VARIABLE MEMORIES & SOLVING EQUATIONS
USING A CASIO SCIENTIFIC CALCULATOR

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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.

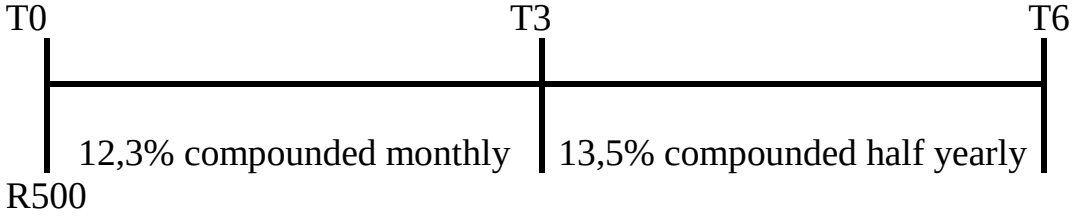
Worksheet:

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.

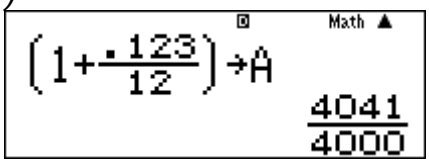
Example 1
What would an investment of R500 be worth in 6 years' time, if for the first 3 years it earns 12,3% p.a. compounded monthly and for the last 3 years it earns 13,5% p.a. compounded half-yearly?



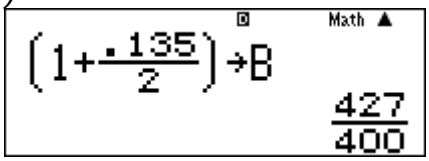
$$A = P(1+i)^n$$

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

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

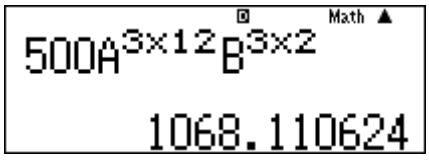


STORE: $\left(1+\frac{0.135}{2}\right)$ INTO VARIABLE B [SHIFT] [RCL] [°,,,]



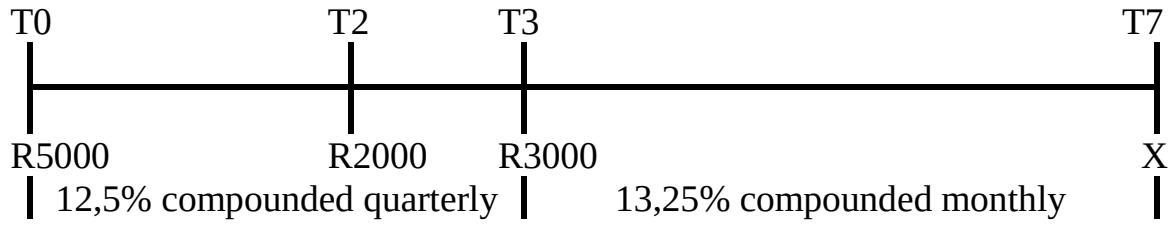
And then complete the calculation

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



Example 2

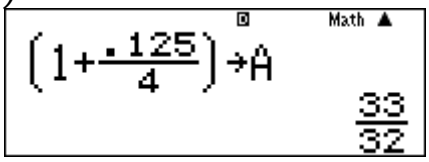
A man borrows R5 000 and agrees to repay the amount as follows: R2 000 after 2 years, R3 000 after 3 years and the balance at the end of 7 years. How much must he pay if interest is at 12,5% p.a. compounded quarterly for the first three years and 13,25% p.a. compounded monthly thereafter?



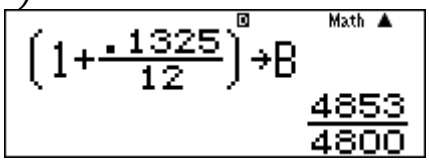
$$A = P(1+i)^n$$

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

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

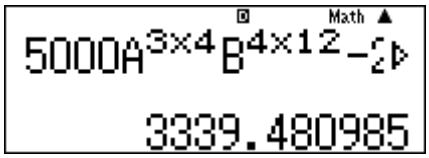


STORE: $\left(1+\frac{0.1325}{12}\right)$ INTO VARIABLE B [SHIFT] [RCL] [°’’’]



And then complete the calculation

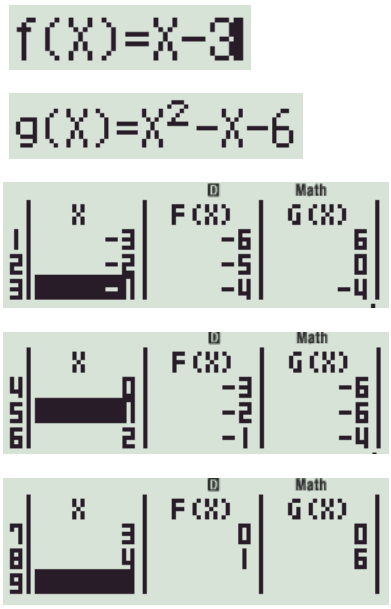
[5] [0] [0] [0] [ALPHA] [(–)] [$x^{\blacksquare}$] [3] [×] [4] [▶] [ALPHA] [°’’’] [$x^{\blacksquare}$] [4] [×]
[1] [2] [▶] [−] [2] [0] [0] [0] [ALPHA] [(–)] [$x^{\blacksquare}$] [1] [×] [4] [▶] [ALPHA]
[°’’’] [$x^{\blacksquare}$] [4] [×] [1] [2] [▶] [−] [3] [0] [0] [0] [ALPHA] [°’’’] [$x^{\blacksquare}$] [4]
[×] [1] [2] [=]



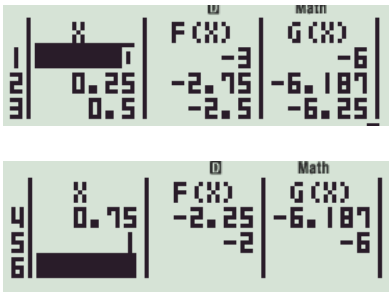
- The Memory Keys save time – less calculator keys are pressed.
- The Memory Keys do not have to be cleared to be used again. When saving a new value, it overwrites the existing value.

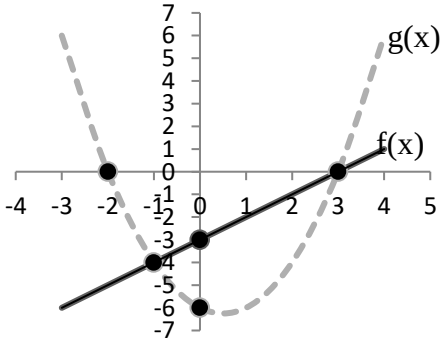
MODE 3: Table

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

Key Sequence:	**On screen:**
• 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)**	

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

Key Sequence:	**On screen:**
• [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)**	



SOLVING EQUATIONS

1. Simultaneous equations with 2 unknowns

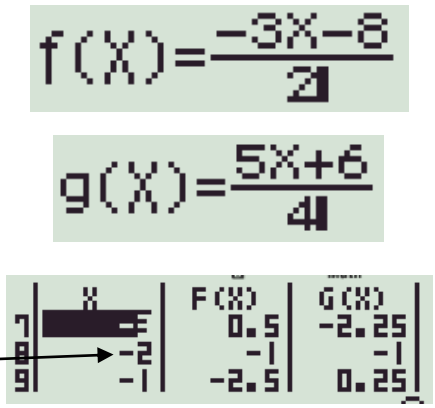
Solve for *x* and *y*:

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

Manipulate

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

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

Key Sequence:	**On screen:**
• Input f(x) formula = • Input g(x) formula = • Set boundaries for the table: Start? (−) 9 = End? 9 = Step? 1 = $\boldsymbol{x = -2\ and\ y = -1}$	

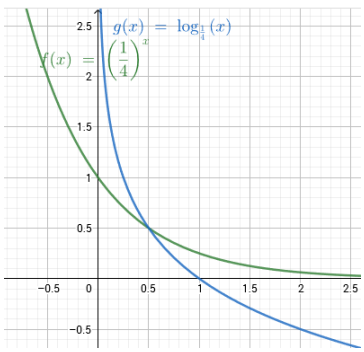
DON'T FORGET

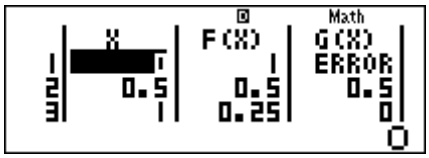
$\boldsymbol{f(x)}$ **&** $\boldsymbol{g(x)}$ **− 20** ***x values***

$\boldsymbol{f(x)}$ **− 30** ***x values***

HOW TO CHANGE:

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

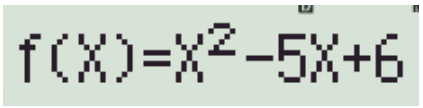
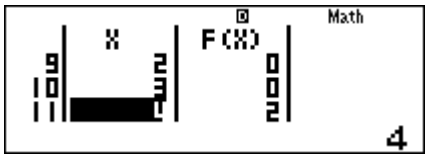




2. Quadratic equation

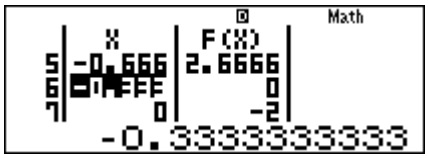
Generate a TABLE for the equation & read off the *x* value where f(*x*) = 0

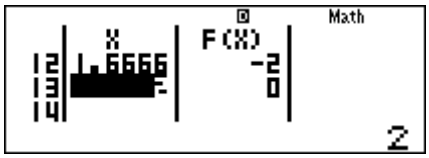
$$\boldsymbol{x^2 - 5x + 6 = 0}$$

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

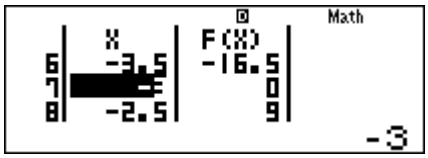
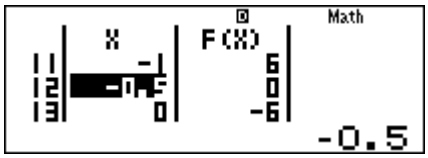
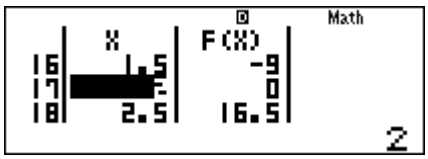




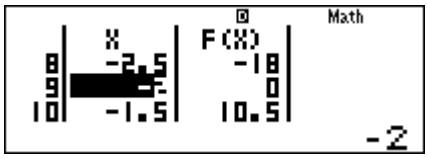
3. Cubic equation

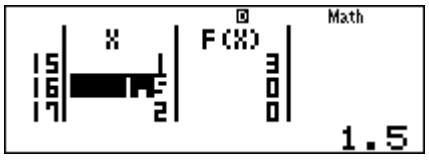
Generate a TABLE for the equation & read off the *x* value where f(*x*) = 0

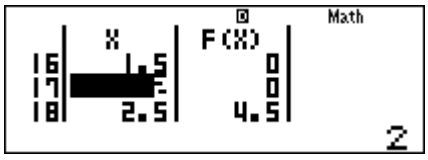
$$\boldsymbol{2x^3 + 3x^2 - 11x - 6 = 0}$$

Key Sequence:	**On screen:**
• Input f(*x*) equation = • *g(x)* = = • Set boundaries for your table: Start? − 6 = End? 6 = Step? 1 ▼ 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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