Watch. Practice. Understand. | Lesson 339

2022 Calculus BC Direct Comparison and Limit Comparison (Rokawski 10.3 2nd half)

Watch the matching video: https://www.youtube.com/watch?v=yq-6ATyp1Is

Practice focus: Comparison tests

Original extra practice matched to the listed lesson topic.

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

01 Determine convergence of sum $1/(n^2+1)$, $n>=1$.

02 Determine convergence of sum $1/\sqrt{(n^2+1)}$, $n>=1$.

03 Determine convergence of sum $n/(n^3+2)$, $n>=1$.

04 Why does being smaller than a divergent positive series not prove convergence?

Worked answers | Lesson 339

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Practice focus: Comparison tests

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01 Determine convergence of sum $1/(n^2+1)$, $n>=1$.

$0<1/(n^2+1)<=1/n^2$. The comparison p-series converges, so this series converges.

02 Determine convergence of sum $1/\sqrt{(n^2+1)}$, $n>=1$.

Limit comparison with $1/n$: $n/\sqrt{(n^2+1)}->1$. Since harmonic series diverges, so does this series.

03 Determine convergence of sum $n/(n^3+2)$, $n>=1$.

Limit comparison with $1/n^2$ gives $n^3/(n^3+2)->1$. It converges.

04 Why does being smaller than a divergent positive series not prove convergence?

A smaller series may converge or diverge. Comparison conclusions require the correct direction and a suitable known benchmark.