WHEN WILL YOU GET A LIMIT?   1

Use a calculator for this activity.

In this activity you are going to explore different sequence in which each term is defined as a function of the previous term: this is called an **INDUCTIVE DEFINITION** of a sequence. To complete the definition of the sequence you also need to give the first term.

The first type of sequence you will consider is of the form $u_{n+1} = \dfrac{u_n + b}{u_n}$ where **b** is a rational number.

- First consider this sequence: $u_1 = 1$ and $u_{n+1} = \dfrac{u_n + 6}{u_n}$

  Hence, $u_2 = \dfrac{u_1 + 6}{u_1} = 7$ and $u_3 = 1.857\ldots$

  Use the **ANS** button on your calculator to continue the sequence. You should find that, by the time you get to u_{20}, you can see that the sequence is converging to **3** (it alternates between being above and below **3**).
  Does the sequence converge to **3** for other values of u_1?

- Now consider **b = 2**, **b = 12** and other positive values of **b**.

- Now consider **b = −1** and other negative values of **b** between **−1** and **0**.

- Can you predict how the sequence will behave from its inductive definition?

- Can you explain any of your findings?

6 – *Sequences and series*

STUDENT RESOURCE

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