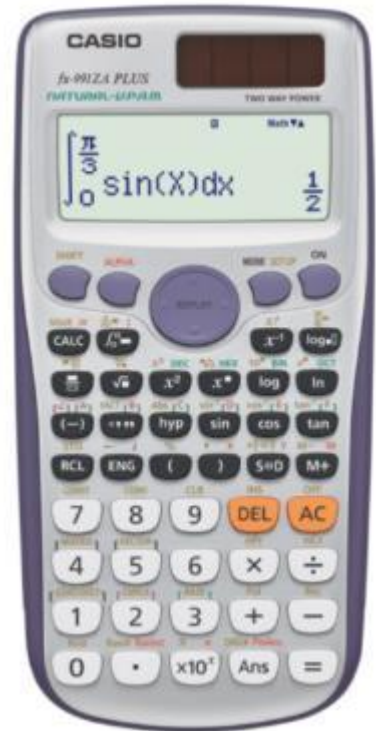


CASIO®

FX-991ZA PLUS

General Worksheet



MODE SETUP

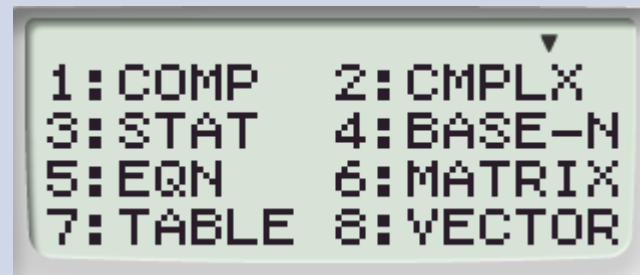


FX-82ZA PLUS vs. FX-991ZA PLUS

CASIO FX-82ZA PLUS

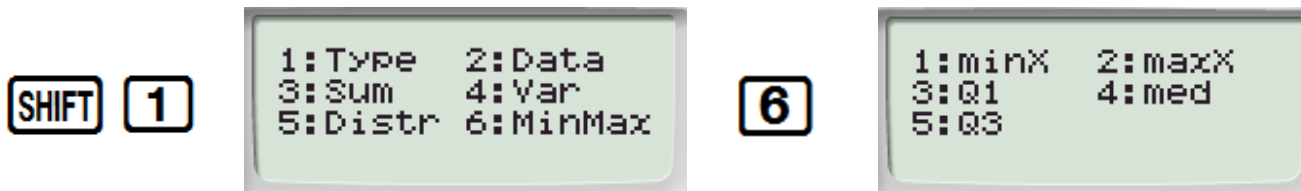


CASIO FX-991ZA PLUS

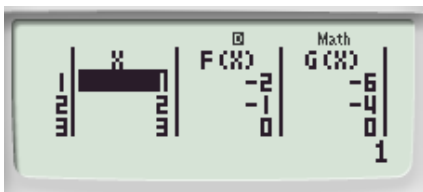


NEW FEATURES

- Q1, Med, Q3 calculations in statistics



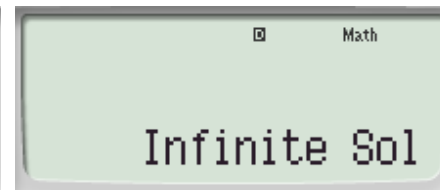
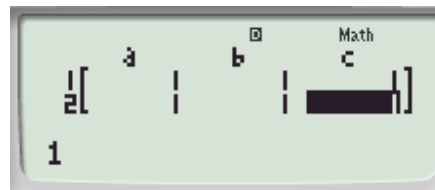
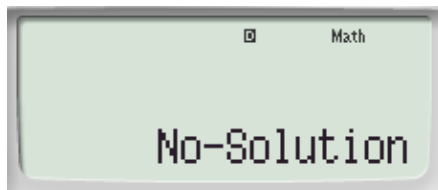
- Dual TABLE MODE - $f(x)$ & $g(x)$



- Min / Max in EQN MODE



- No Solution / Infinite Solutions in EQN MODE

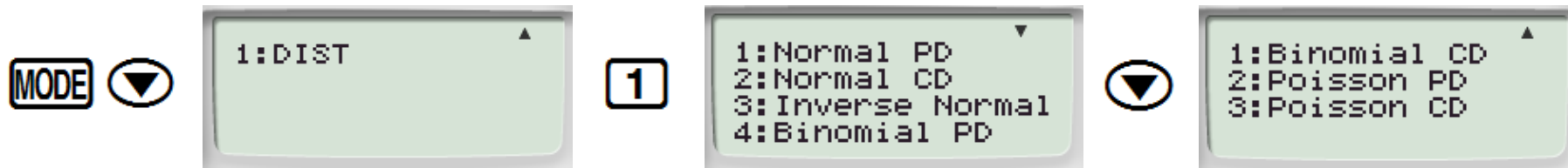


NEW FEATURES

- Previous Answer Key



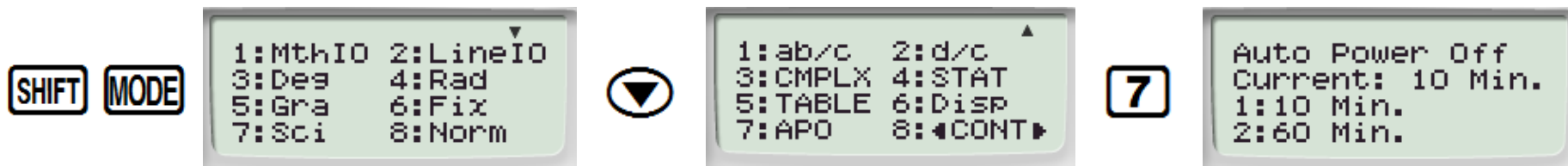
- n -th power of a complex number
- Distribution Calculation MODE



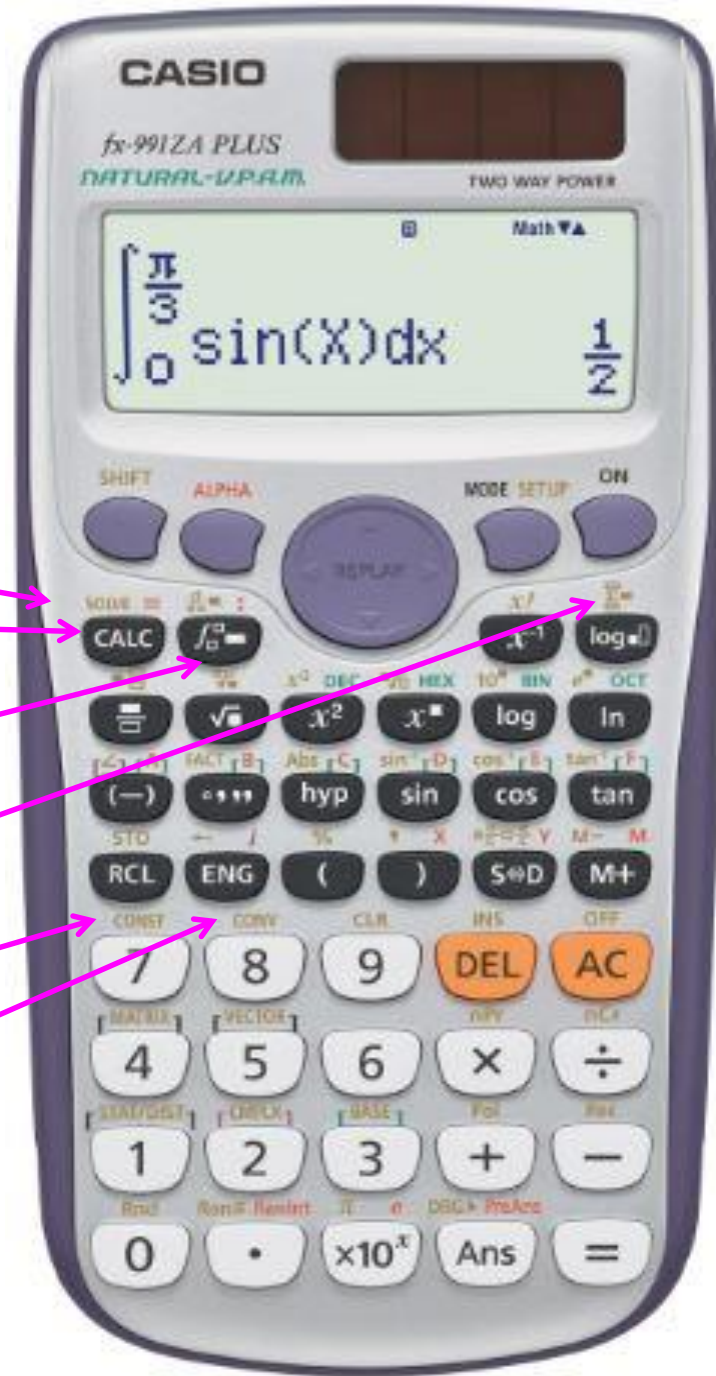
- Prime Factorisation



- Auto Power Off - 10min / 60min



FX-991ZA PLUS



SOLVE for an unknown

CALC the value of an expression

INTEGRATION & DIFFERENTIATION

SIGMA NOTATION calculations

SCIENTIFIC CONSTANTS

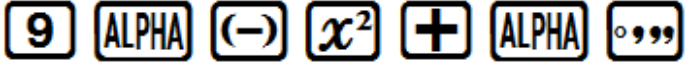
METRIC CONVERSIONS

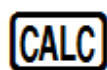
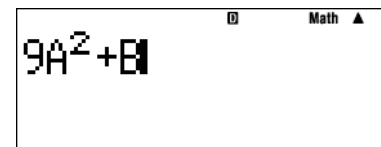
MODE 1 : COMP (Computational Mode)

Using CALC to find the value of an expression

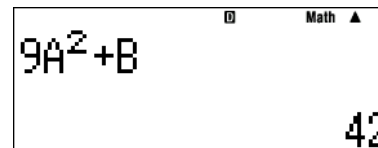
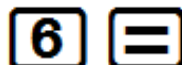
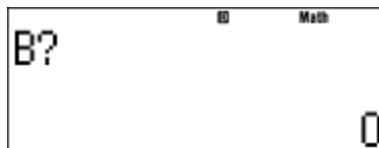
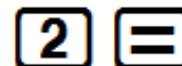
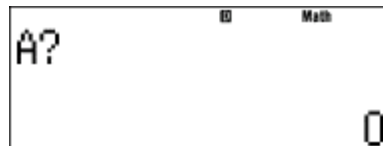
Calculate for $a = 2$ and $b = 6$

1. $9a^2 + b$

Input expression 



Substitute

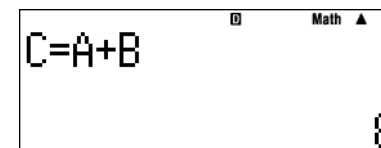
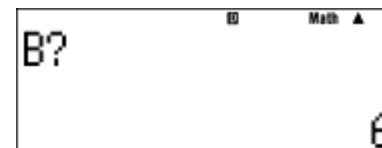
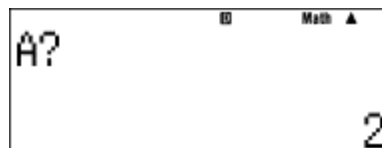
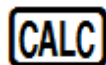
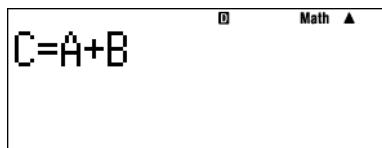


2. $c = a + b$

Input expression





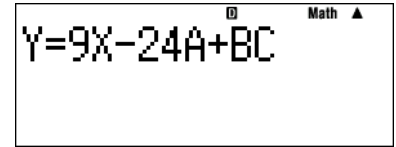


Using SOLVE to find the solution of equations

$$y = 9x - 24a + bc, \text{ with } a = 2, b = 3 \text{ and } c = 6$$

1) Solve for x , when $y = 0$

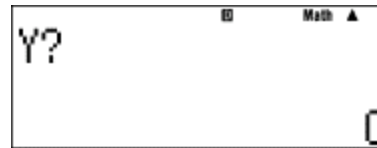
Input expression



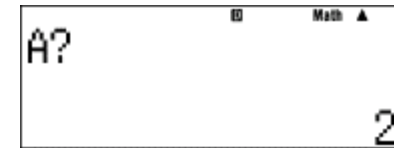
ALPHA S+D ALPHA CALC 9 ALPHA) - 2 4 ALPHA (-) + ALPHA 0.999 ALPHA hyp



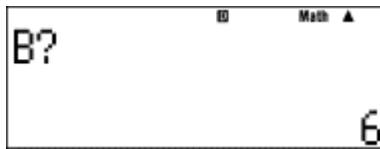
SHIF^T CALC Substitute



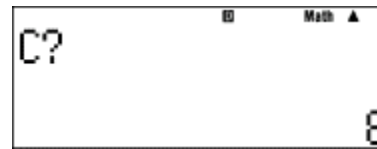
=



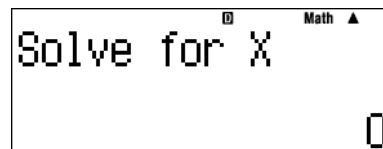
=



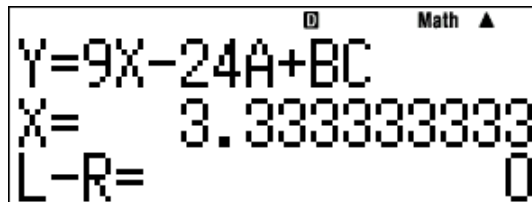
3 =



6 =



=



→ expression

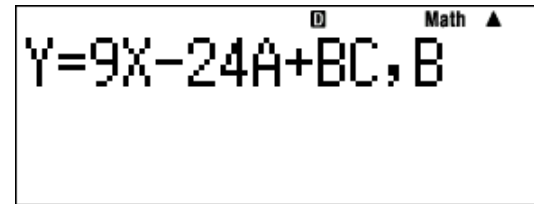
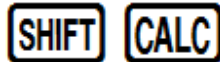
→ solution

→ the closer this value to zero the more

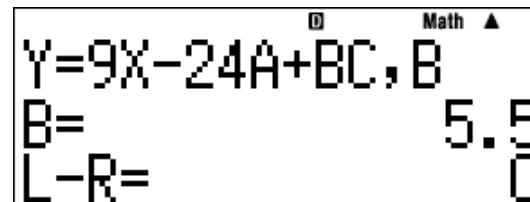
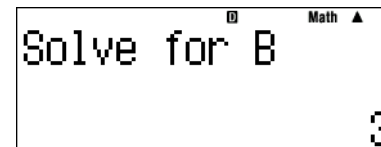
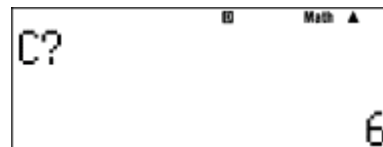
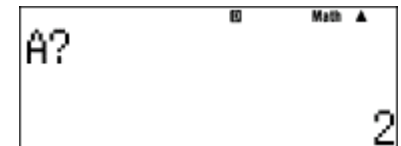
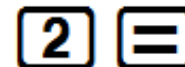
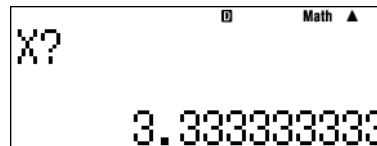
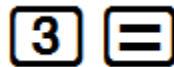
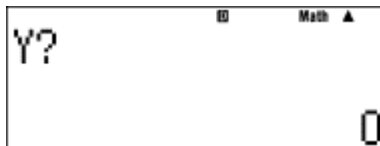
accurate the solution

2) Solve for b , when $y = 3$, $x = 2$, $a = 2$ and $c = 6$

Return to expression



Substitute



Solve: $2 \log x + 3 \log x = 10$
 $x = 100$

SOLVE works in COMPUTATIONAL mode

SOLVE can solve for variables other than “ x ”

SOLVE works for equations other than quadratic & cubic

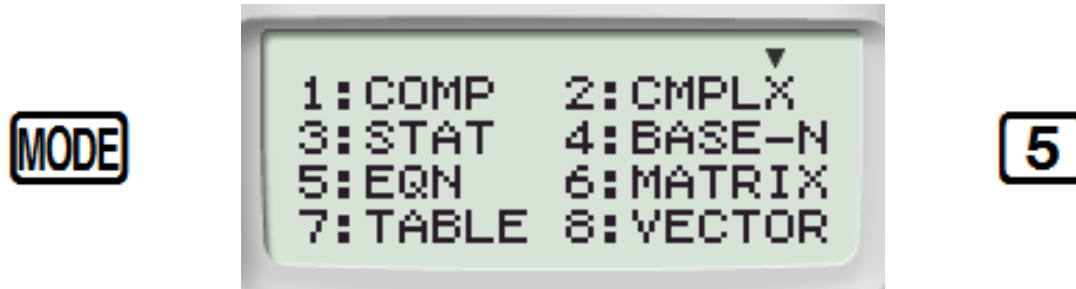
Casio Scientific Technology Tip

ONLY use **ON** when switching the scientific calculator on.

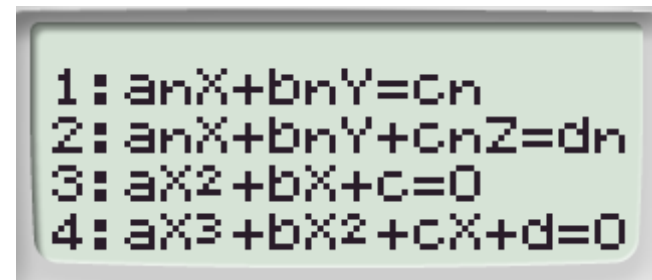
To clear your screen, rather use **AC** -
this saves your calculator’s temporary memory
(see the ▲ in the top right corner of the screen)

Use   to review previous calculations.

MODE 5 : EQN (Equation)



1. Simultaneous equations (2 unknowns)
2. Simultaneous equations (3 unknowns)
3. Quadratic equation
4. Cubic equation



MODE 5 : EQN

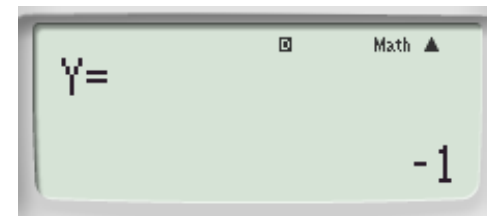
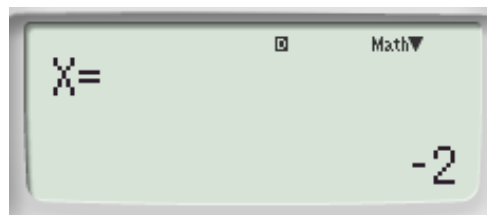
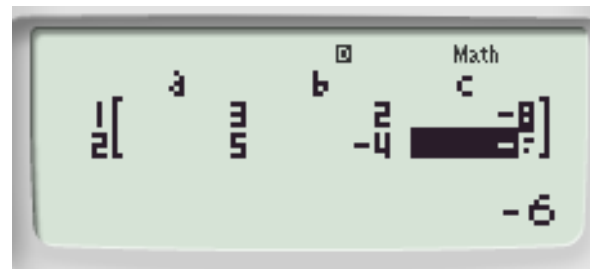
Solving
SIMULTANEOUS EQUATIONS
with 2 unknowns

1



Solve for x and y : $3x + 2y = -8$ and $5x - 4y = -6$

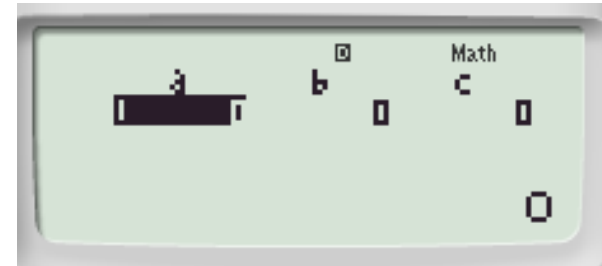
3 = 2 = - 8 = 5 = - 4 = - 6 =



MODE 5 : EQN

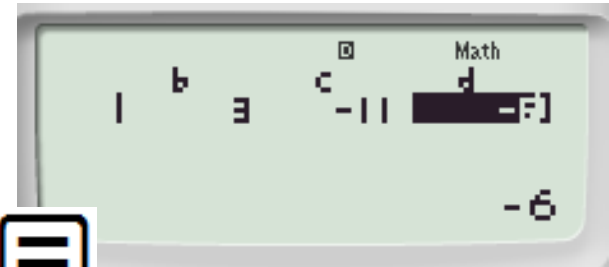
Solving a
CUBIC EQUATION

MODE **5** **4**

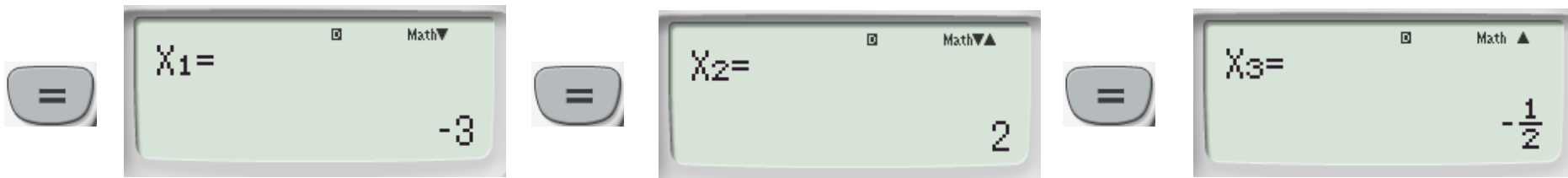


$$2x^3 + 3x^2 = 11x + 6$$

$$2x^3 + 3x^2 - 11x - 6 = 0$$



2 **=** **3** **=** **-** **1** **1** **=** **-** **6** **=**

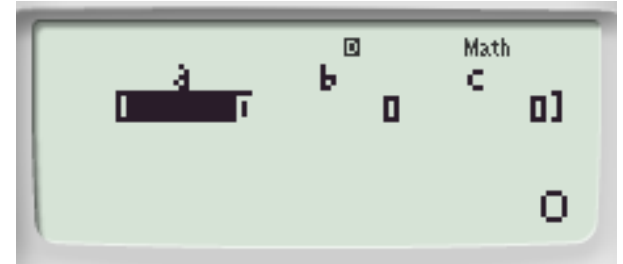


Keep in mind then that the factors of this cubic function are: $(x_1 + 3)(x_2 - 2)(x_3 + \frac{1}{2})$

MODE 5 : EQN

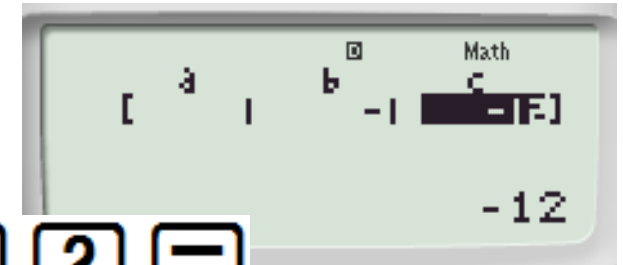
Solving a
QUADRATIC EQUATION

MODE 5 3

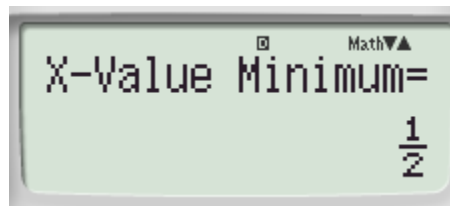
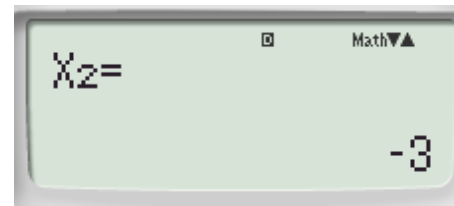
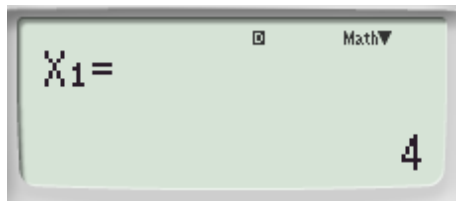


$$x^2 - x = 12$$

$$x^2 - x - 12 = 0$$



1 = - 1 = - 1 2 =



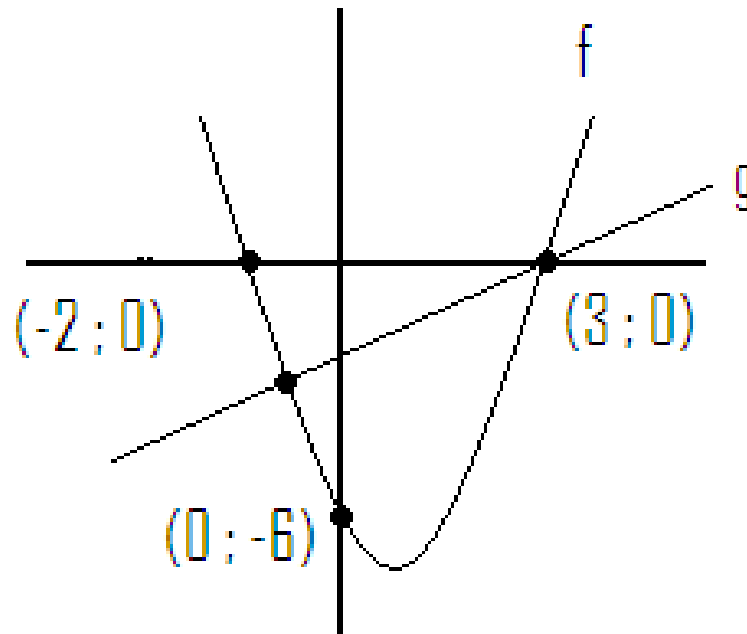
Calculus

Integration

Find the area of the region bounded by the graphs

$$f(x) = x^2 - x - 6 \text{ and } g(x) = x - 3$$

Step 1: Sketch graphs $f(x) = x^2 - x - 6$ and $g(x) = x - 3$,
use TABLE MODE to help you



Step 2: Solve for the intersection of the two graphs

Using EQN MODE - 3: Quadratic equation

$$x^2 - x - 6 = x - 3$$

$$x^2 - 2x - 3 = 0$$

$$x_1 = 3 \text{ or } x_2 = -1 \quad \text{Hence our interval is } [-1 ; 3]$$

Step 3: Set up the integral in COMP MODE



$$\int_{-1}^3 (x - 3) - (x^2 - x - 6) dx$$

Area = 10,667 square units

Differentiation

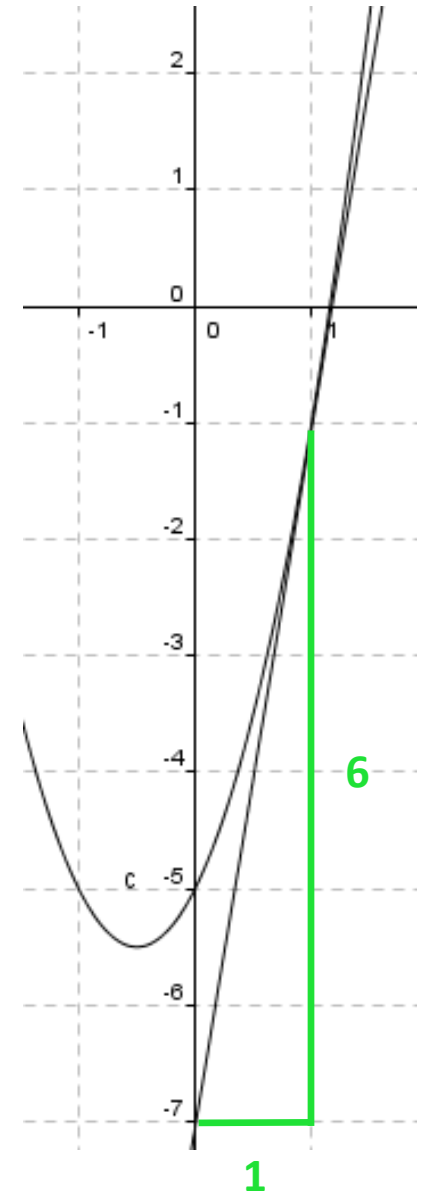
Find the gradient of the graph

$$y = 2x^2 + 2x - 5, \text{ at } x = 1$$



$$\frac{d}{dx} (2x^2 + 2x - 5) \Big|_{x=1}$$

Gradient = 6



Σ Notation

Write the following in Sigma Notation,
then calculate the value :

$$1 \times 2 + 2 \times 3 + 3 \times 4 + 4 \times 5 + 5 \times 6 + 6 \times 7 + 7 \times 8 + 8 \times 9 + 9 \times 10 + 10 \times 11$$



$$\sum_{x=1}^{10} (x(x+1))$$

$$= 440$$

See the INSIDE COVER of the calculator:

Scientific Constants

[Shift] [7] (CONST) Number 01 – 40

Metric Conversions

[Shift] [8] (CONV) Number 01 – 40

[07]

1mile ► km

[=]

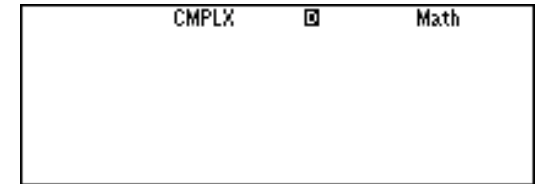
1.609344

MODE 2 : CMPLX (Complex Number)

MODE

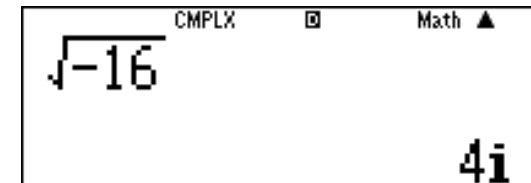


2



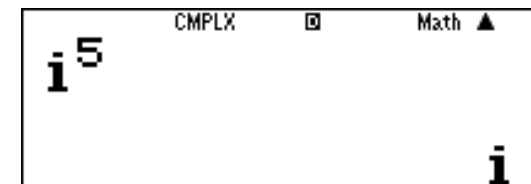
- Express $\sqrt{-16}$ in terms of i :

$\sqrt{\square}$ $-$ 1 6 $=$



- Simplify i^5 :

ENG x^{\square} 5 $=$



MODE 2 : CMPLX

- Simplify $(8 + 6i) + (3 + 2i)$:

(8 + 6 ENG) +
(3 + 2 ENG) =

CMPLX \square Math \blacktriangle
 $(8+6i)+(3+2i)$
 $11+8i$

- Simplify $-4i(3 - 5i)$:

(-) 4 ENG (3 - 5 ENG) =

CMPLX \square Math \blacktriangle
 $-4i(3-5i)$
 $-20-12i$

- Simplify $\frac{-5+9i}{1-2i}$:

((-) 5 + 9 ENG) $\frac{\square}{\square}$ 1 - 2 ENG =

CMPLX \square Math \blacktriangle
 $\frac{(-5+9i)}{1-2i}$
 $-\frac{23}{5}-\frac{1}{5}i$

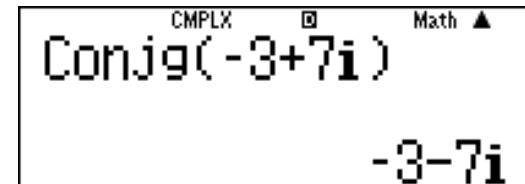
MODE 2 : CMPLX

Sub Menu

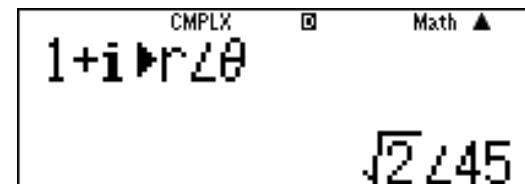
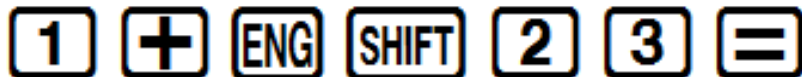


1: arg	2: Conjg
3: $r\angle\theta$	4: $a+bi$

- Find the conjugate of $-3 + 7i$:

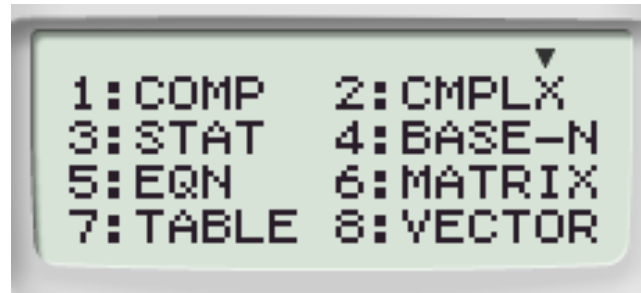


- Find the modulus & argument of $1 + i$:



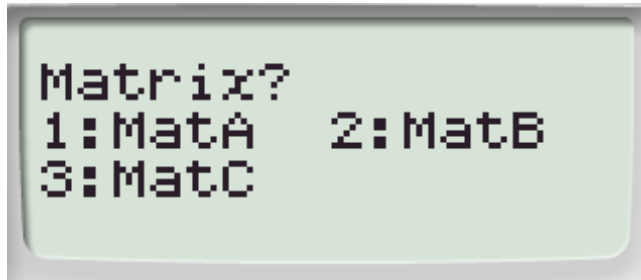
MODE 6 : MATRIX

MODE



6

To perform calculations involving, up to 3x3, matrices.



To perform matrix calculations, you first assign data to special matrix variables (**MatA**, **MatB**, **MatC**) & then use the variables in calculations.

MODE 6 : MATRIX

Assign $\begin{pmatrix} 2 & 1 \\ 1 & 1 \end{pmatrix}$ to **MatA:** 1

MatA(mxn) mxn?
 1:3x3 2:3x2
 3:3x1 4:2x3
 5:2x2 6:2x1

2x2 5

A [2 1]
[1 1]

2 = 1 =
1 = 1 =

A [2 1]
[1 1]

And $\begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix}$ to **MatB:** Sub Menu

MATRIX
4

SHIFT 4

1:Dim 2:Data

2

Matrix?
 1:MatA 2:MatB
 3:MatC

2 5

2 = (-) 1 = (-) 1 = 2 =

B [-2 -1]
[-1 2]

MODE 6 : MATRIX

Press **AC** to advance & perform calculations

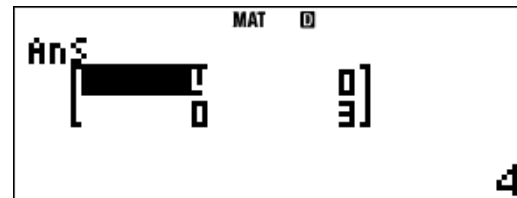
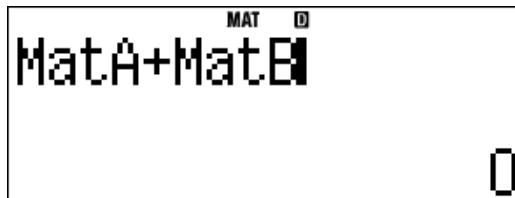
Sub Menu



SHIFT **4**

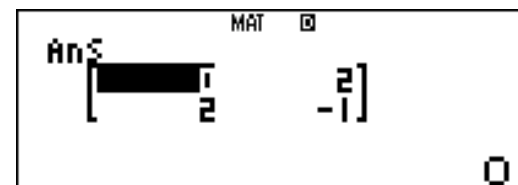
1:Dim	2:Data
3:MatA	4:MatB
5:MatC	6:MatAns
7:det	8:Trn

- **(MatA + MatB):** **3** **+** **SHIFT** **4** **4**



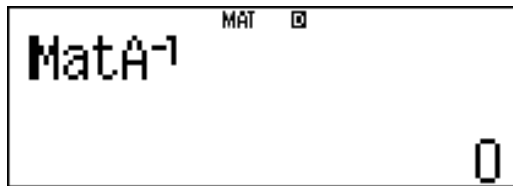
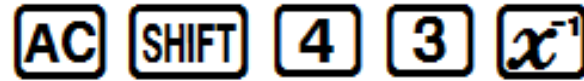
- **(MatA - MatB):** **AC** **SHIFT** **4**

3 **-** **SHIFT** **4** **4**

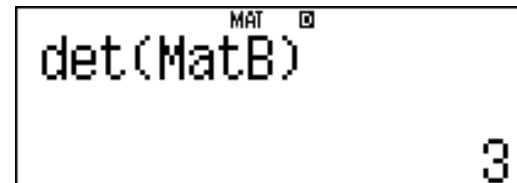
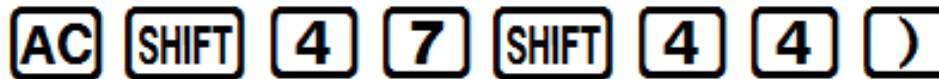
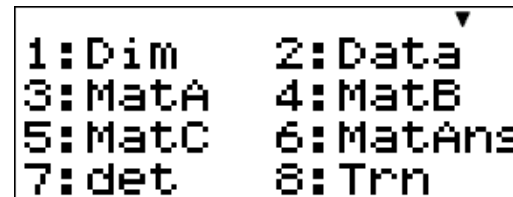


MODE 6 : MATRIX

- Inverse of **MatA**:



- Determinant of **MatB**:



MODE 6 : MATRIX

- Editing Matrix Variable Data: **AC** **SHIFT** **4**

1:Dim	2:Data
3:MatA	4:MatB
5:MatC	6:MatAns
7:det	8:Trn

1 **MatA** $\begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}$

Matrix?	
1:MatA	2:MatB
3:MatC	

1 3×2 **2** **1** **=** **2** **=** **3** **=**
4 **=** **5** **=** **6** **=**

MAT	
A	$\begin{bmatrix} \text{---} & \text{---} \\ \text{---} & \text{---} \end{bmatrix}$
	6

MatB $\begin{pmatrix} 7 \\ 8 \end{pmatrix}$ **SHIFT** **4** **1** **2** 2×1 **6**

MAT	
B	$\begin{bmatrix} \text{---} \\ \text{---} \end{bmatrix}$
	0

7 **=** **8** **=**


MAT	
B	$\begin{bmatrix} \text{---} \\ \text{---} \end{bmatrix}$
	8

MODE 6 : MATRIX



- (MatA × MatB): **AC** **SHIFT** **4**

3 **X** **SHIFT** **4** **4**

1:Dim	2:Data
3:MatA	4:MatB
5:MatC	6:MatAns
7:det	8:Trn

MAT 
MatA×MatB

=

AnS MAT 

 23


- Transposition of MatA: **AC** **SHIFT** **4**

8 **SHIFT** **4** **3** **)**

1:Dim	2:Data
3:MatA	4:MatB
5:MatC	6:MatAns
7:det	8:Trn

MAT 
Trn(MatA)

=

AnS MAT 

 1

MODE 4 : BASE-N (Base-N MODE)

MODE **4**

x^3 DEC $\sqrt[n]{x}$ HEX 10^x BIN e^x OCT
 x^2 x^y log ln

Convert the decimal number 75 to binary

7 **5** **=** **log**

75
Bin
00000000001001011

Convert the binary number 110001 to decimal

110001
Dec
49

1 **1** **0** **0** **0** **1** **=** **x^2**

Add the following binary numbers:

1010+1111

1010+1111
Bin
00000000000011001

log **1** **0** **1** **0** **+** **1** **1** **1** **1** **=**

Subtract the following binary numbers:

111-101

111-101
Bin
0000000000000010

log **1** **1** **1** **-** **1** **0** **1** **=**

Multiply the following binary numbers:

101 x 11

101×11
Bin
0000000000001111

log **1** **0** **1** **×** **1** **1** **=**

Divide the following binary numbers:

1101÷11

1101÷11
Bin
0000000000000100

log **1** **1** **0** **1** **÷** **1** **1** **=**

Initialise/Reset your calculator

when you want to clear your calculator & return it to factory default settings.



Note: This operation also clears all data currently in the calculator memory