

Discrete Functions

A functions made up of separate points that are not connected

Sequence

ordered list of numbers.

ex 1, 3, 5, 7, 9
1 2 3 4 5

$$y = 2x - 1 \quad t_n = 2n - 1$$

1, 2, 4, 8, 16, ...

Discrete

Variables are only natural numbers

ex 1, 2, 3, 4, ...

Continuous

Variables can be ANY possible value

ex. 1, 3.5, $\frac{7}{4}$, π

The image shows a digital notebook interface with a blue border. At the top left is an 'Edit' button, at the top center is a 'Reset' button, and at the top right is a circular help icon with a question mark. The notebook is divided into two columns by a vertical line. The left column is titled 'Discrete' and contains four blue buttons: 'Albums Sold', 'Number of ...', 'Rolling a Die', and 'Grade'. The right column is titled 'Continuous' and contains four blue buttons: 'Height', 'Time', 'Weight', and 'Length'. A horizontal line is drawn across the middle of the notebook, separating the column headers from the examples.

Explicit Formula

a Formula that represents ANY term in the sequence relative to the term number

$$y = 3x + 4$$

$$t_n = 3^n$$

$$f(x) = 3x + 4$$

$$t_n = 2n^2 - 5$$

$$t_n = 3n + 4$$

Determine the next 3 terms of the sequence

$$1, 2, 3, 4, 5, \dots 6, 7, 8 \quad t_n = n$$

$\begin{matrix} \vee & \vee & \vee & \vee \\ +1 & +1 & +1 & +1 \end{matrix}$

$$2, 4, 8, 16, \dots 32, 64, 128 \quad t_n = 2^n$$

$\begin{matrix} \vee & \vee & \vee \\ \times 2 & \times 2 & \times 2 \end{matrix}$

$$10, 7, 4, 1, \dots -2, -5, -8 \quad t_n = 13 - 3n$$

$\begin{matrix} \vee & \vee & \vee \\ -3 & -3 & -3 \end{matrix}$

$$1, 1, 2, 3, 5, 8, \dots 13, 21, 34$$

$\begin{matrix} 5+8 & 13+8 & 13+21 \\ \vee & \vee & \vee \\ \times & \times & \times \end{matrix}$

$1+1=2$
 $1+2=3$
 $2+3=5$
 $3+5=8$

$$1, 1, 2, 3, 5, 8, 13, 21, 34, 55, \dots$$

t_8

Fibonacci Sequence

$$t_n = ?$$

Recursive Formula

A formula where each term of a sequence is generated from preceding terms

ex $t_n = t_{n-1} + 1, t_1 = 1$

$$\begin{aligned} t_1 &= 1 \\ &\downarrow \\ t_2 &= 1 + 1 \\ &= 2 \\ &\downarrow \\ t_3 &= 2 + 1 \\ &= 3 \end{aligned}$$

Fibonacci:

$$t_n = t_{n-1} + t_{n-2}$$
$$\begin{aligned} t_1 &= 1 \\ t_2 &= 1 \end{aligned}$$

pg. 360
1, 3, 5, 6

pg. 370
1, 3, 4, 9