VARIABLE MEMORIES & SOLVING EQUATIONS
USING A CASIO SCIENTIFIC CALCULATOR

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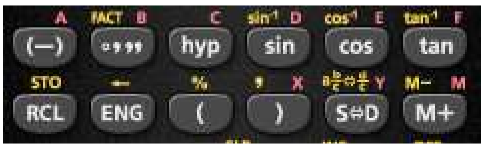
James Ralph / CASIO

Adequate knowledge of calculator skills makes the teaching of Financial Maths & Functions easier and enables the educator to assist their learners more efficiently.

Content: This workshop will cover: In-putting values into the CASIO calculator MEMORY, using the saved values & recalling what has been saved. Using TABLE MODE – solving Simultaneous, Quadratic & Cubic equations.

Worksheet:

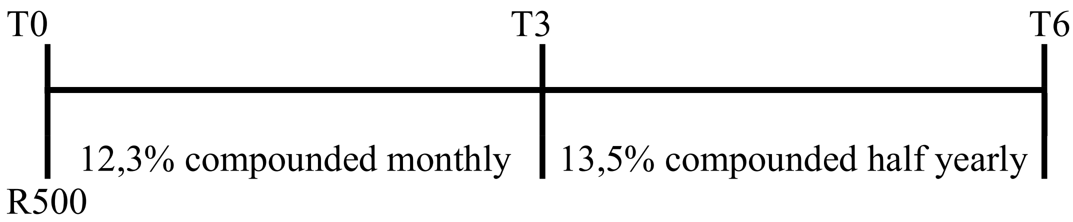
VARIABLE MEMORIES



To assign the result of 3 + 5 to variable A	3 + 5 SHIFT RCL (−)
To multiply the contents of variable A by 10	ALPHA (−) × 1 0 =
To recall the contents of variable A	RCL (−)

On the calculator, financial maths calculations are done as a continuous calculation.
If you use the memory keys, you do not have to key in the same numbers repeatedly.
Which helps save time and prevent confusion.

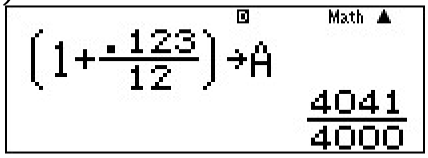
Example 1
What would an investment of R500 be worth in 6 years' time, if for the first 3 years it earns 12,3% p.a. compounded monthly and for the last 3 years it earns 13,5% p.a. compounded half-yearly?



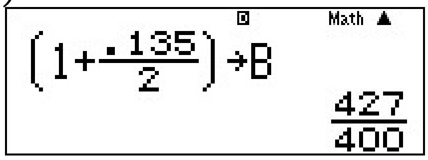
$$A = P(1+i)^n$$

$$A = 500\left(1+\frac{0.123}{12}\right)^{3\times12}\left(1+\frac{0.135}{2}\right)^{3\times2}$$

STORE: $\left(1+\frac{0.123}{12}\right)$ INTO VARIABLE A   SHIFT RCL (–)

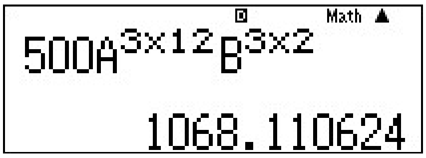


STORE: $\left(1+\frac{0.135}{2}\right)$ INTO VARIABLE B   SHIFT RCL °,,,



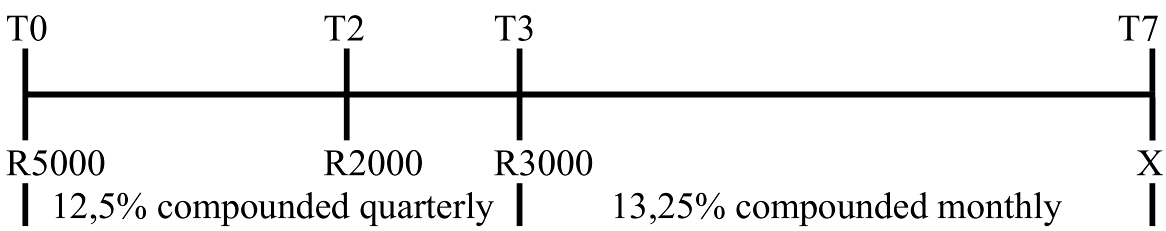
And then complete the calculation

5 0 0 ALPHA (–) $x^{\blacksquare}$ 3 × 1 2 ▶ ALPHA °,,, $x^{\blacksquare}$ 3 × 2



Example 2

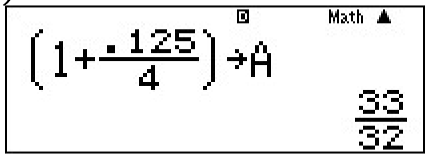
A man borrows R5 000 and agrees to repay the amount as follows: R2 000 after 2 years, R3 000 after 3 years and the balance at the end of 7 years. How much must he pay if interest is at 12,5% p.a. compounded quarterly for the first three years and 13,25% p.a. compounded monthly thereafter?



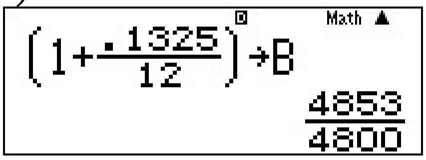
$A = P(1+i)^n$

$$0 = 5000\left(1+\frac{0.125}{4}\right)^{3\times4}\left(1+\frac{0.1325}{12}\right)^{4\times12} - 2000\left(1+\frac{0.125}{4}\right)^{1\times4}\left(1+\frac{0.1325}{12}\right)^{4\times12} - 3000\left(1+\frac{0.1325}{12}\right)^{4\times12} - X$$

STORE: $\left(1+\frac{0.125}{4}\right)$ INTO VARIABLE A [SHIFT] [RCL] [(−)]

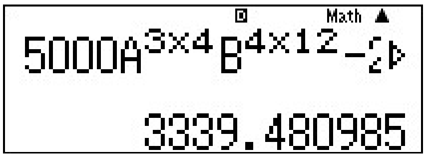


STORE: $\left(1+\frac{0.1325}{12}\right)$ INTO VARIABLE B [SHIFT] [RCL] [°'"]



And then complete the calculation

[5] [0] [0] [0] [ALPHA] [(−)] [$x^\blacksquare$] [3] [×] [4] [▶] [ALPHA] [°'"] [$x^\blacksquare$] [4] [×] [1] [2] [▶] [−] [2] [0] [0] [0] [ALPHA] [(−)] [$x^\blacksquare$] [1] [×] [4] [▶] [ALPHA] [°'"] [$x^\blacksquare$] [4] [×] [1] [2] [▶] [−] [3] [0] [0] [0] [ALPHA] [°'"] [$x^\blacksquare$] [4] [×] [1] [2] [=]



- The Memory Keys save time – less calculator keys are pressed.
- The Memory Keys do not have to be cleared to be used again. When saving a new value, it overwrites the existing value.

MODE 3: Table

Find the points of intersection of the straight line $f(x) = x - 3$ **and the parabola** $g(x) = x^2 - x - 6$ **when** $x \varepsilon [-3 ; 4]$

Key Sequence:

- Input f(*x*) formula [=]
- Input g(*x*) formula [=]
- Set boundaries for the table:
  Start? [(−)] [3] [=]
  End? [4] [=]
  Step? [1] [=]

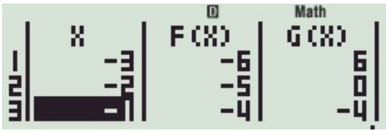
Point of Intersection (-1 ; -4)

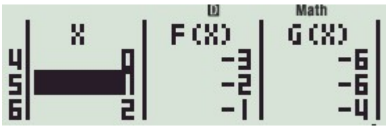
Point of Intersection (3 ; 0)

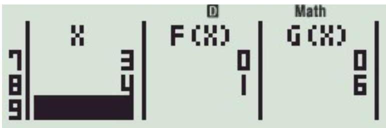
On screen:

f(X)=X−3

g(X)=X²−X−6







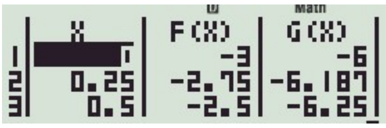
*** ZOOM IN * and find the turning point of g(x)**

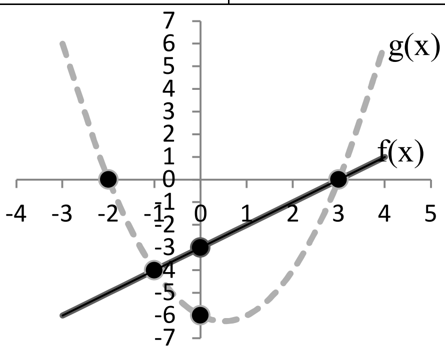
Key Sequence:

- [AC]
- Change the boundaries of the table
  Start? [0] [=]
  End? [1] [=]
  Reduce the STEPS/INTERVALS for a more detailed table.
  Step? [•] [2] [5] [=]

Turning point of g(x): (0,5 ; -6,25)

On screen:





SOLVING EQUATIONS

1. Simultaneous equations with 2 unknowns

Solve for x and y:

$$3x + 2y = -8$$
$$5x - 4y = -6$$

Manipulate

$$y = \frac{-3x - 8}{2}$$

$$y = \frac{5x + 6}{4}$$

<table>
<tr>
<td>

Key Sequence:

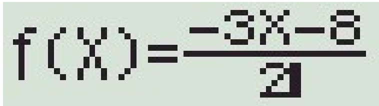
- Input f(x) formula =
- Input g(x) formula =
- Set boundaries for the table:

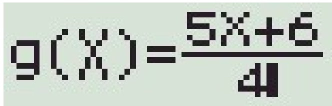
Start? − 9 =
End? 9 =
Step? 1 =

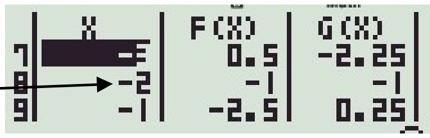
$\boldsymbol{x = -2 \; and \; y = -1}$

</td>
<td>

On screen:







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</tr>
</table>

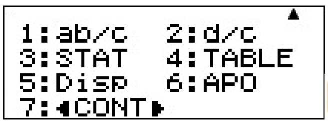
DON'T FORGET

$\boldsymbol{f(x)\ \&\ g(x) - 20\ x\ values}$

$\boldsymbol{f(x) - 30\ x\ values}$

HOW TO CHANGE:

SHIFT MODE ▼



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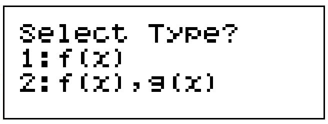
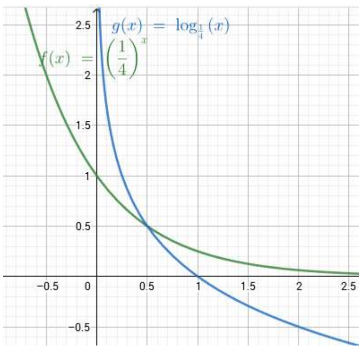
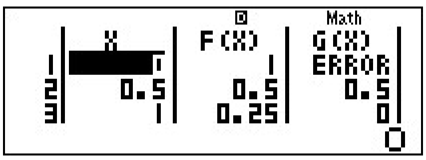


Now try: $\left(\frac{1}{4}\right)^{x} = \log_{\frac{1}{4}} x$ Start: 0 End: 9 Steps: 0,5

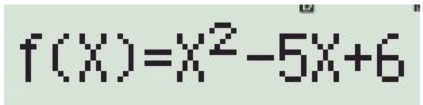
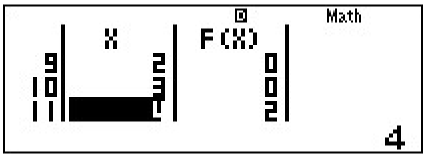




2. Quadratic equation

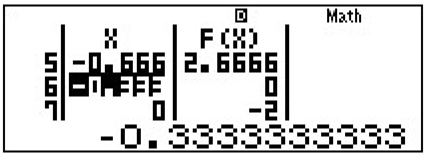
Generate a TABLE for the equation & read off the x value where f(x) = 0

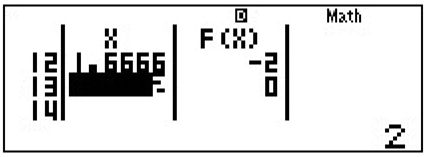
$$x^2 - 5x + 6 = 0$$

Key Sequence:	**On screen:**
• Input f(x) equation = **to input the variable x:** ALPHA) • $g(x)$ = = • Set boundaries for your table: Start? − 6 = End? 6 = Step? 1 = $f(x) = 0\ at\ x = 2\ or\ x = 3$	 

DOMAIN: **Negative & positive values of the constant**
STEPS: **Reciprocal of the co-efficient of the highest power of x**

Now try: $\boldsymbol{3x^2 - 5x = 2}$

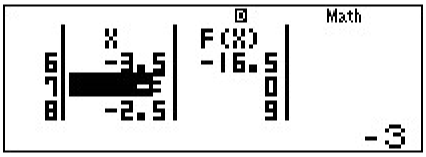
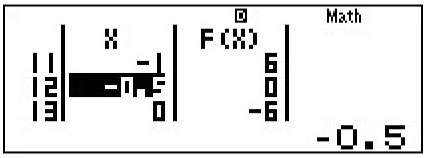
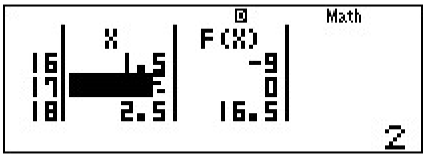


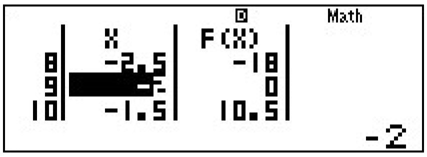


3. Cubic equation

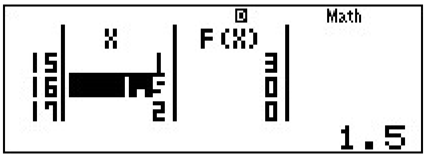
Generate a TABLE for the equation & read off the x value where f(x) = 0

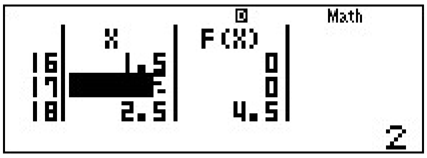
$$2x^3 + 3x^2 - 11x - 6 = 0$$

Key Sequence:	**On screen:**
• Input f(x) equation [=] • $g(x)$ = [=] • Set boundaries for your table: Start? [−] [6] [=] End? [6] [=] Step? [1] [$\frac{\square}{\square}$] [2] [=] • Turn $g(x)$ off [▶] [SHIFT] [MODE] [▼] [4] [1] $f(x) = 0$ at $x = -3$ or $x = -\frac{1}{2}$ or $x = 2$	    



Now try: $\boldsymbol{x^3 - \frac{3}{2}x^2 - 4x + 6 = 0}$





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