


Chapter 11 / Example 25

Euler's method

Use Euler's method with step size 0.1 to approximate the solution to the initial value problem $\frac{dy}{dx} = xy$ and $y(1) = 1$, and estimate the value of $y(2)$.

Press **MENU** 8  to display the sequence entry screen.

The fx-CG50 uses a and b in place of x and y .

When using Euler's method, since the boundary condition is x_0, y_0 , the table should start at 0, end at 10 and a_0 and b_0 are both 1

Press **F5** SET and change the settings to start at 1 end at 10 with $a_0 = 1$ and $b_0 = 1$.

Table Setting		n+1
Start:	:	0
End	:	10
a_0	:	1
b_0	:	1
C_0	:	0
a_n Str:	:	0
a_0	:	a_1

Press **EXIT**.

The fx-CG50 writes iterative formulas using a_{n+1} . The formula $x_n = x_{n-1} + 0.1$ is entered as the equivalent $a_{n+1} = a_n + 0.1$.

Enter $a_n + 0.1$ and press **EXE**.

Enter a_n by pressing **F4** n.a.n... **F2** a_n

Recursion		
a_{n+1}	:	$a_n + 0.1$ [—]
b_{n+1}	:	[—]
C_{n+1}	:	[—]
SEL+S DELETE TYPE n.a.n... SET TABLE		

$y_n = y_{n-1} + 0.1x_{n-1}$ is entered as $b_{n+1} = b_n + 0.1a_n$

Enter $b_n + 0.1a_n$ and press **EXE**.


Enter b_n by pressing **F4** n.a.n... **F3** b_n

Recursion		
a_{n+1}	:	$a_n + 0.1$ [—]
b_{n+1}	:	$b_n (1 + 0.1a_n)$ [—]
C_{n+1}	:	[—]
SEL+S DELETE TYPE n.a.n... SET TABLE		

Press **F6** TABLE.

The GDC displays a table of values of the sequences a_n and b_n .

n+1	a_{n+1}	b_{n+1}
0	1	1
1	1.1	1.1
2	1.2	1.221
3	1.3	1.3675
0		
FORMULA DELETE PHASE WEB-GPH GPH-CON GPH-PLT		

You can scroll down the table using .

From the table, $y_2 = 3.86$

n+1	a_{n+1}	b_{n+1}
7	1.7	2.35
8	1.8	2.7495
9	1.9	3.2444
10	2	3.8608
3.860891894		
FORMULA DELETE PHASE WEB-GPH GPH-CON GPH-PLT		