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]

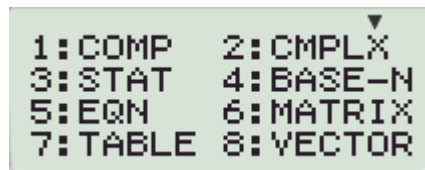Turn off calculator press: [SHIFT] [AC]

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

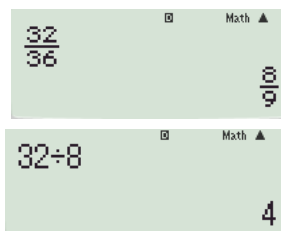 Cambridge IGCSE Mathematics Core and Extended Course Book 2nd Edition

Example 1

Page:6 ,num:1

Find the HCF of 32 and 36

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

Steps using calculator:

1- $Type \dfrac{32}{36}$ ③ ② 🔳 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 $f(x) = \dfrac{desired\ number}{x}$, $start\ 1\ end\ 25\ step1$. Then check the result, if results have integres different from desired number and 1 then its composit, other wise its prime.
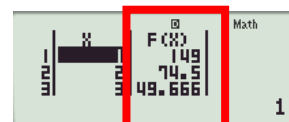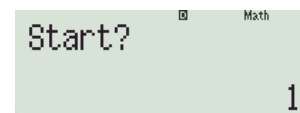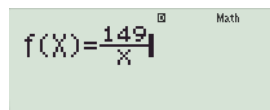

a)   Is 149 prime or composit?
      Steps using calculator:
      ⑯ODE⑯ ⑦ ① ④ ⑨ 🔳 ALPHA ⑯)⑯ 🟰 ① 🟰 ② ⑤ 🟰 ① 🟰

      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:
      ⑯ODE⑯ ⑦ ① ② ① 🔳 ALPHA ⑯)⑯ 🟰 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 :

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

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]

72×108÷36

216

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] [=]

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

7

Calculate $\sqrt{9 + 16}$

steps using calculator

[√▪] [9] [+] [1] [6] [=]

$\sqrt{9+16}$

5

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

Steps using calculator :
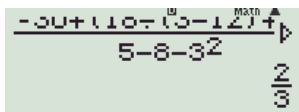
[8] [x▪] [4] [▶] [÷] [(] [SHIFT] [x▪] [5] [▶] [3] [2] [▶] [)] [x▪] [3] [=]

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

512

Example 5:

Page 18, num 4
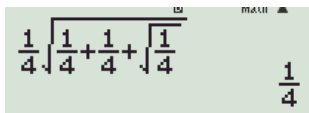
Calculate $\dfrac{-30+[18\div(3-12)+24]}{5-8-3^2}$

$$\frac{2}{3}$$

Steps using calculator:

⊟ ⊟ ③ ⓪ ⊞ 〔 ① ⑧ ÷ 〔 ③ ⊟ ① ② 〕 ⊞ ② ④ 〕 ▽ ⑤ ⊟ ⑧ ⊟ ③ $x^{\blacksquare}$ ② ▷
=

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

$$\frac{1}{4}$$
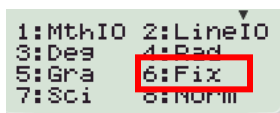
Steps using calculator

▤ ① ▽ ④ ▷ √▪ ▤ ① ▽ ④ ▷ ⊞ ▤ ① ▽ ④ ▷ ⊞ √▪ ▤ ① ▽ ④ ▷ =

when finished initialize calculator SHIFT ⑨ ③ = AC

Example 6

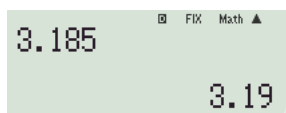*Page 19, num 1*

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

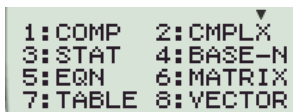*Example 7*

Page:43,num 3

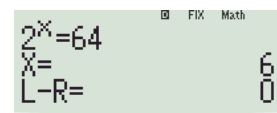Find value of x in each case :

a) $2^x = 64$
Using calculator : log in com SHIFT MODE ①

solve using calculator: ② $x^{\blacksquare}$ 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] [=]
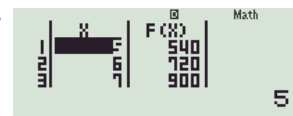
Example 9

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

Steps using Calculator FX-991ES PLUS:

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]

```
1:1-VAR 2:A+BX
3:_+cX2 4:ln X
5:e^X   6:A·B^X
7:A·X^B 8:1/X
```

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
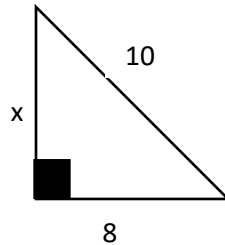
[−] [3] [=] [2] [=] [0] [·] [5] [=]
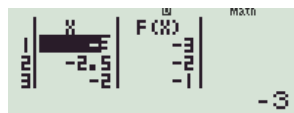
Scroll down then x-intercept is (-1.5,0)

Example 11:

Page 227

Pythagoras Theorem:

Find value of x in the following triangle:

10

x

8

Use pythagoras theorem: steps using calculator

Make sure to be in COMP mode

$$10^2=X^2+8^2$$
X=   6
L-R=   0

[1] [0] [x■] [2] [▷] [ALPHA] [CALC] [ALPHA] [)] [x■] [2] [▷] [+] [8] [x■] [2] [SHIFT] [CALC] [=]

Example 12

Convert to given unit

13in▸cm

33.02

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

17J▸cal

4.06135028

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] [=]

VctA+VctB   Ans
                     0   7

Find dot product of two vectors

VctA·VctB

13

[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⟧ ⟦=⟧ ⟦=⟧ ⟦=⟧

$$\frac{1}{2}\begin{bmatrix} 3 & 2 & 5 \\ -2 & 5 & 3 \end{bmatrix}$$

X=
1

Y=
1
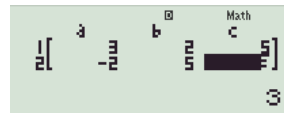
Solving Quadratic Equations:

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

Steps using calculator

Log into quadratic equation ⟦MODE⟧ ⟦5⟧ ⟦3⟧

input data ⟦1⟧ ⟦=⟧ ⟦4⟧ ⟦=⟧ ⟦3⟧ ⟦=⟧ ⟦=⟧

$X_1=$
-1

$X_2=$
-3