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.

a Calculate the amount of money they expect to raise in total. Comment on whether this will be enough to purchase the hammocks.

b Calculate the number of full days they would need to fundraise on if they are to raise enough money to purchase the hammocks.

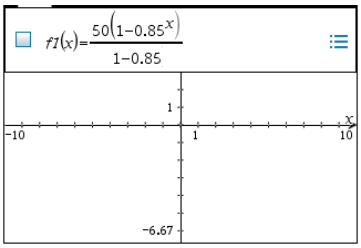
c Find the maximum daily percentage decrease in the money they raise if they are to reach their goal of raising €300 in 10 days.

Open a new document and add a Graphs page.

The entry line is displayed at the top of the work area.

The default graph type is function, so '$f1(x)=$' is displayed.

Type $\frac{50\ 1-0.85\ \hat{}\ x}{1-0.85}$ using the fraction template ctrl and press enter.

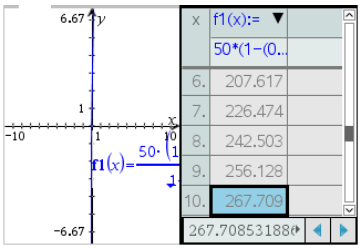


Press ctrl T.

A table of values is displayed alongside a graph.

You can scroll down the table using ▼ on the touchpad.

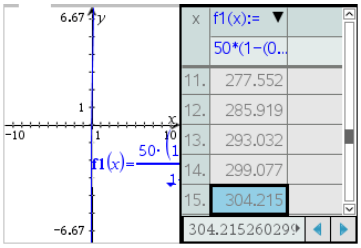
From the table, $S_{10} = \frac{50\ 1-0.85^{10}}{1-0.85} = 267.71$



Scroll down the table using ▼.

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

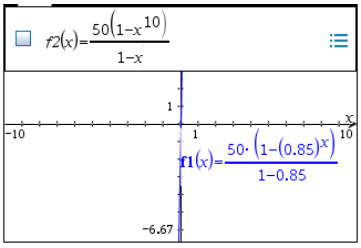
They would need at least 15 days in order to collect €300.



Press ctrl T to exit the table.

Press tab to display the entry line again. This time '$f2(x)=$' is displayed.

Type $\frac{50\ 1-X\ \hat{}\ 10}{1-X}$ using the fraction template ctrl and press enter.



Chapter 7 / **Example 5**

Sum of a geometric sequence

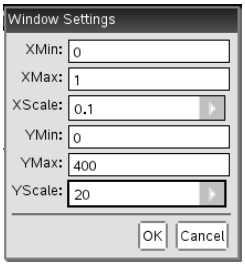
Press tab to display the entry line again and type 300 as '$f3(x)=$'.

Press ctrl T again to remove the table.

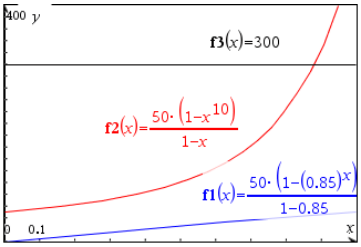
Press menu 4:Window/Zoom | 1:Window Settings…

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

Press enter when you have finished.



The GDC displays the graphs in a suitable window.



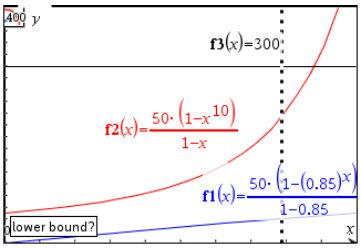
Press menu 6:Analyse Graph | 4:Intersection

Select graph $f2$ and graph $f3$.

To find the intersection you need to give the lower and upper bounds of the region that includes the intersection.

The GDC shows a line and asks you to set the lower bound. Move the line using the touchpad and choose a position to the left of the intersection.

Click the touchpad.

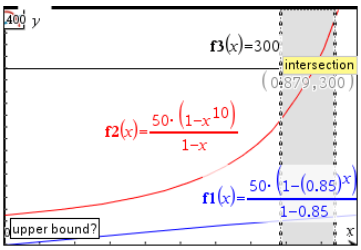


The GDC shows another line and asks you to set the upper bound.

Use the touchpad to move the line so that the region between the lower and upper bounds contains the intersection.

When the region contains the intersection, the calculator will display the word 'intersection' in a box.

Click the touchpad.



The GDC displays an intersection at $0.879, 300$.

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