

Chapter 4 / **Example 9**

Finding the limit of a sequence

The GDC will graph sequences as well as functions.

Find $\lim_{n \rightarrow \infty} \frac{n^3 + 4n}{2n^3 - 1}$. Confirm your answer graphically.

Press **MENU** 8 **RECUR** to display the sequence entry screen.

Type $(n^3 + 4n) \div (2n^3 - 1)$ and press **EXE** to enter the first sequence as a_n .

Type $1 \div 2$ and press **EXE** to enter the second sequence as b_n .

Press **F4** to enter n .

Recursion
 $a_n = \frac{n^3 + 4n}{2n^3 - 1}$ [—]
 $b_n = \frac{1}{2}$ [—]
 $C_n :$ [—]
SEL+S **DELETE** **TYPE** **n** **SET** **TABLE**

Press **F5** **SET** and change the setting for End to 30.

Press **EXIT**.

Table Setting **n**
 Start: 0
 End : 30

Press **F6** **TABLE**.

The GDC displays a table of values of the sequences a_n and b_n .

n	a_n	b_n
0	0	0.5
1	5	0.5
2	1.0666	0.5
3	0.7358	0.5

0
FORMULA **DELETE** **PHASE** **GPH-CON** **GPH-PLT**

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

Set the axes to show $-1 \leq x \leq 10$ and $-1 \leq y \leq 2$ with scales of 1.

You can leave the other items as they are.

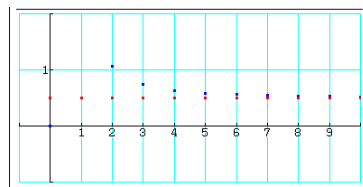
Press **EXIT** when you have finished.

View Window
 Xmin : -1
 max : 10
 scale : 1
 dot : 0.02910052
 Ymin : -1
 max : 2
INITIAL **TRIG** **STANDARD** **V-MEM** **SQUARE**

Press **F6** **GPH-PLT** to display the graph screen.

The GDC displays the graphs in a suitable window.

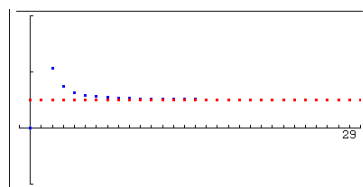
The sequence converges to $\frac{1}{2}$.



Press **F3** **V-WIN** and change the maximum value of x to 30.

Press **EXIT** **F6** **TABLE** and **F6** **GPH-PLT**.

The graph shows the convergence even more clearly.



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