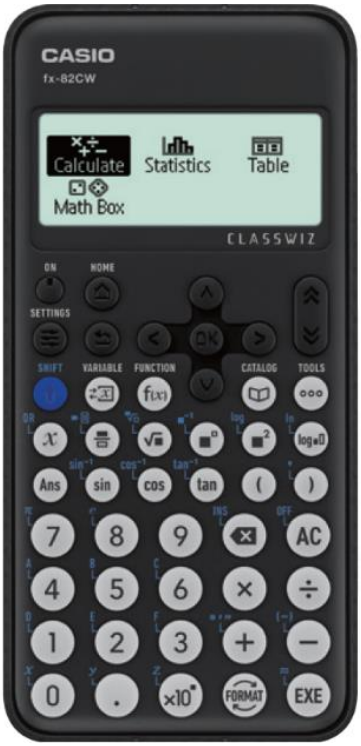
Material
On the usage of
fx-82CW

Section 1: Introduction/Main keys:



Main keys:

1. **ON**: Turns on the calculator
2. **HOME** : Calculator main page
3. **Shift :** Activates Blue functions
4. **AC :** Clear screen
5. **Delete Symbol:** Delete terms separately
6. **SETTINGS:** Transfer to more detailed calculation options
7. **VARIABLE:** Store and Edit Variables
8. **FUNCTION:** Define and Evaluate functions
9. **CATALOG:** Select Mode of Calculations
10. **Tools**: Modify Settings in some sections
11. **FORMAT:** Select number format to appear on the screen

- **To turn off calculator:**
- **To Initialize calculator:**

(Note: You need to be in any calculator app icon).

Section 2: SETTINGS:

To change the calculator SETTINGS

1- Press ☰ to display the settings menu.

2- Use ⌄ and ⌃ to scroll the setting menu.

SETTINGS Options	Settings Type	Calculator Key	Screen Output
Calc Settings (Input / Output)	MathI / MathO	☰ OK OK OK	Input: Natural text book display. Output: Format that includes a fraction, $\sqrt{\ }, and/or\ \pi.$
	MathI / DecimalO	☰ OK OK ⌄ OK	Input: Natural text book display. Output: Convert to Decimal value.
	LineI / LineO	☰ OK OK ⌄ ⌄ OK	Input: Linear, Output: Decimal or Fraction
	LineI / DecimalO	☰ OK OK ⌄ ⌄ ⌄ OK	Input: Linear , Output :Converted to Decimal Value
Calc Settings (Angle Unit)	Degree	☰ OK ⌄ OK OK	Specify the angle unit whether in degree, radian, or gradian for value input and calculation result display
	Radian	☰ OK ⌄ OK ⌄ OK	
	Gradian	☰ OK ⌄ OK ⌄ ⌄ OK	
Calc Settings (Number Format)	Fix	☰ OK ⌄ ⌄ OK OK	The value you specify (from 0 to 9) controls the number of decimal places for displayed calculation results. Calculation results are rounded off to the specified digit before being displayed.
	Sci	☰ OK ⌄ ⌄ OK ⌄ OK	The value you specify (from 1 to 10) controls the number significant digits for displayed calculation results. Calculation results are rounded off to the specified digit before being displayed.
	Norm	☰ OK ⌄ ⌄ OK ⌄ ⌄ OK	Display calculation result in exponential format when they fall within the ranges below: Norm1: $10^{-2} > \|x\|, \|x\| \geq 10^{10}$, Norm2: $10^{-9} > \|x\|, \|x\| \geq 10^{10}$
Calc Settings (Fraction Result)	Mixed Fraction	☰ OK ⌄ ⌄ ⌄ OK OK	Specifies either mixed fraction or improper fraction for display of fractions in calculation results.
	Improp Fraction	☰ OK ⌄ ⌄ ⌄ OK ⌄ OK	
Calc Settings (Decimal Mark)	Dot	☰ OK ⌄ ⌄ ⌄ ⌄ OK OK	Specifies whether to display a dot or a comma for the calculation result decimal mark. A dot is always displayed during input. When dot is selected as the decimal mark, the separator for multiple results is a comma (,). When comma is selected, the separator is a semicolon (;).
	Comma	☰ OK ⌄ ⌄ ⌄ ⌄ OK ⌄ OK	
Calc Settings (Digit Separator)	On	☰ OK ⌄ ⌄ ⌄ ⌄ ⌄ OK OK	Specifies whether or not a separator character should be used in calculation results.
	Off	☰ OK ⌄ ⌄ ⌄ ⌄ ⌄ OK ⌄ OK	

SETTINGS Options	Settings Type	Calculator Key	Screen Output
System Settings (Contrast)	Light	≡ ▽ OK OK <	Specifies the contrast of the screen by multiple presses on right and left arrow keys.
	Dark	≡ ▽ OK OK >	
System Settings (Auto Power Off)	10 Min.	≡ ▽ OK ▽ OK OK	Specifies the amount of time until Auto Power Off is triggered.
	60 Min.	≡ ▽ OK ▽ OK ▽ OK	
System Settings (MultiLine Font)	Normal Font	≡ ▽ OK ▽ ▽ OK OK	Specifies the display font size when LineI/LineO or LineI/DecimalO is selected for Input/Output. Up to four lines can be displayed while Normal Font is selected, and up to six lines can be displayed with Small Font.
	Small Font	≡ ▽ OK ▽ ▽ OK ▽ OK	
System Settings (QR Code)	Version 3	≡ ▽ OK ▽ ▽ ▽ OK OK	Specifies the version of the QR Code displayed when ⬆ 𝑥 (QR) is pressed.
	Version 11	≡ ▽ OK ▽ ▽ ▽ OK ▽ OK	
System Settings (Reset)	Settings & Data	≡ ▽ ▽ OK OK	This procedure initializes all calculator settings, except for Contrast and Auto Power Off. Also clears all data except for variable memory and Ans data
	Variable Memory	≡ ▽ ▽ OK ▽ OK	Ans memory and variable contents are retained even if you press AC, change the calculator app, or turn off the calculator. Apply the specified steps when you want to clear the contents of all memories.
	Initialize All	≡ ▽ ▽ OK ▽ ▽ OK	This procedure initializes all calculator settings, except for Contrast and Auto Power Off. Also clears all data stored in calculator memory.
System Settings (Get Started)		≡ ▽ ▽ ▽ OK	QR Code for accessing the "Get Started" webpage of the Worldwide Education Service (https://wes.casio.com/calc/cw/)

Section 3: Menu:

Select a calculator app that is suitable for the type of calculation you want to perform.

1. Press ⌂ to display the HOME screen.

2. Use the cursor keys (▲, ▼, ◀, ▶) to select the calculator app icon you want.

3. Press OK to display the initial screen of the calculator app whose icon you selected.

Icon	Description
	General calculations
	Statistical and regression calculations
	Generates a number table based on one or two functions
	The following functions to support math learning. Dice Roll, Coin Toss: Probability simulation

Section 4: Calculate Mode:

A- Calculating Numerical Operations:

Example	Steps using CASIO fx-82CW	Answer
$3+2-8^2$	③ ⊕ ② ⊖ ⑧ $\blacksquare^2$ EXE	-59
$(4-8)^2+7$	(④ ⊖ ⑧) $\blacksquare^2$ ⊕ ⑦ EXE	23
$\frac{(4+3)^2}{(3-4)^3+2}$	$\frac{\blacksquare}{\blacksquare}$ (④ ⊕ ③) $\blacksquare^2$ ∨ (③ ⊖ ④) $\blacksquare^{\square}$ ③ > ⊕ ② EXE	49
$\sqrt{5+4}-3\times\sqrt[3]{27}$	$\sqrt{\blacksquare}$ ⑤ ⊕ ④ > ⊖ ③ ⊗ ↑ $\sqrt{\blacksquare}$ ③ > ② ⑦ EXE	-6
$\sqrt{225}+3\sqrt{75}+3^2$	$\sqrt{\blacksquare}$ ② ② ⑤ > ⊕ ③ $\sqrt{\blacksquare}$ ⑦ ⑤ > ⊕ ③ $\blacksquare^2$ EXE	$24+15\sqrt{3}$
$\lvert 5^3-100\rvert+\frac{24}{3}$	Abs ∨ ∨ OK OK ⑤ $\blacksquare^{\square}$ ③ > ⊖ ① ⓪ ⓪ > ⊕ $\frac{\blacksquare}{\blacksquare}$ ② ④ ∨ ③ EXE	33
$\frac{15}{3}+\sqrt{25}-3\lvert-5\rvert-9^4$	$\frac{\blacksquare}{\blacksquare}$ ① ⑤ ∨ ③ > ⊕ $\sqrt{\blacksquare}$ ② ⑤ > ⊖ ③ Abs ∨ ∨ OK OK ⊖ ⑤ > ⊖ ⑨ $\blacksquare^{\square}$ ④ EXE	-6566
$3\div2\times(1+1)$	③ ÷ ② ⊗ (① ⊕ ①) EXE	3
$3\div2(1+1)$	③ ÷ ② (① ⊕ ①) EXE	$\frac{3}{4}$

Note: Whenever you want to move outside radical, exponent, absolute value & fraction use the right arrow

B- Prime Factorization

To activate prime factorization make sure you are in the calculate mode (from the icon menu choose calculate)

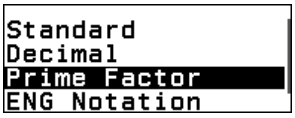
Steps to find the prime factorization of a number:

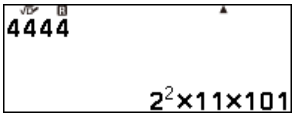
1- Make sure to log into Calculate mode 

EXE
2- Input the number
3- Click EXE
4- Click FORMAT and choose Prime Factor

Example: What is the prime factorization of 4,444?

1- Log into Calculate mode using EXE
2- Input number 4,444 then click EXE
3- Click FORMAT and choose Prime Factor
4-





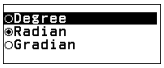
C- Trigonometry

In order to calculate the value of a trigonometric function, log into Calculate mode 

Check table below for examples:

Note: Make sure to select the correct setting of angle before finding the answer

If working in degree "Activate degree from SETTINGS"

If working in radian "Activate radian from SETTINGS" 

Example	Steps using CASIO fx-82CW	Output
$sin30^o$	sin 3 0) EXE	$\frac{1}{2}$
$cos45^o$	cos 4 5) EXE	$\frac{\sqrt{2}}{2}$
$tan60^o$	tan 6 0) EXE	$\sqrt{3}$
$sin30^o + cos30^o$	sin 3 0) + cos 3 0) EXE	$\frac{1+\sqrt{3}}{2}$
$\sin(\frac{\pi}{3})$	Step one Activate Radian: SETUP OK ▽ OK ▽ OK AC Step two input data: sin ↑ 7 (−) 3 >) EXE	$\frac{\sqrt{3}}{2}$
$\cos(\frac{\pi}{6})$	cos ↑ 7 (−) 6 >) EXE	$\frac{\sqrt{3}}{2}$

D- Additional Calculation Functions

Topic	Calculation Function	Steps using CASIO fx-82CW	Answer
Percentage Calculation	What is 15% of 220?	2 2 0 × 1 5 SHIFT ▽ OK OK EXE	33
	What percent of 880 is 660?	6 6 0 ÷ 8 8 0 SHIFT ▽ OK OK EXE	75
	Discount 3500 by 25%	3 5 0 0 − 3 5 0 0 × 2 5 SHIFT ▽ OK OK EXE	2625
Degree, Minutes, Seconds, (Sexagesimal) Calculation	Convert to decimal $20^o30'22''$	2 0 ↑ + 3 0 ↑ + 2 2 ↑ + EXE FORMAT ▽ OK	20.5061
	Convert 2.5 to sexagesimal	2 . 5 EXE ↑ + EXE	$2^o30'0''$
	Write $9'30''$ in decimal	0 ↑ + 9 ↑ + 3 0 ↑ + EXE FORMAT ▽ OK	0.1583
	$2^o30'' + 30'30''$	2 ↑ + 0 ↑ + 3 0 ↑ + + 0 ↑ + 3 0 ↑ + 3 0 ↑ + EXE	$2^o31'0''$
Engineering Notation	Shifting decimal point to the right or to the left: 123 (Use right and left arrow keys)	1 2 3 EXE FORMAT ▽ ▽ ▽ OK	123×10^0
		1 2 3 EXE FORMAT ▽ ▽ ▽ OK >	123000×10^{-3}
		1 2 3 EXE FORMAT ▽ ▽ ▽ OK > >	123000000×10^{-6}

Factorial	Find 4!	(4) (▭) (∨) (OK) (∨) (OK) (EXE)	24
Logarithm	Calculate $\log(1000)$	(⬆) (■²) (1) (0) (0) (0) ( ) (EXE)	3
	$log_3(9) + log_3(27)$	(log■□) (3) (>) (9) (>) (+) (log■□) (3) (>) (2) (7) (EXE)	5
	$log_3(9) + log_2(32)$	(log■□) (3) (>) (9) (>) (+) (log■□) (2) (>) (3) (2) (EXE)	7
	$log_3(3 + 6) - \log(4 \times 25)$	(log■□) (3) (>) (3) (+) (6) (>) (−) (⬆) (■²) (4) (×) (2) (5) ( ) (EXE)	0

E- Converting angle measure from Radians to Degrees and vice versa

Using CASIO fx-82CW, the user can convert the measure from radian to degree and vice versa

In order to convert angels for a given unit, log into Calculate mode: 

<u>Convert from Degrees to Radians:</u>

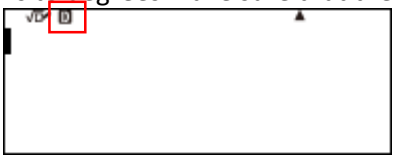
In order to convert from degrees to radians make sure that the calculator in Radian mode and "R" sign appears on the screen. 

Setup calculator on Radian mode: (≡) (OK) (∨) (OK) (∨) (OK) (AC)

Example: convert $45^o\ to\ radians$.

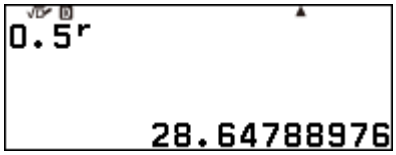
Steps using calculator : (4) (5) (▭) (∨) (∨) (∨) (OK) (OK) (EXE) 

<u>Convert from Radians to Degrees:</u>

In order to convert from radians to degrees make sure that the calculator is on Degrees mode, and "D" sign appears on the screen. 

Setup calculator on Degrees mode: (≡) (OK) (∨) (OK) (OK) (AC)

Example: convert 0.5 radians to degrees.

Steps using calculator: (0) (.) (5) (▭) (∨) (∨) (∨) (OK) (∨) (OK) (EXE) 

F- Permutation and Combination

To perform permutation using CASIO fx-82CW of 4P3
Click ④ ▭ ▽ OK ▽ ▽ OK ③ EXE

To perform Combination using CASIO fx-82CW of 5C3
Click ⑤ ▭ ▽ OK ▽ ▽ ▽ OK ③ EXE

G- Polar & Rectangular coordinates

To convert from rectangular to polar:

Ex: what is (3, 4) in polar coordinates.

Steps using fx-82CW: ▭ ▽ ▽ ▽ OK ▽ ▽ ▽ OK ③ ⬆) ④) EXE

To convert from polar to rectangular

Ex: what is $(5,50^o)$ in rectangular coordinates.

Steps using fx-82CW: ▭ ▽ ▽ ▽ OK ▽ ▽ ▽ ▽ OK ⑤ ⬆) ⑤ ⓪) EXE

Section 5: Statistics:

In order to solve statistics log into statistics from main menu 

and choose the type of your Statistics. In this session we will solve 1 variable statistics and 2 Variable (linear equation).

Example 1:

Rami got the following grades in Mathematics:

30, 32, 35, 34, 36, 40, 32, 33, 36, 41, 44, 37,

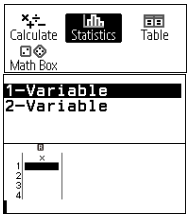
Calculate the mean and the standard deviation.

Steps using Calculator fx-82CW:

1st log into Statistics

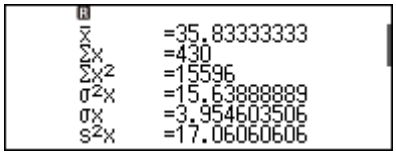
2nd Choose 1- Variable

3rd fill up the table



③ ⓪ EXE ③ ② EXE ③ ⑤ EXE ③ ④ EXE ③ ⑥ EXE ④ ⓪ EXE ③ ② EXE ③ ③ EXE
③ ⑥ EXE ④ ① EXE ④ ④ EXE ③ ⑦ EXE

4th click EXE EXE for calculation.



A screen will show all calculations scroll down by arrow to see more results.

Example 2:

The following table gives the distribution of students according to their weight:

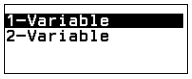
Weight	30	31	32	33	34	35	36
Frequency	7	4	5	2	4	5	1

Calculate the mean, median, and standard deviation.

In this question insert frequency table:

Steps using Calculator fx-82CW:

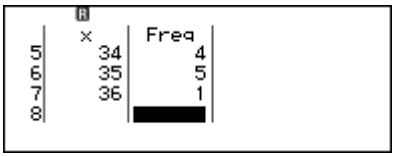
1st log into statistic 1-variable



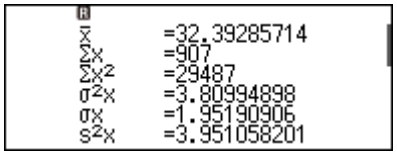
2nd activate frequency table ⚙ ▽ OK OK AC

3rd input data

3 0 EXE 3 1 EXE 3 2 EXE 3 3 EXE 3 4 EXE 3 5 EXE 3 6 EXE ▷ ^ ^
^ ^ ^ ^ ^ 7 EXE 4 EXE 5 EXE 2 EXE 4 EXE 5 EXE 1 EXE



Click EXE EXE



Example 3:

The marks of 20 obtained on physics and mathematics test by 5 students of the same class are as follows:

Mark x in Physics	7	10	11	13	16
Mark y in Math	8	9	12	12	13

Write the regression linear equation D_y/x

This question deals with two variable statistics

<u>Steps using calculator fx-82CW</u>

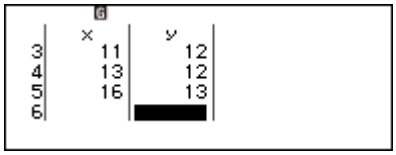
If frequency table appears you can turn off frequency by:

⚙ ▽ OK ▽ OK AC

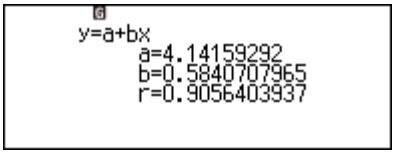
1st log into statistics and choose 2-Variable ⌂ ▷ OK ▽ OK

2nd input data

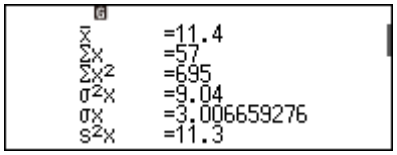
7 EXE 1 0 EXE 1 1 EXE 1 3 EXE 1 6 EXE ▷ ^ ^ ^ ^ ^ 8 EXE 9 EXE
1 2 EXE 1 2 EXE 1 3 EXE



To find regression equation ($y = ax + b$): EXE ▽ EXE EXE



For 2-Variables calculation: AC EXE EXE



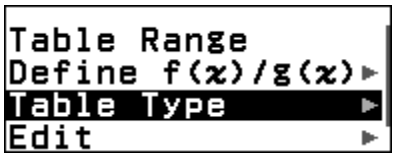
Section 6: Table:

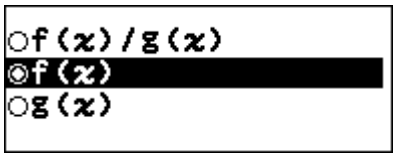
In order to use the table using fx-82CW log into main menu screen and choose Table

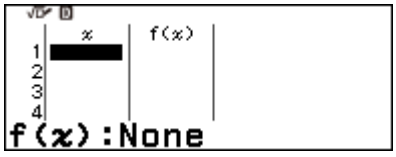
Example 1: Check whether the function $f(x) = x^2 + 3$ is decreasing or increasing over the domain $x\epsilon(1,5)$.

Steps using calculator: Make sure the calculator is logged into Table

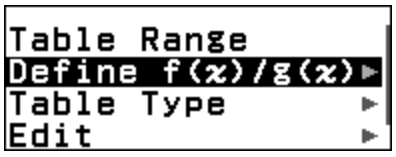
1st Set your table type to $f(x)$ only in this case: ⊙⊙⊙ ▽ ▽ OK ▽ OK AC

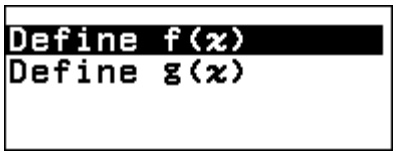


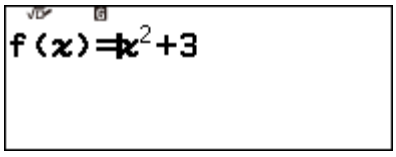




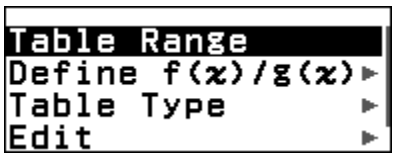
2nd Define f(x): ⊙⊙⊙ ▽ OK OK ↑ 0 ■² + 3 EXE

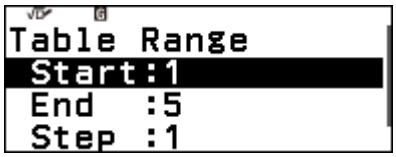


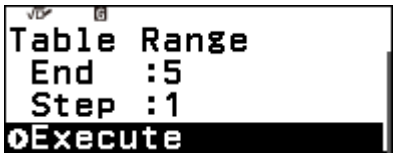




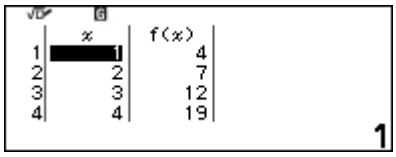
3rd Define the table range: ⊙⊙⊙ OK 1 EXE 5 EXE ▽ EXE







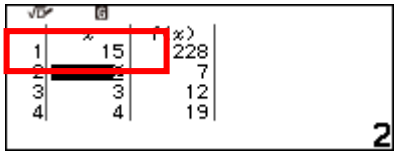
The table will show the result, now look at the f(x)



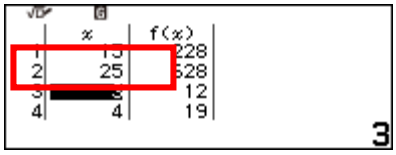
Values are they increasing or decreasing?

- To evaluate the function at any given "x"value, move the marked black space by arrow downward or upward in "x" column and replace it by any "x" value. FOR EXAMPLE : change the 1st "x" value to 15 and the 2nd "x" value to 25.
  Steps :

① ⑤ EXE



② ⑤ EXE

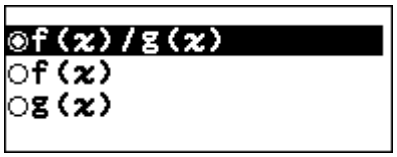


Example 2: What is the intersection between the two given functions

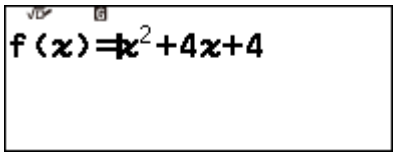
$f(x) = x^2 + 4x + 4 \quad and \quad g(x) = 3x + 6 \ where \ -4 < x < 4$

Steps using calculator: make sure to be in the table mode again:

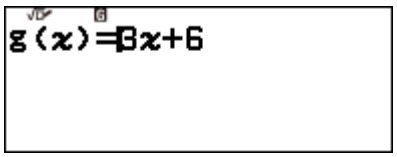
1st Set your table type to $f(x)$ and $g(x)$ in this case: ⚙ ▼ ▼ OK OK AC



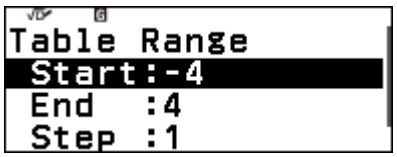
2nd Define f(x): ⚙ ▼ OK OK ↑ 0 x^2 + 4 x + 4 EXE

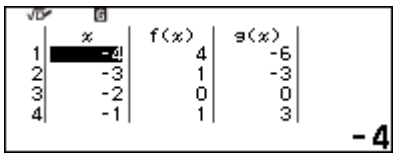


3rd Define g(x): ⚙ ▼ OK ▼ OK 3 ↑ 0 + 6 EXE



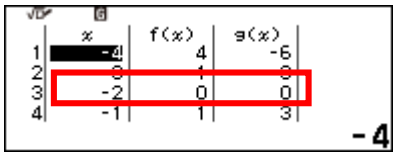
4th Input your numbers or define table range: ⚙ OK − 4 EXE 4 EXE 1 EXE EXE





In order to locate the intersection point just check the table where $value \ f(x) = g(x)$

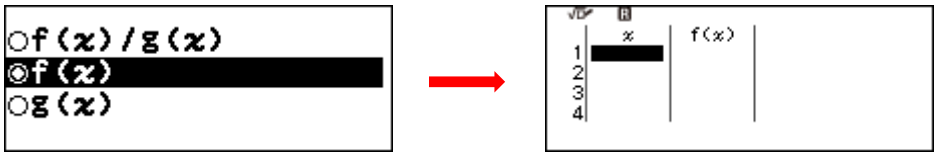
So the intersection point is (-2,0)



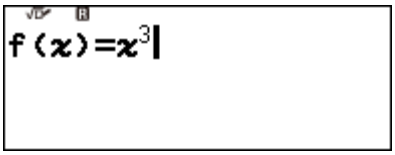
Example 3: For what values of $x, f(x) = x^3$ *is negative* , *in the domain* $-3 \leq x \leq 3$

Steps using calculator: make sure table mode is activated.

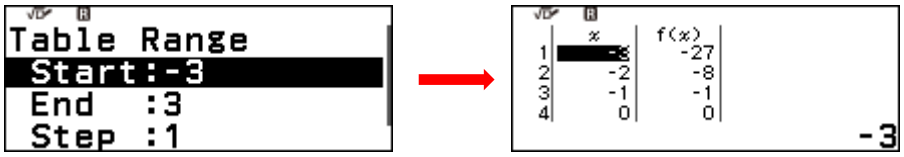
1st Set your table type to $f(x)$ only in this case: ⚙ ▼ ▼ OK ▼ OK AC



2nd Define your function: ⚙ ▼ OK OK x $x^{\square}$ 3 EXE

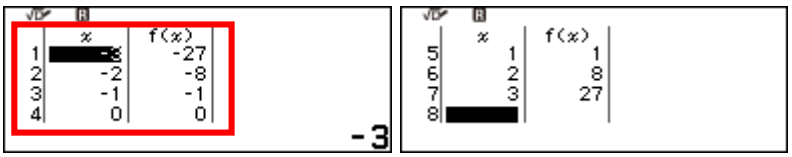


3rd Input your numbers or define table range: ⚙ OK (−) 3 EXE 3 EXE ▼ EXE

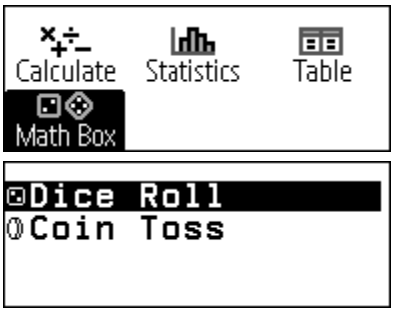


Check the negative values of f(x) from the table with respect to "x"

Domain where f(x) is negative : $x\epsilon[-3,0)$



Section 7: Math Box:



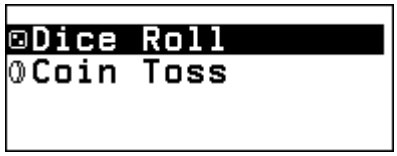
In order to use the Math Box using fx-82CW log into main menu screen and choose Math Box. It has the following learning support functions:

Dice Roll: Dice Roll is function that simulates dice probability.

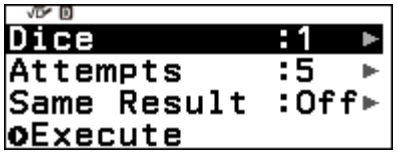
Coin Toss: Coin Toss is a function that simulates coin toss probability.

Example 1: To simulate 100 rolls of two dice. For this example, the Relative Freq screen is used for simulation results, showing the number of occurrences (frequencies) and relative frequencies of the numeric difference (0, 1, 2, 3, 4, 5) between the two dices each roll.

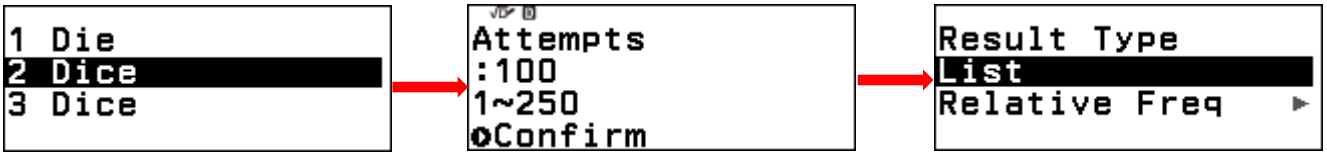
- Select Dice Roll from the Menu:



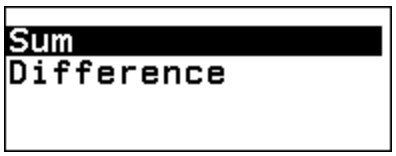
- This displays the parameter input screen:
  - Dice: Select the number of dice as 1, 2, or 3.
  - Attempts: Input the number of dice rolls (number of trials) as a value from 1 to 250.



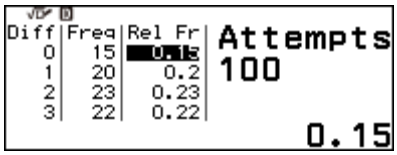
- After all of the settings are the way you want, select EXE and then press OK
- The screen showing execution of the simulation will appear, and then the screen will change to the Result Type menu.



- List: Shows a list of the outcome of each roll (trial).
- Relative Freq: Shows the number of occurrences based on roll results and their relative frequencies.
- Use the Result Type menu to select a result display format. Here, we want to display the number of occurrences and relative frequencies, so select **[Relative Freq]** and then press OK .This displays the [Sum] or [Difference] selection menu.

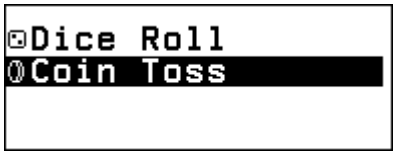


- Here, we want to display the difference in the outcome of each roll, so select **[Difference]** and then press (OK).

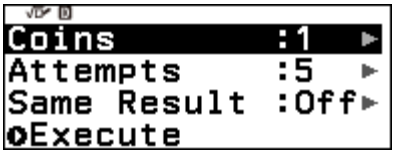


Example 2: To simulate 100 tosses of three coins. For this example, the Relative Freq screen is used for simulation results, showing the number of heads (0, 1, 2, and 3) and the relative frequencies of heads of each toss.

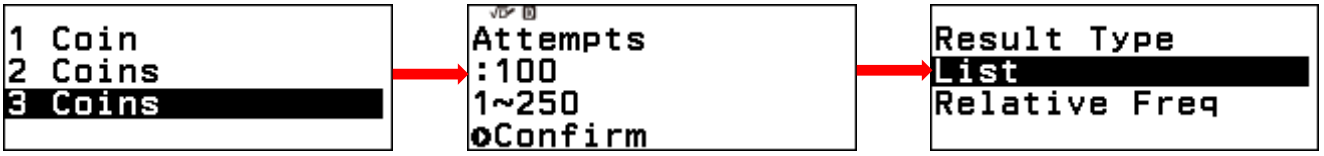
- Select Coin Toss from Main Menu:



- This displays the parameter input screen:
  - Coins: Select the number of coins as 1, 2, or 3.
  - Attempts: Input the number of coin tosses (number of trials) as a value from 1 to 250.



- After all of the settings are the way you want, select (EXE) and then press (OK)
- The screen showing execution of the simulation will appear, and then the screen will change to the Result Type menu.



  - List: Shows a list of heads or tails for each toss (trial).
  - Relative Freq: Shows the number of occurrences for each coin that comes up heads, and their relative frequencies.
- Use the Result Type menu to select a result display format. Here we want to display the number of occurrences and relative frequencies, so select **[Relative Freq]** and then press (OK).