

Sequences

Intro and Example Problems

April 21, 2020

Explicit v. Recursive

$$\{2, 4, 6, 8, 10, \dots a_{n-1}, a_n\}$$

$$\{2, 4, 8, 16, 32, \dots a_{n-1}, a_n\}$$

Explicit v. Recursive

$$\{2, 4, 6, 8, 10, \dots a_{n-1}, a_n\}$$

$$d = 2$$

$$\{2, 4, 8, 16, 32, \dots a_{n-1}, a_n\}$$

$$r = 2$$

Explicit

$$\{2, 4, 6, 8, 10, \dots, a_{n-1}, a_n\}$$

$$a_n = 2$$

Explicit

$$\{2, 4, 6, 8, 10, \dots, a_{n-1}, a_n\}$$

$$a_n = 2 + 2n$$

Explicit

$$\{2, 4, 6, 8, 10, \dots, a_{n-1}, a_n\}$$

$$a_n = 2 + 2n$$

$$a_2 = 2 + 4$$

Explicit

$$\{2, 4, 6, 8, 10, \dots, a_{n-1}, a_n\}$$

$$a_n = 2 + 2(n - 1)$$

Recursive

$$\{2, 4, 6, 8, 10, \dots a_{n-1}, a_n\}$$

if $n = 1, a_n = 2$

Recursive

$$\{2, 4, 6, 8, 10, \dots, a_{n-1}, a_n\}$$

if $n = 1, a_n = 2$

$n > 1$

Recursive

$$\{2, 4, 6, 8, 10, \dots, a_{n-1}, a_n\}$$

$$\text{if } n = 1, a_n = 2$$

$$\text{if } n > 1$$

$$a_n = a_{n-1}$$

Recursive

$$\{2, 4, 6, 8, 10, \dots a_{n-1}, a_n\}$$

$$\text{if } n = 1, a_n = 2$$

$$\text{if } n > 1$$

let's say we want a_2

$$4 = 2 + \text{something}$$

Recursive

$$\{2, 4, 6, 8, 10, \dots, a_{n-1}, a_n\}$$

$$\text{if } n = 1, a_n = 2$$

$$\text{if } n > 1$$

$$a_n = a_{n-1} + 2$$

Recursive

$$\{2, 4, 6, 8, 10, \dots a_{n-1}, a_n\}$$

$$\text{if } n = 1, a_n = 2$$

$$\text{if } n > 1$$

$$a_n = a_{n-1} + 2$$

Recursive

Given $a_3 = 1$ and $a_4 = 2$, find the 7th term for the sequence where any given term is the sum of the previous two terms.

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Given $a_3 = 1$ and $a_4 = 2$, find the 7th term for the sequence where any given term is the sum of the previous two terms.

$$a_n = a_{n-2} + a_{n-1}$$

Recursive

Given $a_3 = 1$ and $a_4 = 2$, find the 7th term for the sequence where any given term is the sum of the previous two terms.

$$a_n = a_{n-2} + a_{n-1}$$

$$a_7 = a_5 + a_6$$

Recursive

Given $a_3 = 1$ and $a_4 = 2$, find the 7th term for the sequence where any given term is the sum of the previous two terms.

$$a_n = a_{n-2} + a_{n-1}$$

$$a_7 = a_5 + a_6$$

$$a_6 = a_5 + a_4$$

Recursive

Given $a_3 = 1$ and $a_4 = 2$, find the 7th term for the sequence where any given term is the sum of the previous two terms.

$$a_n = a_{n-2} + a_{n-1}$$

$$a_7 = a_5 + a_6$$

$$a_6 = a_5 + a_4$$

$$a_5 = a_4 + a_3$$

Recursive

Given $a_3 = 1$ and $a_4 = 2$, find the 7th term for the sequence where any given term is the sum of the previous two terms.

$$a_n = a_{n-2} + a_{n-1}$$

$$a_7 = a_5 + a_6$$

$$a_6 = a_5 + a_4$$

$$a_5 = 3$$

Recursive

Given $a_3 = 1$ and $a_4 = 2$, find the 7th term for the sequence where any given term is the sum of the previous two terms.

$$a_n = a_{n-2} + a_{n-1}$$

$$a_7 = a_5 + a_6$$

$$a_6 = 3 + 2$$

$$a_5 = 3$$

Recursive

Given $a_3 = 1$ and $a_4 = 2$, find the 7th term for the sequence where any given term is the sum of the previous two terms.

$$a_n = a_{n-2} + a_{n-1}$$

$$a_7 = 3 + 5$$

$$a_6 = 5$$

$$a_5 = 3$$

Recursive

Given $a_3 = 1$ and $a_4 = 2$, find the 7th term for the sequence where any given term is the sum of the previous two terms.

$$a_7 = 8$$

Recursive (Geometric)

$$\{2, 4, 8, 16, 32, \dots, a_{n-1}, a_n\}$$

$$\text{if } n = 1, a_n = 2$$

$$\text{if } n > 1$$

$$a_n = a_{n-1} \times 2$$

Explicit (Geometric)

Write an explicit expression for the following sequence

$$\{2, 4, 8, 16, 32, \dots, a_{n-1}, a_n\}$$