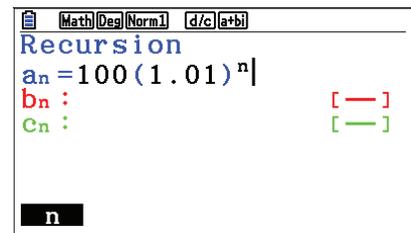
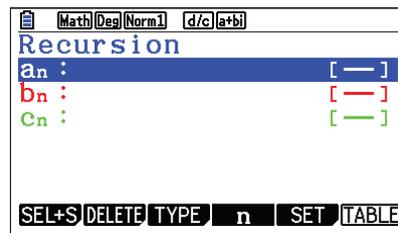
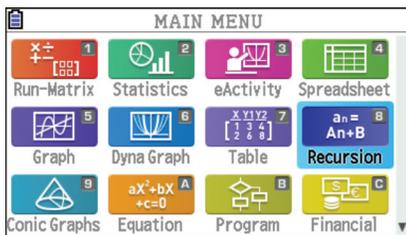


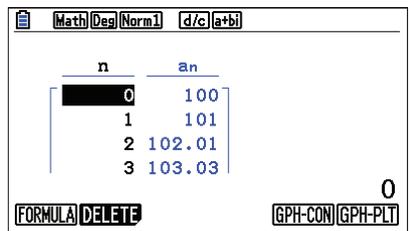
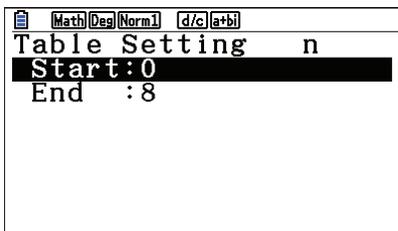
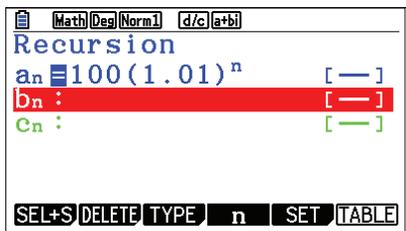
# RECURSION

1. Suppose \$100.00 is deposited into a savings account with an interest rate of 4% compounded quarterly. How much is in the account for each of the first 8 quarters?

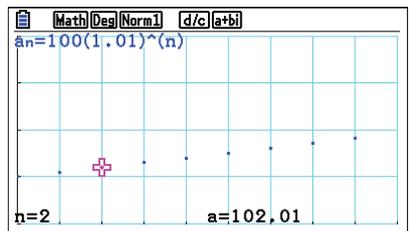
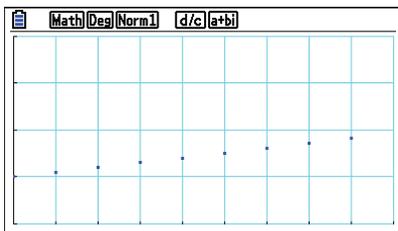
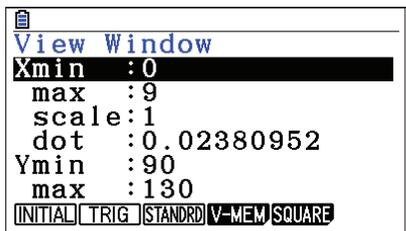
Because this is a discrete model, it can be modeled as a sequence. Although the menu says Recursion, it can be used for both explicit and recursive sequences. From the Main Menu, press **[8]** to open the sequence editor. If the type is not **a<sub>n</sub>**, press **[F3]** (TYPE) **[F1]** (**a<sub>n</sub>**). The account pays 1% per quarter so enter the formula as shown, using **[F1]** (**n**) for **n**. Press **[EXE]**.



To create a table of values, press **[F5]** (SET). Select **Start** and **End** values and press **[EXE]** after entering each value. To display the table, press **[EXIT]** **[F6]** (TABLE).



This sequence can also be viewed as a graph. Before plotting the graph, set a window by pressing **[SHIFT]** **[F3]** (**V-Window**). Press **[EXIT]**. To see the graph, press **[F6]** (GPH-PLT). To trace on the graph, press **[SHIFT]** **[F1]** (**Trace**).



# RECURSION

The sequence can also be created as a recursive formula. Return to the editor using **SHIFT** **EXIT** (**QUIT**). To change the type, press **F3** (**TYPE**) **F2** (**a<sub>n+1</sub>**) and edit the equation. To insert **a<sub>n</sub>**, press **F2** (**a<sub>n</sub>**) then **EXE**. To specify the initial value, press **F5** (**SET**). For **a<sub>0</sub>**, enter **1 0 0 EXE**.

Math Deg Norm1 d/c |a+b|

Select Type

F1 : a<sub>n</sub> = A<sub>n</sub> + B  
 F2 : a<sub>n+1</sub> = A a<sub>n</sub> + B n + C  
 F3 : a<sub>n+2</sub> = A a<sub>n+1</sub> + B a<sub>n</sub> + ...

an an+1 an+2

Math Deg Norm1 d/c |a+b|

Recursion

a<sub>n+1</sub> = 1.01 a<sub>n</sub> [ - ]  
 D<sub>n+1</sub> : [ - ]  
 C<sub>n+1</sub> : [ - ]

SEL+S DELETE TYPE n.an... SET TABLE

Math Deg Norm1 d/c |a+b|

Table Setting n+1

Start: 0  
 End : 8  
 a<sub>0</sub> : 100  
 b<sub>0</sub> : 0  
 c<sub>0</sub> : 0  
 a<sub>n</sub> Str: 0

a<sub>0</sub> a<sub>1</sub>

To see the table, press **EXIT** **F6** (**TABLE**). To view a graph, press **F6** (**GPH-PLT**).

Math Deg Norm1 d/c |a+b|

n	a <sub>n</sub>
0	100
1	101
2	102.01
3	103.03

FORMULA DELETE GPH-COIN GPH-PLT

Math Deg Norm1 d/c |a+b|

a<sub>n+1</sub> = 1.01 a<sub>n</sub>

n=8 a=108,2856706

2. How long will it take for the account to double in value to \$200.00?

One good way to answer this question is to return to the Equation menu. Press **MENU** **X,θ,T** (**A**). To enter the equation, press **F3** (**SOLVER**). If **F3** (**SOLVER**) is not an option, press **EXIT** until it is. To insert the =, press **SHIFT** **□** (**=**). Once the equation is entered, press **EXE** or **F6** (**SOLVE**). It will take 70 quarters or  $17\frac{1}{2}$  years for the investment to double.

Math Deg Norm1 d/c |a+b|

Eq :

RECALL DELETE SOLVE

Math Deg Norm1 d/c |a+b|

Eq : 100 (1.01)<sup>x</sup> = 200  
 x=0  
 Lower = -9E+99  
 Upper = 9E+99

RECALL DELETE SOLVE

Math Deg Norm1 d/c |a+b|

Eq : 100 (1.01)<sup>x</sup> = 200  
 x = 69.66071689  
 Lft = 200  
 Rgt = 200

REPEAT