

Chapter 7 / Example 5

Sum of a geometric sequence

The students in a school decided to raise money in order to install hammocks in the campus. They have 10 days to raise the required money of €300. The money raised on the first day was €50. The money that they raise on each subsequent day is 15% less than the previous.

- Calculate the amount of money they expect to raise in total. Comment on whether this will be enough to purchase the hammocks.
- Calculate the number of full days they would need to fundraise on if they are to raise enough money to purchase the hammocks.
- Find the maximum daily percentage decrease in the money they raise if they are to reach their goal of raising €300 in 10 days.

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

Press **EXIT**

Table Setting
X

Start: 1
End : 20
Step : 1

Type $\frac{50(1-0.85^x)}{1-0.85}$ and press **EXE** to enter the equation as Y1.

Press **□** to add a fraction template.

Table Func : Y=
Y1= $\frac{50(1-0.85^x)}{1-0.85}$ [—]
Y2: [—]
Y3: [—]
Y4: [—]
Y5: [—]
[SELECT] [DELETE] [TYPE] [STYLE] [SET] [TABLE]

Press **F6** TABLE.

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

Y1=(50(1-0.85^(x))) / (1-0.85)
x y1
7 228.47
8 242.6
9 256.12
10 267.7
267.7085319
[FORMULA] [DELETE] [ROW] [EDIT] [GPH-CON] [GPH-PLT]

Scroll down the table using **▼**.

$$S_{15} = \frac{50(1-0.85^{15})}{1-0.85} = 304.22$$

They would need at least 15 days in order to collect €300.

Y1=(50(1-0.85^(x))) / (1-0.85)
x y1
12 285.91
13 293.03
14 299.07
15 304.21
304.2152603
[FORMULA] [DELETE] [ROW] [EDIT] [GPH-CON] [GPH-PLT]

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

Type $\frac{50(1-x^{10})}{1-x}$ using the fraction template **□** in the second equation as Y2.

Type 300 in the third equation Y3.

Graph Func : Y=
Y1= $\frac{50(1-x^{10})}{1-x}$ [—]
Y2= $\frac{50(1-x^{10})}{1-x}$ [—]
Y3= 300 [—]
Y4: [—]
[SELECT] [DELETE] [TYPE] [TOOL] [MODIFY] [DRAW]

Chapter 7 / Example 5

Sum of a geometric sequence

Choose suitable window settings to display the graphs.

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

Change the settings to $0 \leq x \leq 1$ with a scale of 0.1 and
 $0 \leq y \leq 400$ with a scale of 20.

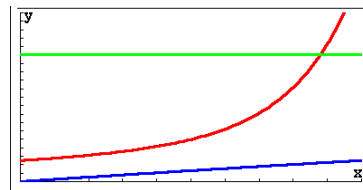
You can leave the other items as they are.

Press **EXIT** when you have finished.

View Window
 Xmin : 0
 max : 1
 scale: 0.1
 dot : 2.6455×10^{-3}
 Ymin : 0
 max : 400
 INITIAL TRIG STANDARD V-MEM SQUARE

Press **F6** DRAW.

The GDC displays the graphs in a suitable window.

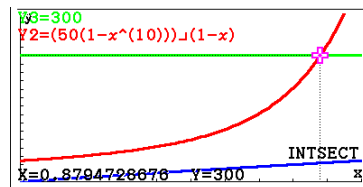


To find the intersection press **F5** G-Solv **F5** Intersect.

Select Y2 and Y3.

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 an intersection at 0.879,300 .

$$r = 0.879 \Rightarrow p = 12.1\%$$

