Sequences Assignment

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Original file	**Sequences Assignment.sagews**

Sequences Assignment

Question 0

Watch the lecture video here.

Did you watch the video? [Type yes or no.]

Question 1

Consider the sequence $a_n = \frac{n^5}{2^n - 1}$.

Part a

Graph the first 50 terms of the sequence.

Part b

Estimate the limit of the sequence based on the graph.

Part c

Evaluate the limit using Sage's limit command.

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Question 2

Consider the sequence $a_n = \dfrac{10^n}{n!}$

[Note: Use factorial(n) for $n!$]

Part a

Graph the first 50 terms of the sequence.

Part b

Estimate the limit of the sequence based on the graph.

Part c

Evaluate the limit using Sage's limit command.

Question 3

Consider the sequence $a_n = \dfrac{n^2}{2n+2} - \dfrac{n^2}{2n-1}$

Part a

Graph the first 50 terms of the sequence.

Part b

Estimate the limit of the sequence based on the graph.

Part c

Evaluate the limit using Sage's limit command.

Question 4

Consider the sequence defined by $a_1 = \sqrt{2}$ and $a_n = \sqrt{2 + a_{n-1}}$ for $n \geq 2$.

Part a

Graph the first 20 terms of the sequence.

Part b

Estimate the limit of the sequence based on the graph.

Part c

Estimate the limit by computing a_{50}.

Question 5

Consider the sequence defined by $a_1 = 3$ and $a_n = 3 + \frac{1}{a_{n-1}}$ for $n \geq 2$.

Part a

Graph the first 20 terms of the sequence.

Part b

Estimate the limit of the sequence based on the graph.

Part c

Estimate the limit by computing a_{50}.