

6.2 Recursive Procedures – Lesson

MCR3U

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In earlier sections we used function notation to write an explicit formula to determine the value of any term in a sequence. Sometimes it is easier to calculate one term in a sequence using the previous terms.

Recursion Formula:

Recursive Functions

Functions that get new terms in the sequence by using earlier terms.

Example 1: Write the first four terms of the sequence.

a) $t_n = t_{n-1} - 2$ where $t_1 = 7$

b) $t_n = 2t_{n-1} + 4$ where $t_1 = 5$

You may also see questions asked in function notation.

Example 2: Find the first 4 terms.

$$f(n) = 2f(n-1) - 7 \quad \text{where } f(1) = 2$$

Example 3: Find the first seven terms of the sequence.

$$t_n = t_{n-2} + t_{n-1} \quad \text{where } t_1 = 1 \quad \text{and} \quad t_2 = 1$$

Example 4: Write a recursion formula for each sequence

a) -3, 6, -12, 24, ...

Look for a pattern in the terms:

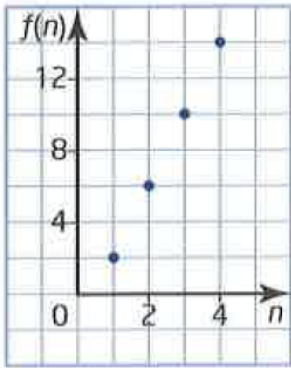
$$t_1 = -3$$

$$t_2 = t_1 \times (-2)$$

$$t_3 = t_2 \times (-2)$$

$$t_4 = t_3 \times (-2)$$

b)



c) 3, 5, 8, 12, ...