FX 65 Training guide

Tools	FX 65 Fraction Calculator Overhead OH 65
Handouts	Applicable activities Activities for the Classroom FX-65 Fraction Calculator
Other materials	Quick Reference Guide (inside the calculator cover)

Key Points/ Overview

- ❖ True fraction display
- ❖ Fraction and decimal conversions
- ❖ Integer division (quotient and remainder)
- ❖ Ability to fix decimal places
- ❖ Basic scientific functions
- ❖ Single variable statistics
- ❖ Super solar power- operates even in low light

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Display Indicators

The display window has many indicators that will be displayed when a certain function is performed. Alternatively, it may also show the status of a setting. The following is a list of the display indicators along with a description:

Indicator	Meaning
FIX	Number of decimal places is fixed.
SCI	Number of significant digits is fixed.
SIMP	Displayed fraction can be simplified.
R	Remainder of division.
‘	3-digit separator
( )	Parentheses
M	A value is stored in memory.
E	Error
+	Addition
-	Subtraction
x	Multiplication
÷	Division
÷R	Division with remainder
=	Result
D	Degrees
R	Radians
G	Grads
STAT	Statistics mode. The calculator is in the COMP mode when this indicator is not on the display.
x^y	The *y*th power of *x*.
$x^{1/y}$	The *y*th root of *x*.
F1	Data is stored in constant memory F1.
F2	Data is stored in constant memory F2.
S	[SHIFT] was pressed
Hyp	Hyperbolic function

Display Set Up

The FX-65 allows you to change the display format for the following:

Fixed number decimal places
Number of significant digits in scientific notation
Engineering notation mode

Key	Function
[FIX] *n*	Sets the number of decimal places according to the value you input for n (0 – 9).
[FIX] [.]	Clears the decimal place setting.
[SHIFT] [SCI] *n*	Sets the number of significant digits according to the value you input for n (0 – 9).
[SHIFT] [SCI] [.]	Clear the scientific notation setting.
[SHIFT] [ENG]	Enters the engineering notation mode and normalizes the displayed value so its exponent is a positive multiple of three.
[SHIFT] [$\overleftarrow{ENG}$]	Enters the engineering notation mode and normalizes the displayed value so its exponent is a negative multiple of three.

Basic Arithmetic Calculations

Basic Functions and Operations

The following are the basic functions and operations of the calculator.

►	Backspaces and deletes the right digit of a displayed input value.
[AC]	Turns power on.
[C]	Clears the displayed input value.
[SHIFT]	Shifts the keyboard and accesses functions marked above the keys.

Note: There is no power off key. The calculator automatically turns off about six minutes after you finish using it.

Basic Calculations

Be sure to press [AC] when beginning a new calculation.

[+] [-] [x] [÷]	Addition, subtraction, multiplication, and division
÷R	Division with remainder. The display shows up to (6) digits for the quotient and (4) digits for the remainder.
[=]	Performs calculation
[+/-]	Changes the sign of a displayed value. You must enter the value first.
[(] [)]	Left and right parentheses. You can have up to 18 sets of nested parentheses. Note: The calculator uses "order of operations". So for 2 + 3 x 4, you do not need parentheses around 3 x 4. The calculator will calculate 3 x 4, then add 2.
[SHIFT] [π]	In degree mode, this will input the numerical value for π. In radian mode, the "π" symbol will be displayed.
[SHIFT] [X-Y]	Swaps the value of x and y in power and root calculations. Also swaps the minuend and subtrahend in subtraction calculations. Example: for 3^2, to swap 3 and 2, press [3] [x^y] [2] [SHIFT] [X-Y] [=]. The answer displayed is 8.

Fraction calculations and simplification

- You can perform addition, subtraction, multiplication, and division.
- The result of a calculation that mixes fractions and decimal values is displayed as a decimal value.
- Using the [b/c] key, you can enter a fraction with up to 4 digits in both the numerator and denominator.
- Results can have up to four digits each for integer, numerator, and denominator. If any part is longer, value is displayed as decimal with error symbol E.

Be sure to press [AC] when beginning a new calculation.

[b/c]	Inputs the numerator (b) /denominator (c) of a fraction in the form b/c. Example: to input ½ , press [1] [b/c] [2].
[a]	Inputs the integer part of a fraction (mixed number). Example: to input 2 ½, press [2] [a] [1] [b/c] [2].
[SHIFT] [a b/c – d/c]	Converts the displayed value between mixed number and improper fraction.
[=]	When "SIMP" is displayed, pressing [=] will reduce the fraction to its simplest form.
[SIMP]	Simplifies a fraction by the smallest divisor possible. The divisor being used appears on the display for a moment, followed by the simplified fraction.
n [SIMP]	Simplifies a fraction by a specific divisor. Example: 50 [b/c] [100] [=] Press [5] [SIMP]. The fraction is reduced to 10/20.
[F-D]	Converts the displayed value between fraction and decimal form.

Percent calculations

	Example	Display
To find percentage of a number.		
12% of 15	[15] [x] [12] [SHIFT] [%]	1.8
To calculate percentage of one number to another.		
What percentage of 80 is 40?	[40] [÷] [80] [SHIFT] [%]	50
To add a percentage.		
15% to 1000 (or 1000 increased by 15%)	[1000] [x] [15] [SHIFT] [%] [+]	1150
To discount a percentage.		
85 by 10%	[85] [x] [10] [SHIFT] [%] [-]	76.5

% change, when a value is increased

From 30 to 36	[36] [-] [30] [SHIFT] [%]	20

Percent of increase, when an amount is added.

300 cc is added to 500 cc	[300] [+] [500] [SHIFT] [%]	160

Default angle unit setting and conversions

[DRG] Changes the default angle unit cyclically between degrees, radians, and grads.

[SHIFT] [DRG] Changes the default angle unit cyclically between degrees, radians, and grads, and converts the displayed value accordingly.

Powers and roots

[x^2] Squares a number. Example: [5] [x^2]

[SHIFT] [x^3] Cubes a number. Example: [3] [SHIFT] [x^3]

[x^y] Raises a number to a power (other than 2 or 3).
Example: [2] [x^y] [4] [=]

[SHIFT] [1/x] Calculates the reciprocal of the displayed value.
Example: [3] [SHIFT] [1/x]

[SHIFT] [$\sqrt{\ }$] Calculates the square root of a number.
Example: [9] [SHIFT] [$\sqrt{\ }$]

[SHIFT] [$\sqrt[3]{\ }$] Calculates the cube root of a number.
Example: [27] [SHIFT] [$\sqrt[3]{\ }$]

[SHIFT] [$x^{1/y}$] Calculates the specified root of a number.
Example: For $27^{1/3}$, press [27] [SHIFT] [$x^{1/y}$] [3] [=]

Internal Rounding

Calculates internal rounding based on the number of decimal places you have on the display. For example, set the calculator to 3 fixed decimal places.

Press [200] [÷] [7] [=]
Press [SHIFT] [RND]. This will truncate the number at 3 decimal places.
Press [x] [14] [=]
(The answer displayed is 399.994).

Probability

Random number generation

[SHIFT] [RAN#] Generates a random number between 0 and 0.999.

Permutations and combinations

[SHIFT] [nPr] A permutation is a selection of objects in which the order matters.
Example: To determine the number of possible different arrangements using 4 items selected from 10 items.
[10] [SHIFT] [nPr] [4] [=] 5040

[SHIFT] [nCr] A combination is a selection of objects from a collection and order is irrelevant.
Example: To determine the number of different combinations of 4 items selected from 10 items. [10] [SHIFT] [nCr] [4] [=] 210

Factorials

[SHIFT] [x!] Calculates the factorial of a number. Example: [5] [SHIFT] [!]

Memory

Memory Calculations

The memory function is convenient for calculating cumulative totals.

[M+]	Adds displayed value to memory.
[MR]	Recalls the value stored in memory.
[SHIFT] [MC]	Clears memory.
[SHIFT] [M-]	Subtracts the displayed value from memory.
[SHIFT] [X-M]	Swaps the displayed value with the value currently in memory.

Constant Memory Calculations

A pair of constant memories let you store operators and values. Once stored, a value and operator can be recalled with the touch of a key as necessary.

- Arithmetic operators (+, -, x, ÷), power, and root operations can be stored in constant memory.
- An error will occur if you try to store only an operator or only a value.
- You can store data in constant memory immediately after pressing the [AC] key.
- Storing data to a memory that already contains data replaces the old data with the new.

[SHIFT] [SET1]	Stores data into constant memory F1.
[SHIFT] [SET2]	Stores data into constant memory F2.
[F1]	Recalls data from constant memory F1.
[F2]	Recalls data from constant memory F2.
[AC] [SHIFT] [SET1]	Clears constant memory F1.
[AC] [SHIFT] [SET2]	Clears constant memory F2.
[AC] [F1]	Displays the contents of constant memory F1.
[AC] [F2]	Displays the contents of constant memory F2.

Examples:
To store x 123 in constant memory F1: [AC] [x] [123] [SHIFT] [SET1]
To use constant memory (multiply by 123): [AC] [2] [F1]

Trigonometry

Be sure to select the angle unit (D, R, G) you want to use before beginning a calculation.

Trigonometric/Inverse Trigonometric Functions

To calculate the sine, cosine, or tangent of the displayed angle.
Example (in degree mode): [30] [sin] (= .5)

To calculate the arcsine, arccosine, or arctangent.
Example (in degree mode): [.5] [SHIFT] [sin] (= 30)

Hyperbolic/ Inverse Hyperbolic Functions

To calculate the hyperbolic sine, cosine, or tangent of the displayed angle.
Example (in degree mode): [3.6] [hyp] [sin]

To calculate the hyperbolic arcsine, arccosine, or arctangent of the displayed angle.
Example (in degree mode): [30] [hyp] [SHIFT] [$\sin^{-1}$]

Coordinate Conversion

You can convert between rectangular and polar coordinates.
Make sure you are using the correct angle unit (D, R, G) before starting your calculation.

[SHIFT] [R-P] Rectangular to polar coordinate conversion
[SHIFT] [P-R] Polar to rectangular coordinate conversion
[SHIFT] [X-Y] Use this operation to switch between the two coordinates produced by the conversion operation.

Example: To convert polar coordinates ($r = 2$, $\theta = 60$) to rectangular coordinates (x, y).

[2] [SHIFT] [P-R] [60] [=] This gives you the x value.
[SHIFT] [X-Y] This gives you the y value.

Logarithmic Functions

You can find logarithms, natural logarithms, and antilogarithms.

[log] Calculates the common logarithm of the displayed value.
[100] [log]

[ln] Calculates the natural logarithm (base *e*) of the displayed value.
[90] [ln]

[SHIFT] [10^x] Calculates the common antilogarithm of the displayed value, which is 10 raised to the power of the value.
[2] [SHIFT] [10^x]

[SHIFT] [e^x] Calculates the natural antilogarithm of the displayed value, which is *e* raised to the power of the value.
[1] [SHIFT] [e^x]

Statistics

Entering and analyzing statistical data

[SHIFT] [STAT]	Enters the statistics mode.
[COMP]	Exits the statistics mode. Note that all input data is deleted.
[SHIFT] [SAC]	Clears statistical memory. Be sure to perform this operation before inputting new data.
[DATA]	Inputs the displayed value as data. Press [DATA] twice to input two entries of the same value. (NOTE: This is the "M+" key).
[SHIFT] [DEL]	Deletes the displayed value as data.

Note: You can input multiple entries of the same data using [x].
To input 100 ten times, press [100] [x] [10] [DATA].

After entering data, you can retrieve the following values:

[SHIFT] [$\sigma\ n^{-1}$]	Sample standard deviation.
[SHIFT] [$\sigma\ n$]	Population standard deviation.
[SHIFT] [$\bar{x}$]	Arithmetic mean.
[SHIFT] [n]	Number of data items.
[SHIFT] [$\sum x$]	Sum of data.
[SHIFT] [$\sum x^2$]	Sum of the squares.