

Chapter 7 / Example 6

Geometric sequences

Sheldon is carrying out an experiment that involve adding decreasing amounts of a chemical to a series of test solutions.

He adds 60 ml to the first and 50 ml to the second. The amounts added form a geometric sequence.

- Find the amount added to the fifth solution.
- Find which solution will be the first to have less than 10 ml added.

$$u_n = 60 \times \left(\frac{5}{6}\right)^{n-1}$$

Press **MENU** 5 **GRAPH** to display the equation entry screen.

Type $60 \times \left(\frac{5}{6}\right)^{x-1}$ and press **EXE** to enter the equation as Y1.

Use **□** to enter the fraction.

Graph Func : Y=

Y1: $60 \times \left(\frac{5}{6}\right)^{x-1}$ [—]

Y2: [—]

Y3: [—]

Y4: [—]

Y5: [—]

[SELECT] [DELETE] [TYPE] [TOOL] [MODIFY] [DRAW]

Press **MENU** 7 **TABLE**. Press **F5** SET and change the settings so that the table starts from 0 and ends at 10.

Press **EXIT**.

Table Setting

X

Start: 1

End : 10

Step : 1

Press **F6** TABLE.

A table of values is displayed.

Scroll down with **▼**.

From the table, you can see that $u_5 = 28.9$ ml.

X	Y1
5	28.935
6	24.112
7	20.093
8	16.744

5

[FORMULA] [DELETE] [ROW] [EDIT] [GPH-CON] [GPH-PLT]

Use this information to choose suitable window settings to display the graph.

Press **MENU** 5 **GRAPH** **II**.

Press **SHIFT** **F3** V-WIN.

Set the axes to show $0 \leq x \leq 15$ with a scale of 1 and $0 \leq y \leq 60$ with a scale of 10 leaving the remaining items the same.

Press **EXIT** when you have finished.

View Window

Xmin : 0

max : 15

scale: 1

dot : 0.03968253

Ymin : 0

max : 60

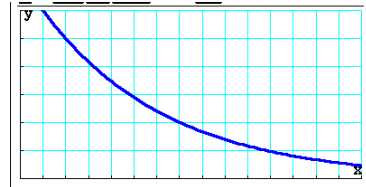
[INITIAL] [TRIG] [STANDARD] [V-MEM] [SQUARE]

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Press **F6** DRAW to display the graph screen

The GDC displays the graph of the value of the value of the car in a suitable window.



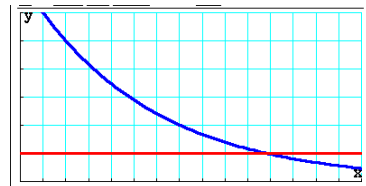
Press **EXIT** to return to the equation entry screen.

Type 10 press **EXE** to enter the equation as Y2.

Graph Func : Y=
Y1=60×(5/6)^{x-1} [—]
Y2=10 [—]
Y3: [—]
Y4: [—]
Y5: [—]
[SELECT] [DELETE] [TYPE] [TOOL] [MODIFY] [DRAW]

Press **F6** DRAW.

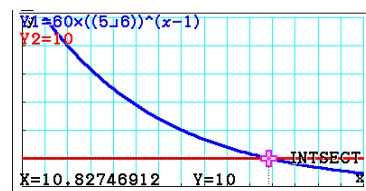
The GDC displays $Y1 = 60 \times \left(\frac{5}{6}\right)^{x-1}$ and $Y2 = 10$.



To find the intersection press **F5** G-Solv **F5** Intersect.

Press **EXE** to display the coordinates.

Press **EXIT** to leave G-Solv mode and **F6** DRAW to display the graph screen again.



The GDC displays the intersection of the curve and the line at the point (10.8, 10).

Since $n > 10.8$, $n = 11$ as it must be an integer.

