

Watch. Practice. Understand. | Lesson 344

The Secret of Calculus BC Root Test of Convergent and Divergent Infinite Series (Calcul...

Watch the matching video: <https://www.youtube.com/watch?v=xJAYj2LKt5Y>

Practice focus: Ratio and root tests

Original extra practice matched to the listed lesson topic.

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

01 Use the ratio test for $\sum 2^n/n!$, $n \geq 1$.

02 Use the ratio test for $\sum n!/3^n$, $n \geq 1$.

03 Use the root test for $\sum (n/(2n+1))^n$.

04 What does a ratio-test limit of 1 imply?

Worked answers | Lesson 344

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Practice focus: Ratio and root tests

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01 Use the ratio test for $\sum 2^n/n!$, $n \geq 1$.

$a_{n+1}/a_n = 2/(n+1) \rightarrow 0 < 1$. Absolutely convergent.

02 Use the ratio test for $\sum n!/3^n$, $n \geq 1$.

Ratio $= (n+1)/3 \rightarrow \infty > 1$. Divergent.

03 Use the root test for $\sum (n/(2n+1))^n$.

Nth root $= n/(2n+1) \rightarrow 1/2 < 1$, so convergent.

04 What does a ratio-test limit of 1 imply?

The test is inconclusive. Both $\sum 1/n$ (divergent) and $\sum 1/n^2$ (convergent) have ratio limit 1.