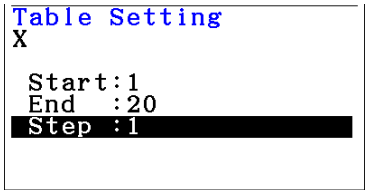
Chapter 1 / **Example 18**
Finding the number of terms in a geometric sequence

The first term of a geometric sequence is 16 and the common ratio is $\frac{1}{2}$

Find the biggest term that is smaller than $\frac{1}{1000}$

Press MENU 7 TABLE. Press F5 SET and change the settings so that the table starts from 1 and ends at 20.

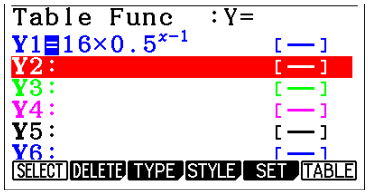
Press EXIT.



$u_1 = 16, r = \frac{1}{2}$

$u_n = 16 \times \left(\frac{1}{2}\right)^{n-1} > \frac{1}{1000}$

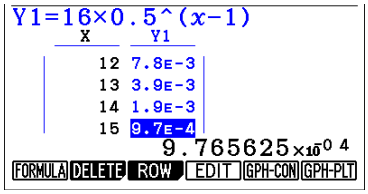
Type $16 \times 0.5 \wedge X - 1$ and press EXE to enter the equation as Y1.



Press F6 TABLE.

A table of values is displayed. Scroll down the table using ▼.

From the table, $Y_1 = 0.000977$ when $n = 15$

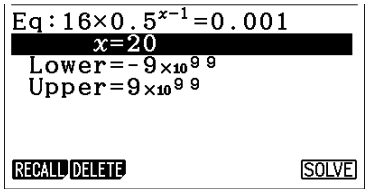


An alternative method is to solve $16 \times \left(\frac{1}{2}\right)^{n-1} > \frac{1}{1000}$ using the numerical solver.

Press MENU A EQUA

Press F3 SOLVER.

Type $16 \times 0.5 \wedge X - 1 = 0.001$ in E1 and press EXE.



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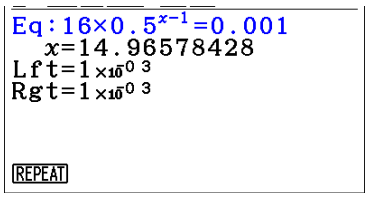
Press F6 SOLVE to obtain a solution to the problem.

$16 \times \left(\frac{1}{2}\right)^{n-1} = \frac{1}{1000}$ when $n = 14.96...$

Hence the smallest value of n for which $u_n < \frac{1}{1000}$ is 15.



Press MENU 1 to display the Run-Matrix screen.

Calculate $16 \times 0.5 \wedge 15 - 1$

The biggest term that is smaller than $\frac{1}{1000}$ is $u_{15} = 0.000977$