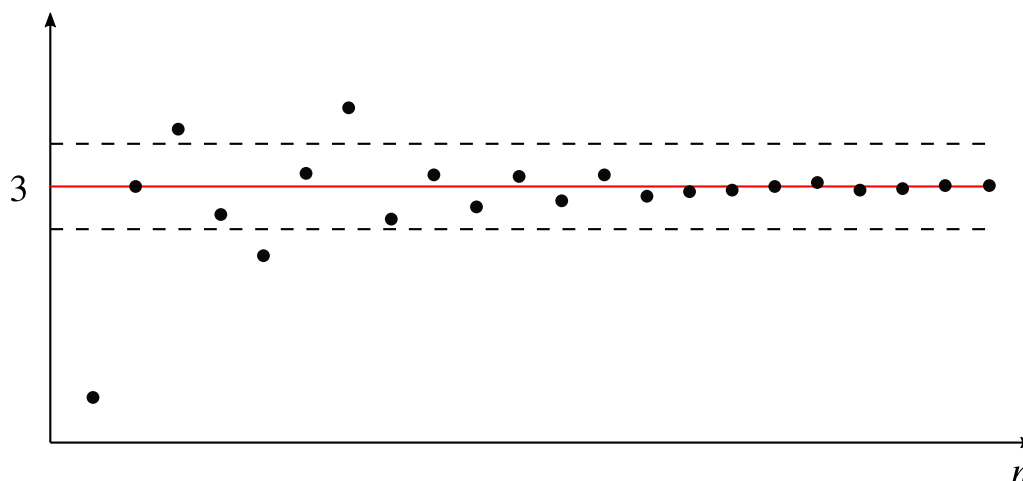


# Convergent sequence

A sequence is said to *converge* to a number (not including  $\infty$  or  $-\infty$ , which are not numbers) if it “gets closer and closer” to this number. A sequence which converges to some number is called a *convergent sequence*.

Here is a graph of a sequence which converges to 3:



Some of the terms equal 3, some terms are above 3 and some are below. But from the 8th term onwards, all of the terms are between the dashed lines. No matter how close we make the dashed lines to 3, eventually the terms will all be between them. It is this property of being “eventually being stuck between the close dashed lines, no matter how close they are” which is what we mean by saying that the sequence converges to 3.

Some examples of convergent sequences include:

$\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \dots$	converges to 0
$0, \frac{1}{2}, 0, \frac{1}{4}, 0, \frac{1}{8}, 0, \dots$	also converges to 0
$0, 1, \frac{1}{2}, \frac{3}{4}, \frac{5}{8}, \frac{11}{16}, \dots$	converges to $\frac{2}{3}$

(In the third sequence, each term from the third onwards is the mean of the previous two.)

A sequence which does not converge is said to *diverge*.