CASIO FX-991 ES PLUS 2nd Edition over view:

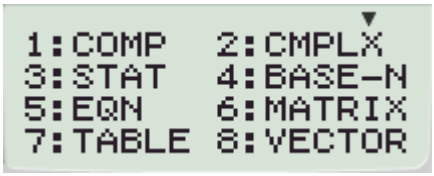
Main Keys:

a) On: turn on calculator [ON]
b) Mode/Menu: menu of desired subjects
c) Alpha: Activates Red symbols [ALPHA]
d) Shift: Activates Yellow Symbols [SHIFT]
e) Del: Undo [DEL]
f) AC: Empty Screen [AC]

Turn off calculator press: [SHIFT] [AC]

Initialize calculator press: [SHIFT] [9] [3] [=] [AC]

Mode/Menu Page:



Mode contains 8 subjects.

1) Comp:
   Normal calculation, integral, derivative, summation, factorial, evaluate, trigonometric calculation, logarithmic calculation, exponential calculation, Radical Calculation, probability calculation, unit conversion ….

2) Complx: complex number calculation (argument, conjugate, convert from rectangular to polar and vice versa)

3) Stat:
   Solving Statistics and Regression

4) Base-N: calculation involving special numbers (binary, octal, decimal…)
5) EQN: solve system of equations, Quadratic and cubic equations.
6) Matrix: operation with matrices, determinant, transpose, inverse…
7) Table: table of values
8) Vectors: vector operation.

Selected Sample problems

Cambridge IGCSE Mathematics Core and Extended Course Book 2nd Edition

Example 1

Page:6 ,num:1

Find the HCF of 32 and 36

$type\ the\ fraction \frac{32}{36}\ on\ calculator\ then\ divide\ the\ 32\ by\ the\ answer\ on\ the\ numerator.$

Steps using calculator:

1- $Type \frac{32}{36}$ [3] [2] [$\frac{\square}{\square}$] [3] [6] [=]

2- $Then\ divide\ 32\ by\ 8$ [3] [2] [÷] [8] [=]

3- $The\ answer\ is\ HCF = 4$

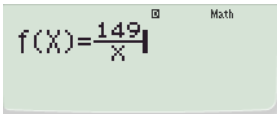
Example 2:

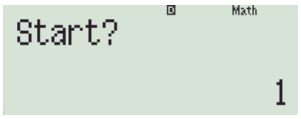
Page 9,table of prime numbers

Prime numbers between 1 and 625

To check if a number is prime construct a table using the calculator with $f(x) = \frac{desired\ number}{x}, start\ 1\ end\ 25\ step 1$. Then check the result, if results have integres different from desired number and 1 then its composit, other wise its prime.

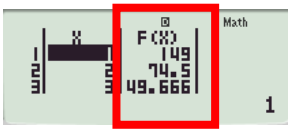
a) Is 149 prime or composit?
Steps using calculator:
[MODE] [7] [1] [4] [9] [$\frac{\square}{\square}$] [ALPHA] [)] [=] [1] [=] [2] [5] [=] [1] [=]





scroll down the result by ▼ there is only one integer 149(desired number)

then 149 is prime.



b) Is 121 prime or composit?
Steps using calculator:
[MODE] [7] [1] [2] [1] [$\frac{\square}{\square}$] [ALPHA] [)] [=] [1] [=] [2] [5] [=] [1] [=]
scroll down result f(x) by ▼, there are 2 integres 121 and 11 then there is an integer different from the disred number and 1 , so 121 is composite number.

c) Is 17 prime or composite?

Steps using calculator

MODE 7 1 7 ▤ ALPHA) = 1 = 2 5 = 1 =

Scroll down for more results, there are 2 integres 1 and 17 (since resulted integres are 1 and desired number) then 17 is prime.

When finished from table initialize calculator: SHIFT 9 3 = AC

Example 3:

Page 9, num:3

To find the LCM(a,b) apply the following formula : $a \times b = HCF(a,b) \times LCM(a,b)$

$then\ LCM(a,b) = \frac{a \times b}{HCF(a,b)}$

Determine HCF and LCM of 72 and 108

1- Find HCF

Steps using calculator:

7 2 ▤ 1 0 8 =

7 2 ▤ 2 =

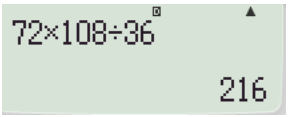
Then HCF is 36

2- Find LCM

Apply the above formula

Steps using calculator

7 2 ÷ × 1 0 8 ÷ 3 6



Then LCM is 216

Initialize calculator when done SHIFT 9 3 = AC

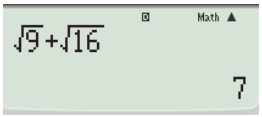
Example 4

Page 13, num 7

Calcullate: $\sqrt{9} + \sqrt{16}$

Steps using calculator

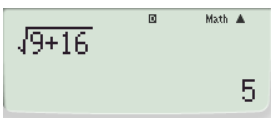
√ 9 ▶ + √ 1 6 =



Calculate $\sqrt{9 + 16}$

steps using calculator

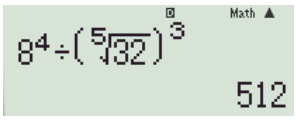
√ 9 + 1 6 =



Calculate $8^4 \div \left(\sqrt[5]{32}\right)^3$

Steps using calculator :

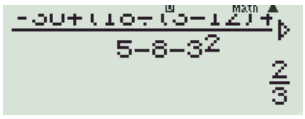
8 $x^{\square}$ 4 ▶ ÷ (SHIFT $x^{\square}$ 5 ▶ 3 2 ▶) $x^{\square}$ 3 =



Example 5:

Page 18, num 4

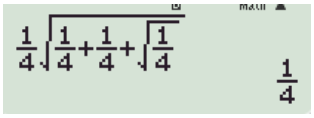
Calculate $\frac{-30+[18\div(3-12)+24]}{5-8-3^2}$



Steps using calculator:

(-) 3 0 + (1 8 ÷ (3 − 1 2) + 2 4) ▼ 5 − 8 − 3 x^2 2 ▶ =

calculate $\frac{1}{4}\sqrt{\frac{1}{4}+\frac{1}{4}+\sqrt{\frac{1}{4}}}$



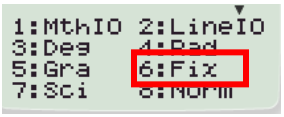
Steps using calculator

1 ▼ 4 ▶ √ 1 ▼ 4 ▶ + 1 ▼ 4 ▶ + √ 1 ▼ 4 ▶ =

when finished initialize calculator SHIFT 9 3 = AC

Example 6

Page 19, num 1



To activate rounding click SHIFT MODE 6 then choose desired decimal places in this case choose 2

Then write the number press = S⇔D

Round 3.185 to 2 decimal places

Steps using calculator:

SHIFT MODE 6 2 3 • 1 8 5 = S⇔D

when finished initialize calculator: SHIFT 9 3 = AC

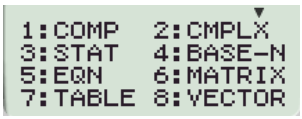
Example 7

Page:43,num 3

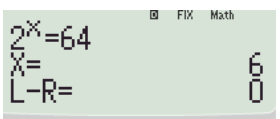
Find value of x in each case :

a) $2^x = 64$

Using calculator : log in com SHIFT MODE 1



solve using calculator: 2 x^2 SHIFT) ▶ ALPHA CALC 6 4 SHIFT CALC =



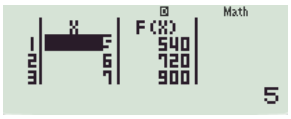
Example 8
Page 63, Ex.3.7

Complete the table

Number of sides in the polygon	5	6	7
Angle sum of interior angles			

$sum\ of\ interior\ angle = (n-2) \times 180$
Using the calculator use the table mode: MODE 7

and write the function $(x-2) \times 180$ $,use\ x\ insted\ of\ n\ in\ calculator$



(ALPHA) − 2) × 1 8 0 = 5 = 7 = 1 =

Example 9

Statistics

In order to solve statistics log into statistics from main menu MODE 3 and choose the type of your Statistics. In this session we will solve 1 variable statistics

Ex1:

Rami got the following grades in Mathematics:

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

Calculate the mean. Calculate the standard deviation

<u>Steps using Calculator FX-991ES PLUS:</u>

1st log into Statistics MODE 3

2nd Choose 1- Variable 1

3rd fill up the table

3 0 = 3 2 = 3 5 = 3 4 = 3 6 = 4 0 = 3 2 = 3 3 = 3 6 = 4 1 = 4 4 = 3 7 = AC

4th for calculation: click

SHIFT 1 4 2 for mean

SHIFT 1 4 3 for variance

Ex 2:

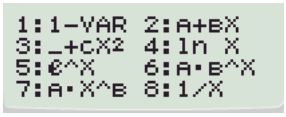
The following table gives the distribution of students according to their weight:

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:



1st log into statistic 1-variable MODE 3 1

2nd activate frequency table SHIFT MODE ▼ 4 1

3rd input data

3 0 = 3 1 = 3 2 = 3 3 = 3 4 = 3 5 = 3 6 = ▶ ▲
▲ ▲ ▲ ▲ ▲ ▲ 7 = 4 = 5 = 2 = 4 = 5 = 1 =

4th for calculation: click

SHIFT 1 4 2 for mean

SHIFT 1 4 3 for variance

To turn off frequency Column SHIFT MODE ▼ 4 2

When finished initialize calculator SHIFT 9 3 AC =

Example 10:

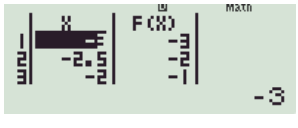
Page:201, EX1

Construct table of values of y=2x+3,and deduce x-intercept

Steps using calculator:

MODE 7 2 ALPHA) + 3 =

start -3 , End 2, Step 0.5



− 3 = 2 = 0 • 5 =

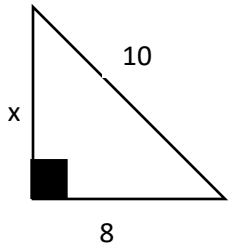
Scroll down then x-intercept is (-1.5,0)

Example 11:

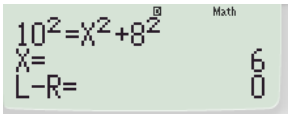
Page 227

Pythagoras Theorem:

Find value of x in the following triangle:



Use pythagoras theorem: steps using calculator



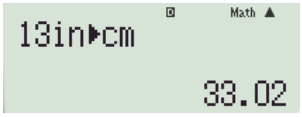
Make sure to be in COMP mode

[1] [0] [$x^{\square}$] [2] [▶] [ALPHA] [CALC] [ALPHA] [)] [$x^{\square}$] [2] [▶] [+] [8] [$x^{\square}$] [2] [SHIFT] [CALC] [=]

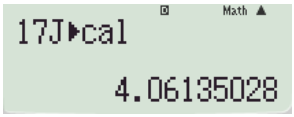
Example 12

Convert to given unit

13 in =……..cm [SHIFT] [8] [0] [1] [▶] [1] [3] [=] [S⇔D]



17J=……Cal [SHIFT] [8] [3] [9] [▶] [1] [7] [=]



Example 13:

Page:576, Vectors

$\vec{A} = \begin{pmatrix} 5 \\ 3 \end{pmatrix} \quad \vec{B} = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$

Calclate sum of two vectors

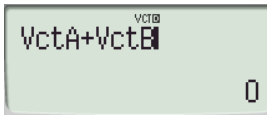
Steps using calculator:

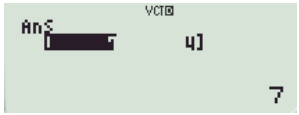
Log into vectors through mode. [MODE] [8]

Define vector A [1] [2] [5] [=] [3] [=] [AC]

Define vector B [SHIFT] [5] [2] [2] [2] [2] [=] [1] [=] [AC]

Sum of two vectors [SHIFT] [5] [3] [+] [SHIFT] [5] [4] [=]





Find dot product of two vectors

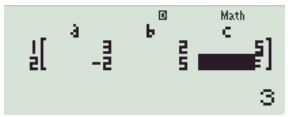
[SHIFT] [5] [3] [SHIFT] [5] [7] [1] [5] [4] [=]

Solving System of linear equations:

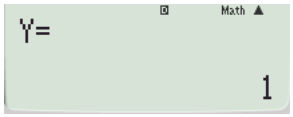
$$\begin{cases} 3x + 2y = 5 \\ -2x + 5y = 3 \end{cases}$$

Steps using calculator:

log into system of equations MODE 5 1



input data: 3 = 2 = 5 = (−) 2 = 5 = 3 = = =



Solving Quadratic Equations:

$x^2 + 4x + 3 = 0$

Steps using calculator

Log into quadratic equation MODE 5 3

input data 1 = 4 = 3 = =