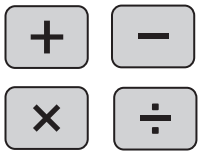
* The average distance between the Earth and the Sun is 149,600,000 km.

The circumference is equal to the diameter × π; therefore:
149,600,000 × 2 × π

Operation	Display
ON/C 149600000 × 2 ×	
2nd F π	149600000×2×π
=	939964522.

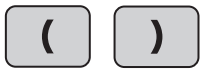
Basic Arithmetic Keys, Parentheses





The four basic operators. Each is used in the same way as a standard calculator:
+ (addition), – (subtraction), × (multiplication), and ÷ (division).

Finds the result in the same way as a standard calculator.



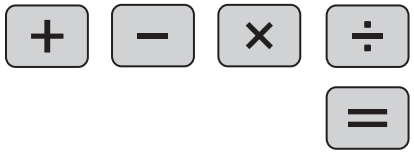
Used to specify calculations in which certain operations have precedence. You can make addition and subtraction operations have precedence over multiplication and division by enclosing them in parentheses.

<Example>

(1) 51−6+57×5÷3=
(2) 51−(6+57×5)÷3=
(3) 51−((6+57)×5)÷3=

	Operation	Display
(1)	ON/C 51 − 6 + 57 × 5 ÷ 3 =	140.
(2)	51 − (6 + 57 × 5) ÷ 3 =	-46.
(3)	51 − ((6 + 57) × 5) ÷ 3 =	-54.

Constant Calculations, Chain Calculations



Constant Calculations

You can repeat a basic operation (+, –, × and ÷) with a constant.

<Example> A worker produces $30 worth of items in one hour.
Calculate the total value of items produced in 40 hours and in 800 hours.

Operation	Display
ON/C 30 × 40 =	1200.
"30" is a constant.	
800 =	24000.

NOTE:
In constant calculations, the multiplicand is treated as a constant for multiplication. The addend is treated as a constant for addition. Subtraction and division follow the same principle as addition.

Chain Calculations

You can use the result of a previous calculation in the next calculation.

<Example>

Operation	Display
ON/C 2 × 11 × 29 =	638.
+ 2 =	640.
+ 60 =	700.
+ 300 =	1000.

Memory Calculations

CM RM M− M+

CM — Clears the memory contents.

RM — Recalls the memory contents.

M− — A value can be subtracted from an existing memory value.

M+ — A value can be added to an existing memory value.

<Example 1>

Operation	Display
ON/C 2nd F CM	0.
25 × 27 2nd F M+	M 675.
12 + 9 2nd F M−	M 21.
2nd F RM	M 654.

<Example 2> Calculate $ and ¥ at the designated exchange rate.
$1 = ¥130
¥33,800 = $?
$2,750 = ¥?

Operation	Display
ON/C 2nd F CM	0.
130 2nd F M+	M 130.
33800 ÷ 2nd F RM =	M 260.
2750 × 2nd F RM =	M 357500.

Fractional Calculations

[a/b] [a b/c] [CHANGE]

[a/b] Enter proper or improper fractions which consist of a numerator and denominator.

[a b/c] Enter mixed fractions.

[CHANGE] The calculation result will cycle through the following display styles:

- Mixed fractions → Improper fractions → Decimal numbers
- Proper fractions → Decimal numbers

<Example 1> Add $3\frac{1}{2}$ and $\frac{5}{7}$, then convert the result to an improper fraction and a decimal number.

Operation	Display
[ON/C] 3 [2nd F] [a b/c] 1 [▶] 2 [▶]	
[+] 5 [a/b] 7 [=]	4 3/14
The mixed fraction is displayed.	
[CHANGE]	59/14
Convert to the improper fraction.	
[CHANGE]	4.214285714
Convert to the decimal number. Press once to return to the mixed fraction.	

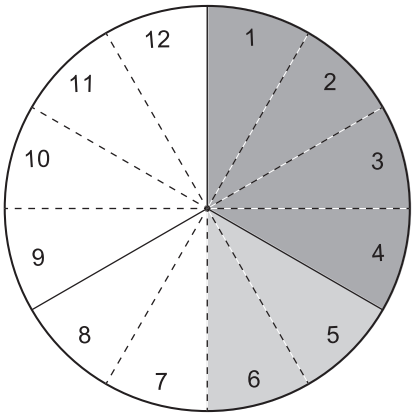
Fractional Calculations

$\frac{a}{b}$ a b/c CHANGE

<Example 2>

(1) Add $\frac{1}{3}$ and $\frac{2}{12}$

(2) The common denominator is “12”.
So, transform $\frac{1}{3}$ into $\frac{4}{12}$, and
add $\frac{4}{12}$ and $\frac{2}{12}$



Operation **Display**

(1) ON/C 1 $\frac{a}{b}$ 3 ▶ +

2 $\frac{a}{b}$ 12 =

(2) 4 $\frac{a}{b}$ 12 ▶ +

2 $\frac{a}{b}$ 12 =

Fractional Calculations

<Example 3>

Part of Leibniz's triangle is given below:

1 / 1

1 / 2 1 / 2

1 / 3 1 / 6 1 / 3

1 / 4 1 / 12 1 / 12 1 / 4

1 / 5 (A) (B) (C) 1 / 5

Using the relationship between the entries of Leibniz's triangle, compute (A), (B) and (C).

Operation **Display**

(A) ON/C 1 a/b 4 ▶ −

1 a/b 5 =

(B) 1 a/b 12 ▶ −

1 a/b 20 =

(C) 1 a/b 12 ▶ −

1 a/b 30 =

Random Functions

RANDOM

RANDOM Generates random numbers; there are two options.

1 **R.DICE** (Random Dice)

To simulate rolling the dice, a random integer between 1 and 6 can be generated by pressing 2nd F RANDOM 1 =.
To generate the next random dice number, press =.

2 **R.COIN** (Random Coin)

To simulate a coin flip, 0 (heads) or 1 (tails) can be randomly generated by pressing 2nd F RANDOM 2 =.
To generate the next random coin number, press =.

<Example> Generates random numbers simulating a dice roll.

Operation	Display
ON/C 2nd F RANDOM 1 =	4.
=	1.
=	3.
. . .	. . .

Percent Calculations

(%) %

(%) When specified immediately after a value, the value is treated as a percentage.

% You can perform premium, discount, and percentage calculations.

<Example 1> According to some data, 30% of the total calories an average American consumes come from fat. Calculate how many calories from fat an average American consumes daily if their total intake is 2,000 calories.

Operation	Display
ON/C 2000 × 30 2nd F (%)	2000×30(%)_
=	600.

<Example 2>

Operation	Display
(1) $125 increased by 10% 125 + 10 2nd F %	137.5
(2) $125 reduced by 20% 125 − 20 2nd F %	100.
(3) 15% of $125 125 × 15 2nd F %	18.75
(4) $125 is what percentage of $500 125 ÷ 500 2nd F %	25.

Square, Cube, Square Root, Cube Root

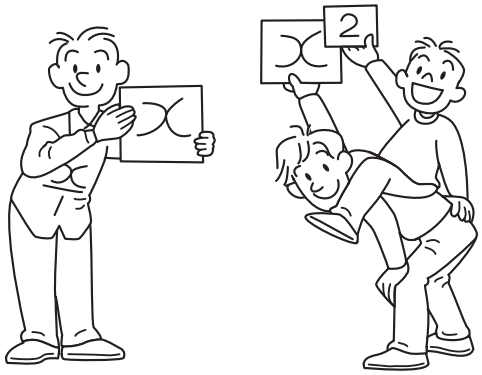
[x^2] [x^3]
[$\sqrt{}$] [$\sqrt[3]{}$]

[x^2] Raises the value to the power of 2.

[x^3] Raises the value to the power of 3.

[$\sqrt{}$] Calculates the square root of the value.

[$\sqrt[3]{}$] Calculates the cube root of the value.



<Example>

Operation	Display
ON/C 2 2nd F [x^2] =	4.
2 2nd F [x^3] =	8.
2 2nd F [x^3] + 3 2nd F [x^2]	2^3+3^2
=	17.
2nd F [$\sqrt{}$] 49 =	7.
2nd F [$\sqrt{}$] 4 + 12	$\sqrt{4+12}$
=	4.
2nd F [$\sqrt[3]{}$] 27 =	3.

Greatest Common Divisor, Lowest Common Multiple

GCD LCM

GCD Finds the greatest common divisor (GCD).

LCM Finds the lowest common multiple (LCM).

<Example 1>

Find the GCD and the LCM of each of the following pairs of numbers:

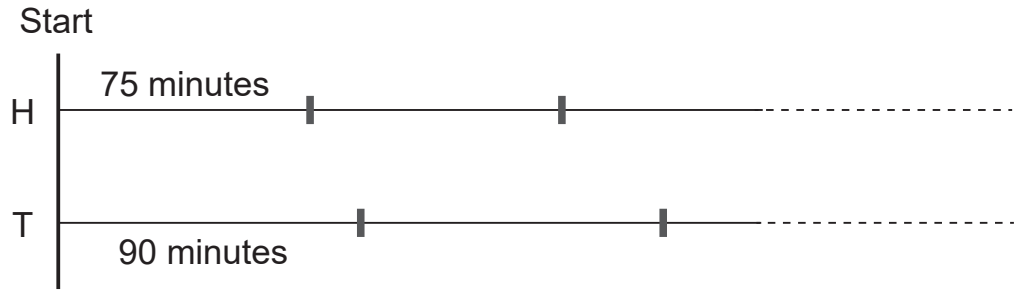
Operation	Display
(1) 900 and 630	
ON/C 900 2nd F GCD 630 =	90.
900 2nd F LCM 630 =	6300.
(2) 84 and 92	
84 2nd F GCD 92 =	4.
84 2nd F LCM 92 =	1932.

Greatest Common Divisor, Lowest Common Multiple

GCD LCM

<Example 2> When will we meet again?

High Point Middle School and Taylor Middle School both start their “all night” charity volleyball games at 7:00 p.m. on Friday. High Point takes 75 minutes per game, while Taylor takes 90 minutes per game.
Some students want to meet their friends after watching complete games. At what time will the game end times of both schools coincide, allowing the students to meet?
Assume the games are played continuously through the night, and travel time between schools is ignored.



Operation	Display
ON/C 75 2nd F LCM 90 =	450.

The games will coincide after 7 hours and 30 minutes (450 minutes). Assuming the games are played continuously from 7:00 p.m., the students can meet to watch a complete game together at 2:30 a.m.

Prime Factorization

P.FACT

P.FACT The calculation result can be shown as a product of prime numbers.

<Example>

Operation	Display
ON/C 900 =	900.
2nd F P.FACT	$2^2 \times 3^2 \times 5^2$
1895 =	1895.
2nd F P.FACT	5×379

NOTE:
A prime number is a number that can be divided only by itself and 1.
For example, 2, 3, 5, 7, 11, 13, 17, 19, etc.

Drill Mode

DRILL You can do the four types of drills (exercises).

1 **= < >** (Equality/inequality)

An equation of fractions, power functions and polynomials is randomly displayed.

2 **a/b** (Fraction calculations)

A conversion between numbers (fractions/decimals) is randomly displayed. There are four sub-modes.

3 **TIME** (Time calculations)

A time calculation in 24-hour format of addition or subtraction is randomly displayed.

4 **+−×÷** (Basic calculations)

A basic calculation of addition, subtraction, multiplication and division is randomly displayed. There are five sub-modes.

<Example> Let's try doing the "Equality/inequality" drill.

Operation	Display
(1) Enter the Drill mode. ON/C DRILL	
(2) Select the drill type. 1 (= < >)	
(3) Select the number of questions. ▶ ("25" is selected.)	

Drill Mode

(4) Start the “Equality/inequality” drill.

ENTER (= key)

(5) Press one of the following keys, for entering your answer.

= (□ key) : Left and right values are the same.

< (. key) : the right value is large.

> ((-) key) : the left value is large.

Press < and ENTER here.

- Before pressing ENTER, press BACK SPACE or ON/C to clear the entered answer and then enter the answer again.
- After pressing ENTER, it will be as follows depending on the correct answer, incorrect answer, and no entering.
  - If the answer is correct, “√” appears. Then press ENTER again to display the next question.
  - If the answer is incorrect, “×” appears. Then press ENTER again to display the same question again.
  - If you press ENTER without entering an answer, the correct answer is displayed. This will be regarded as an incorrect answer. And then press ENTER again to display the next question.

< (the right value is large) is the correct answer. So “√” appears. Then press ENTER to display the next question.

(6) Continue answering the series of questions by entering the answer and pressing ENTER.

(7) After you finish all questions, press ENTER and then the number and percentage of correct answers are displayed.

(8) Press ENTER to return to the initial screen (selection of the number of questions) for your current drill.

- Press 2nd F HOME to quit.

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