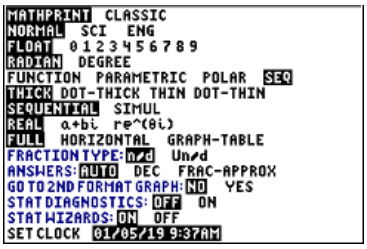
Chapter 11 / **Example 25**

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 $y(2)$.

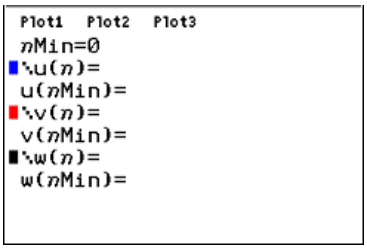
To enter iterative formulas press [MODE]. Use the | } ~ † keys to place the cursor on SEQ in the Mode menu, and then press [ENTER] to highlight it.



Press [F1] [Y=] to display the sequence entry screen.

When using Euler's method, since the boundary condition is (x_0, y_0), the minimum value of n is 0.

set nMin to 0 and press [ENTER].

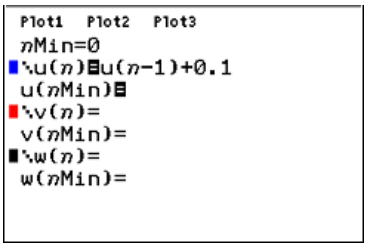


The TI-84 Plus C uses u and v in place of x and y.

$x_n = x_{n-1} + 0.1$

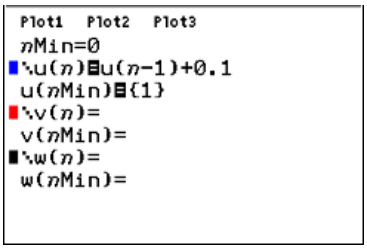
Set u(n) to u(n–1) + 0.1 and press [ENTER].

To enter u, press [2nd] [7] [u] and to enter n press [X,T,Θ,n].



Since an iterative formula defines each term in terms of the previous one, you must enter the first term, u(0).

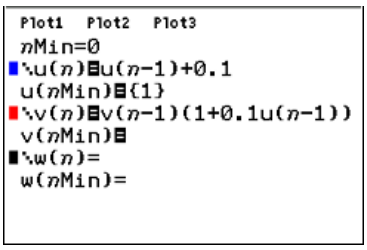
Set u(nMin) to 1 and press [ENTER].



$y_n = y_{n-1}(1 + 0.1x_{n-1})$

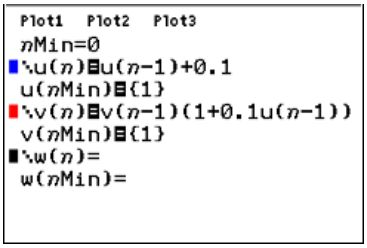
Set v(n) to v(n-1) (1 + 0.1 u(n-1)) and press [ENTER].

To enter v, press [2nd] [8] [v].



Chapter 11 / **Example 25**

Euler's method

Enter the initial value of v(n). Set v(nMin) to 1 and press ENTER.	
To view the sequences open the table of values by pressing 2nd GRAPH [TABLE]. From the table, $y(2) = 3.86$.