FX 300 MS Training guide

Tools   FX 300 MS Calculator
                         Overhead OH 300 MS

Handouts   Applicable activities
                         Activities for the Classroom FX-300 Scientific Calculator

Other materials   Quick Reference Guide (inside the calculator cover)

Key Points/ Overview
- ❖ Two line display
- ❖ VPAM to show formulas as in textbooks
  (Visually Perfect Algebraic Method)
- ❖ Fraction key; Mixed number vs. improper fractions
- ❖ Recall and edit function
- ❖ Statistics mode including standard deviation and regression

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Content

BASIC ARITHMETIC CALCULATIONS   Mode 1 (Comp) Computation
        Making Corrections During Input
        Replay Function
        Order of Operations
        Display Format (FIX, SCI, Norm)
        Fraction Display
        Decimal-Fraction Conversion
        Angle Display
        Initial Defaults
        Percentage Calculations
        Degrees/Minutes/Seconds
        Memory Calculations
                Answer Memory
                Consecutive Calculations
                Independent Memory
                Variables
                Clearing Memory
        Powers/Square Roots/Cube Root, nth roots
        Probability Calculations/Random Number/Factorials
        Trigonometry
                Trigonometric/Inverse Trigonometric Functions
                Hyperbolic/ Inverse Hyperbolic Functions
                Convert Radians to Degrees
                Coordinate Conversion
                Logarithms/Natural Logarithms

STATISTICAL CALCULATIONS
        Standard Deviation   Mode 2 (SD) Standard Deviation
        Regression   Mode 3 (Reg) Regression

1

Basic Arithmetic Calculations

Making Corrections During Input
- Use the left and right arrows on the REPLAY function to move the cursor to the location you want to correct.
- Press [DEL] to delete at the current cursor position
- Press [SHIFT] [INS] to change the cursor to an insert cursor [ ].

Replay Function
>Every time you perform a calculation, the replay function stores the calculation formula and its result in replay memory. Pressing the up arrow displays the formula and result of the calculation you last performed. If you continue to press the up arrow, you will scroll sequentially through your last calculations (most recent to oldest).

>Notes:
>Replay memory capacity is 128 bytes.
>Pressing AC will not clear the replay memory.
>If you want to clear the replay memory, press the ON key or reset the modes/settings:
>Press [SHIFT] [CLR] [2] [=] or [SHIFT] [CLR] [3] [=] .

Order of Operations
>The calculator uses "order of operations".

Examples:	2 + 3 x 4 = 14	You do not need parentheses around 3 x 4.
	(2 + 3) x 4 = 20	Use Replay and [SHIFT] [INS] to add parentheses. Blinking [ ] is the insert cursor.
	$- 2^2 = -4$	
	$(- 2)^2 = 4$	

Display Format
>To change the exponential display format, press the [MODE] key 3 times.

Fixed number of decimal places:	Press 1: FIX You will then be prompted for the number of decimal places (0 – 9).
Scientific Notation:	Press 2: SCI You will then be prompted for the number of significant digits (0 – 9).
Normal Notation:	Press 3: NORM You will then be prompted for NORM 1 or NORM 2.
	NORM 1 uses exponential notation for integers with more than 10 digits and decimal values with more than 2 decimal places. **Ex/ $1 \div 1000 = 1 \times 10^{-3}$**
	NORM 2 uses exponential notation for integers with more than 10 digits and decimal values with more than 9 decimal places. **Ex/ $1 \div 1000 = .001$**

2

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Fraction Display

You can use the display set up screen to specify the display format when a fraction calculation result is greater than one. To set the fraction display, press the [MODE] key 4 times and press "1" for Display (DISP).

Example

Mixed Fraction: Press 1: a b/c $\dfrac{3}{2} + \dfrac{4}{3} = 2\dfrac{5}{6}$

Improper Fraction: Press 2: d/c $\dfrac{3}{2} + \dfrac{4}{3} = \dfrac{17}{6}$

Decimal-Fraction Conversion

Examples:

Keystrokes	Display
Enter [2.75] [=]	2.75
Press [a b/c]	2 ⌐3⌐ 4
[SHIFT] [d/c]	11 ⌐ 4

Angle Display

To set the angle unit at degrees, radians, or grads, press the [MODE] key 2 times.

Degrees   Press 1
Radians   Press 2
Grads   Press 3

Initial Defaults

To return the calculation mode and setup to the initial defaults, press [SHIFT] [CLR] [2] [=]. This will return the calculator to the following settings:

Calculation mode	COMP
Angle unit	Deg
Exponential display format	Norm 1
Fraction display format	a b/c
Decimal point character	Dot

Percentage Calculations

Examples:

	Keystrokes	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

3

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To add a percentage.
15% to 1000   [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

Degrees/Minutes/Seconds
You can perform calculations using degrees, minutes, and seconds, and convert
between sexagesimal and decimal values.

Examples:
Keystrokes   Display
[2.5] [=]   2.5
Press [°,,,]   2° 30° 0
[10] [°,,,] [15] [°,,,] [12] [°,,,] [x] [4] [=]   41° 0° 48°

Memory Calculations
There are different types of memory available:
Answer Memory, Consecutive Calculations, Independent Memory, and Variables.

Answer Memory
Whenever you press [=] after inputting values or an expression, the calculated result
automatically updates the Answer Memory contents by storing the result. You can recall
it by pressing [ANS].

Consecutive Calculations
You can use the calculation result that is currently on display (and also stored in Answer
Memory) as the first value of your next calculation.

Independent Memory
Independent Memory uses the memory area in variable M and is convenient for
calculating cumulative totals.
To add a value to M, press [M+].
To subtract a value from M, press [SHIFT] [M-].
To recall the value of M, press [RCL] [M].

Variables
There are 9 variables available (including M) to store data (A through F, M, X, and Y).
To add a value to memory letter A, enter the value and press [SHIFT] [STO] [A].
To recall the value of A, press [RCL] [A]. **Note**: *Do NOT use the ALPHA key.*

Clearing Memory
To clear independent memory, press [0] [SHIFT] [STO] [M] (*this stores 0 in M*).
To delete data assigned to a specific variable, press [0] [SHIFT] [STO] <> (enter the
letter you want to clear, without pressing the ALPHA key).
To clear the values assigned to all of the variables, press [SHIFT] [CLR] [1] [=].

4

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Powers/Square Roots/Cube Root, nth roots

To square a number:	Use the [x^2] key
	Example: [5] [x^2] [=] 25

To cube a number:	Use the [x^3] key
	Example: [3] [x^3] [=] 27

To raise a number to a power (other than 2 or 3):	Use the [$\wedge$] key
	Example: [2] [$\wedge$] [4] = 16

To find a square root:	Use the [$\sqrt{\ }$] key
	Example: [$\sqrt{\ }$] [25] [=] 5

To find a cube root:	Use the [$\sqrt[3]{\ }$] key
	Example: [SHIFT] [$\sqrt[3]{\ }$] [27] [=] 3

To find a root	Use the [$\sqrt[x]{\ }$] key
(other than square or cube root):	Example: [4] [SHIFT] [$\sqrt[x]{\ }$] [81] = 3

To find a reciprocal:	Use the [x^{-1}] key
	Example: [5] [x^{-1}] [=] .2
	Note: Press [a b/c] and the display will change to 1/5.

Probability Calculations/ Random Number/ Factorials

Permutations	A permutation is a selection of objects in which the order of the objects matters.
	Example: To determine the possible number of different arrangements using 4 items selected from 10 items.
	[10] [SHIFT] [nPr] [4] [=] 5040
Combinations	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] [nCr] [4] [=] 210
Factorials	To calculate a factorial, use [SHIFT] [$x!$]
Random Number	To generate a random number between 0 and 1, press [SHIFT] [Ran#] [=]

5

References the Casio FX-300 MS User's Guide   *Casio FX-300MS Scientific calculator*

FX 300 MS Training guide

Trigonometry

Trigonometric/Inverse Trigonometric Functions
You can use sin, cos and tan to calculate and solve trigonometric equations.

Examples (in degree mode):
Keystrokes	Display
[sin] [30] [=]	0.5
[SHIFT] [sin] [.5] [=]	30

Hyperbolic/Inverse Hyperbolic Functions

Examples (in degree mode):
Keystrokes	Display
[hyp] [sin] [3.6] [=]	18.28545536
[SHIFT] [hyp] [sin] [30] [=]	4.094622224
Or	
[hyp] [SHIFT] [sin] [30] [=]	

Convert Radians to Degrees
To convert Radians to Degrees, put the calculator in Degree mode.
Example: π radians to degrees
             Press [SHIFT] [π] [SHIFT] [DRG] and press [2] for Radians [=] 180

To convert Degrees to Radians, put the calculator in Radian mode.
Example: 180 degrees to radians
             Press [180] [SHIFT] [DRG] and press [1] for Degrees [=] 3.141592654

Coordinate Conversion
You can convert from polar to rectangular and from rectangular to polar. The calculation results are automatically assigned to variables E and F. Note: For both examples, be sure you are in degree mode.

To convert polar coordinates (r, θ) to rectangular coordinates (x, y).
Example: To convert (r = 2, θ = 60) to rectangular coordinates:
          Press [SHIFT] [REC] [2] [,] [60] [ )] [=]   1 (x value)
          [RCL] [F]   1.732050808 (y value)

To convert rectangular coordinates (x, y) to polar coordinates (r, θ).
Example: To convert (x = 1, y = $\sqrt{3}$) to rectangular coordinates:
          Press [POL] [1] [,] [$\sqrt{}$] [3] [ )] [=]   2 (r value)
          [RCL] [F]   60 (θ value)

6

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Logarithms/Natural Logarithms

You can find logarithms, natural logarithms, and antilogarithms.

Examples:

Keystrokes	Display
[log] [100] [=]	2
[ln] [90] [=]	4.49980967
[ln] [ALPHA] [*e*]	1
[SHIFT] [e^x] [1] [=]	2.718281828
[SHIFT] [10^x] [2] [=]	100

Standard Deviation

Use the [MODE] key to enter the Standard Deviation (SD) mode when you want to perform statistical calculations using standard deviation. [MODE] [2]

- To clear statistical memory, press [SHIFT] [CLR] [1] [=].
- To enter data, use the following key sequence: <value> [DT]
- Input data is used to calculate the following values:

Sum of the squares ($\sum x^2$)	[SHIFT] [S-SUM] [1]
Sum of data ($\sum x$)	[SHIFT] [S-SUM] [2]
Number of data items (n)	[SHIFT] [S-SUM] [3]
Mean of the data	[SHIFT] [S-VAR] [1]
Population standard deviation σn	[SHIFT] [S-VAR] [2]
Sample standard deviation σn^{-1}	[SHIFT] [S-VAR] [3]

Key points to note:
- [DT] [DT] inputs the same data twice
- You can input multiple entries of the same data using [SHIFT] [;].
  To input 100 ten times, press [100] [SHIFT] [;] [10] [DT]
- You can scroll through the data you entered using the up and down arrows on the REPLAY button.
- You can edit the displayed data by inputting a new value and then pressing the [=] key to replace it. If you use the [DT] key (and not the [=] key), this will register the value you input as a new data item and will leave the old value as is.
- If you want to perform statistical calculations, always press the [AC] key first to exit the data display.
- To delete a data value that is displayed, press [SHIFT] [CL].
- If you switch to another MODE, you will no longer be able to display or edit your data.

8

FX 300 MS Training guide

Regression

Use the [MODE] key to enter the Regression (REG) mode when you want to perform statistical calculations using regression. [MODE] [3]

When you enter Regression mode, you can select from 6 types of regression:

Linear regression	[1] (Lin)
Logarithmic regression	[2] (Log)
Exponential regression	[3] (Exp)
Power regression	$\rightarrow$ [1] (Pwr)
Inverse regression	$\rightarrow$ [2] (Inv)
Quadratic regression	$\rightarrow$ [3] (Quad)

- To clear statistical memory, press [SHIFT] [CLR] [1] [=].
- To enter data, use the following key sequence: <x data> , <y data> [DT]
- The values produced by a regression calculation depend on the values input. Results can be recalled using the following:

$\sum x^2$	[SHIFT] [S-SUM] [1]
$\sum x$	[SHIFT] [S-SUM] [2]
n	[SHIFT] [S-SUM] [3]
$\sum y^2$	[SHIFT] [S-SUM] $\rightarrow$ [1]
$\sum y$	[SHIFT] [S-SUM] $\rightarrow$ [2]
$\sum xy$	[SHIFT] [S-SUM] $\rightarrow$ [3]
Mean of the x data	[SHIFT] [S-VAR] [1]
Population standard deviation (x)	[SHIFT] [S-VAR] [2]
Sample standard deviation (x)	[SHIFT] [S-VAR] [3]
Mean of the y data	[SHIFT] [S-VAR] $\rightarrow$ [1]
Population standard deviation (y)	[SHIFT] [S-VAR] $\rightarrow$ [2]
Sample standard deviation (y)	[SHIFT] [S-VAR] $\rightarrow$ [3]
Regression coefficient A	[SHIFT] [S-VAR] $\rightarrow$ $\rightarrow$ [1]
Regression coefficient B	[SHIFT] [S-VAR] $\rightarrow$ $\rightarrow$ [2]

For regression calculations other than quadratic regression:

Correlation coefficient r	[SHIFT] [S-VAR] $\rightarrow$ $\rightarrow$ [3]
Estimate x	[SHIFT] [S-VAR] $\rightarrow$ $\rightarrow$ $\rightarrow$ [1]
Estimate y	[SHIFT] [S-VAR] $\rightarrow$ $\rightarrow$ $\rightarrow$ [2]

For quadratic regression:

$\sum x^3$	[SHIFT] [S-SUM] $\rightarrow$ $\rightarrow$ [1]
$\sum x^2 y$	[SHIFT] [S-SUM] $\rightarrow$ $\rightarrow$ [2]
$\sum x^4$	[SHIFT] [S-SUM] $\rightarrow$ $\rightarrow$ [3]
Regression coefficient C	[SHIFT] [S-VAR] $\rightarrow$ $\rightarrow$ [3]
Estimate x_1	[SHIFT] [S-VAR] $\rightarrow$ $\rightarrow$ $\rightarrow$ [1]
Estimate x_2	[SHIFT] [S-VAR] $\rightarrow$ $\rightarrow$ $\rightarrow$ [2]
Estimate y	[SHIFT] [S-VAR] $\rightarrow$ $\rightarrow$ $\rightarrow$ [3]

9

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