

TEKS a.1, a.5, a.6, 2A.2.A



Another Way to Solve Example 4, page 829

MULTIPLE REPRESENTATIONS In Example 4 on page 829, you found the number that a real-life sequence approaches over time by using a calculator to evaluate the rule for the sequence. You can also solve this problem using a graph or an algebraic method.

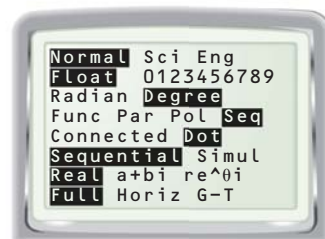
PROBLEM

MUSIC SERVICE An online music service initially has 50,000 annual members. Each year the music service loses 20% of its current members and adds 5000 new members. What happens to the number of members over time?

METHOD 1

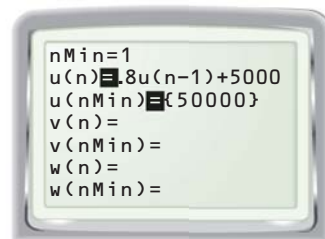
Using a Graph A recursive rule for the number a_n of members at the beginning of the n th year is $a_1 = 50,000$, $a_n = 0.8a_{n-1} + 5000$. One alternative method for finding the number this sequence approaches is to graph the sequence on a graphing calculator.

STEP 1 Set the calculator to *sequence* mode and *dot* mode.

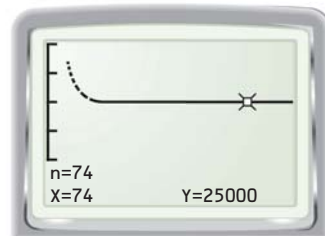


STEP 2 Press $\boxed{Y=}$ and enter the equations $n\text{Min} = 1$, $u(n) = 0.8u(n-1) + 5000$, and $u(n\text{Min}) = 50,000$. Press $\boxed{\text{WINDOW}}$ and enter the following parameters:

$n\text{Min} = 1$ $X\text{min} = 0$ $Y\text{min} = 15,000$
 $n\text{Max} = 100$ $X\text{max} = 100$ $Y\text{max} = 35,000$
 $\text{PlotStart} = 1$ $X\text{scl} = 10$ $Y\text{scl} = 5000$
 $\text{PlotStep} = 1$



STEP 3 Graph the sequence. Use the *trace* feature to find the value that the sequence approaches as n becomes large. From the graph, you can see that the sequence approaches 25,000.



► Over time, the number of members of the music service approaches 25,000.