

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.

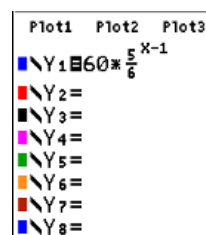
- Find the amount added to the fifth solution.
- Find which solution will be the first to have less than 10 ml added.

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

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

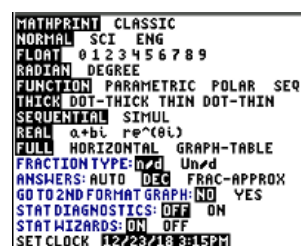
Type $60 \times \left(\frac{5}{6}\right)^{x-1}$ and press $[ENTER]$ to enter the equation as Y_1 .

Press $[ALPHA]$ $[F1]$ 1:n/d to use a fraction template.



Press $[MODE]$

Using \downarrow and \uparrow , navigate down to ANSWERS and select 'DEC' by pressing $[ENTER]$.



Press $[2nd]$ $[F5]$ $[TABLE]$ to display a table of values for

$$Y_1 = 60 \times \left(\frac{5}{6}\right)^{x-1}$$

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

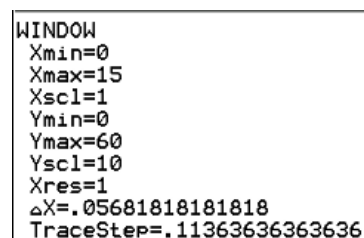
X	Y1				
0	72				
1	60				
2	50				
3	41.667				
4	34.722				
5	28.935				
6	24.113				
7	20.094				
8	16.745				
9	13.954				
10	11.628				

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

Press $[F2]$ $[WINDOW]$

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.

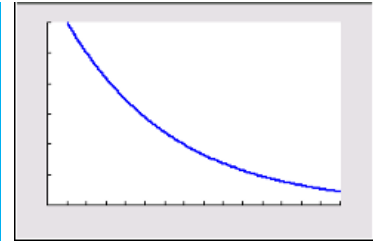
Press $[F5]$ $[GRAPH]$ when you have finished.



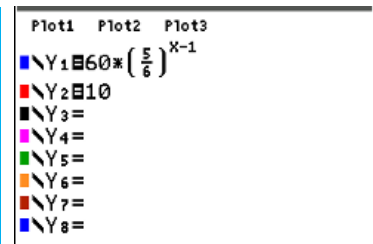
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The GDC displays the graph of the sequence in a suitable window.

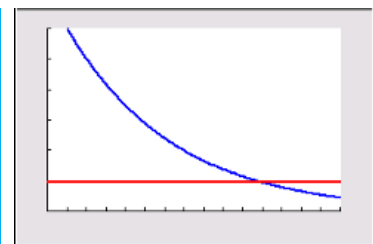


Press $[F1]$ $[Y=]$ to display the equation entry screen.
Type 10 and press $[ENTER]$ to enter the equation as Y_2 .



Press $[F5]$ $[GRAPH]$.

The GDC displays $Y_1 = 60 \times \left(\frac{5}{6}\right)^{X-1}$ and $Y_2 = 10$

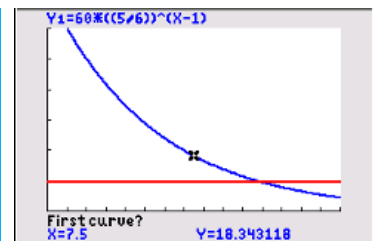


Press $[2nd]$ $[F4]$ $[CALC]$ 5:intersect

To find the intersection you need to choose the two lines that intersect.

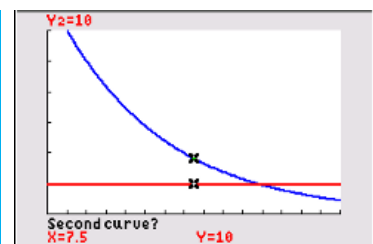
The GDC shows a cross on one of the lines and 'First curve?'.

Press $[ENTER]$.



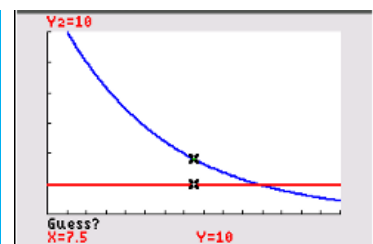
The GDC shows a cross on the other line and 'Second curve?'.

Press $[ENTER]$.



The GDC requires an initial guess for the position of the intersection. Choose the default position.

Press $[ENTER]$.



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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.

