

W07 Stepwise

Due date: Thursday 2/26, 11:59pm

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✍ L'Hopital practice - converting indeterminate form

By imitating the technique of the L'Hopital's Rule example, find the limit of the sequence:

$$a_n = \sqrt{n} \ln \left(1 + \frac{1}{n} \right)$$

✍ Limits and convergence

For each sequence, either write the limit value (if it converges), or write 'diverges'.

(a) $\frac{5n-1}{12n+9}$ (b) $(-1)^n \left(\frac{5n-1}{12n+9} \right)$ (c) $\sqrt{4 + \frac{1}{n}}$

(d) $\cos^{-1} \left(\frac{n^3}{n^3+1} \right)$ (e) $10 + \left(-\frac{1}{9} \right)^n$

 **General term of a sequence**

Find a formula for the general term (the n^{th} term) of each sequence:

(a) $\frac{1}{1}, \frac{-1}{8}, \frac{1}{27}, \dots$ (b) $\frac{2}{6}, \frac{3}{7}, \frac{4}{8}, \dots$ (c) $\frac{3}{5}, -\frac{4}{25}, \frac{5}{125}, -\frac{6}{625}, \dots$

 **General term of a series**

Write this series in summation notation:

$$\frac{1}{1} - \frac{2^2}{2 \cdot 1} + \frac{3^3}{3 \cdot 2 \cdot 1} - \frac{4^4}{4 \cdot 3 \cdot 2 \cdot 1} + \cdots$$

(Hint: Find a formula for the general term a_n .)