8.1 Sequences

Sequence Vocab.

sequence -

finite

infinite

May 19-10:11 AM

explicit - each term is defined independently

rule: $a_n = 4 + 5n$

recursive - use the previous term to define the following terms

rule: $a_1 = 5$ $a_{n+1} = a_n - 4$

May 19-10:20 AM

Arithmetic Sequence

#243

arithmetic - sequence with common difference between successive terms (repeated addition) linear

explicit rule: $a_n = a_1 + (n-1)d$

d = common difference

n = term number

a = term

recursive rule: $a_n = a_{n-1} + d \quad n \geq 2$

May 19-10:15 AM

Find the common difference, a recursive rule, and an explicit rule for the following sequence:

5, 2, -1, -4, -7, ...

Graph it:

May 19-10:26 AM

The fifth & ninth terms of an arithmetic sequence are 5 and -3, respectively. Find the first term and an explicit rule for the nth term.

Feb 3-10:00 AM

Geometric Sequence

#244

geometric - sequence with a common ratio (quotient) between successive terms (repeated multiplication) exponential

explicit rule: $a_n = a_1 \bullet r^{(n-1)}$

r = common ratio

n = term number

a = term

recursive rule: $a_n = a_{n-1} \bullet r \qquad n \geq 2$

May 12-10:19 AM

Find the common ratio, a recursive rule, and an explicit rule for the following sequences:

$4, -2, 1, -\frac{1}{2}, \ldots$

Graph it:

May 19-10:31 AM

The second and fifth terms of a geometric sequence are 6 and -48, respectively. Find an explicit expression for the nth term.

Feb 3-10:02 AM

Convergence/Divergence of an infinite sequence

#242

if $\{a_n\}$ is a sequence - consider $\lim_{n\to\infty} a_n$

convergence: if the limit is a finite number - the sequence converges

divergence: if the limit is infinite or non-existent - the sequence diverges

May 12-10:24 AM

Determine whether the sequence converges or diverges. If it converges, give the limit.

2, 4, 6, 8, 10, ...

$\frac{1}{1}, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \ldots\ldots, \frac{1}{n}, \ldots\ldots$

$-1, 1, -1, 1, -1, \ldots\ldots$

May 12-10:30 AM

Determine if the following sequence converges or diverges. If it converges, then find its limit. Use graphical or symbolic methods.

$$a_n = \frac{-5n+7}{-7n}$$

$$a_n = \frac{1+2n}{2n^2+1}$$

Feb 3-10:18 AM

Show the sequence converges and find its limit.

$$a_n = \frac{\sin^3 n}{n^3}$$

Feb 3-10:22 AM