

Watch. Practice. Understand. | Lesson 334

2022 Calculus BC Sequences and Series 10.1 1st Half

Watch the matching video: <https://www.youtube.com/watch?v=h738F2C0FXg>

Practice focus: Sequences and monotonicity

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Find $\lim_{n \rightarrow \infty} a_n = (3n+1)/(n+2)$.

02 Determine whether $a_n = 1 - 1/n$ ($n \geq 1$) is increasing and bounded.

03 Does $a_n = (-1)^n$ converge?

04 Explain the monotone convergence theorem for sequences.

Worked answers | Lesson 334

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01 Find $\lim_{n \rightarrow \infty} a_n = (3n+1)/(n+2)$.

Divide by n ; limit $(3+0)/(1+0)=3$.

02 Determine whether $a_n = 1 - 1/n$ ($n \geq 1$) is increasing and bounded.

$a_{n+1} - a_n = 1/n - 1/(n+1) > 0$. Also $0 \leq a_n < 1$; it increases toward 1.

03 Does $a_n = (-1)^n$ converge?

No. Even terms equal 1 and odd terms equal -1, so no single limit exists.

04 Explain the monotone convergence theorem for sequences.

Every bounded monotone real sequence converges. Both boundedness and monotonicity are sufficient together, not separately.