Welcome to MAT136 LEC0501 (Assaf)

Administrative Announcements

us Class will "meet" at 2:10pm MWF on BB Collaborate

us Classes will all be recorded

me My office hour times are now after every class, and will be held on BB Collaborate

me In-Class TopHat is ungraded, and is replaced by assigned TopHat questions

you Pre-reading, WeBWork stay the same

you Watch the videos on the main site!

S9.2 – Geometric Series

Assaf Bar-Natan

"If I could only reach you
If I could make you smile,
If I could only reach you,
That would really be a breakthrough."

– "Breakthru", Queen

March 16, 2020

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Series

We've seen sequences:

$$a_1, a_2, a_3, \ldots$$

Now, we're going to add them up:

$$a_1$$
$$a_1 + a_2$$
$$a_1 + a_2 + \cdots + a_n + \cdots$$

Such a sum is called a **series**.

Q: What is the difference between a **sum** and a **series**?

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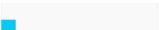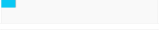$$\sum_{i=0}^{n} f(x_i)\Delta x$$

is a sum.
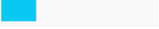
$$\sum_{n=0}^{\infty} \frac{1}{2^n}$$

is a series (see Zeno's Paradox video)

Submissions Closed

A geometric series is characterized by...

✓ **64%** Answered Correctly

A	The terms in the sum are constant		6
B	The ratios of subsequent terms in the sum is a fixed number		75
C	The differences between subsequent terms in the sum is a fixed number		11
D	Every term in the sum is a constant multiple of all the previous terms		26
E	The terms in the sum are increasing		0

March 15 at 10:34 PM results ▾   Segment Results   Compare with session   Show percentages   Hide Graph   Condense Text

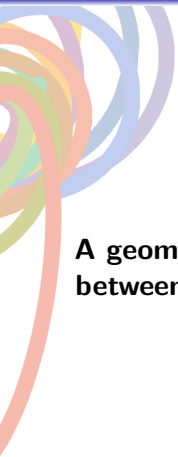118/120 answered   ⟳ Ask Again

∧   ‹   ›   ⬤ Open   ⊘ Closed   ⬚ Responses   ✓ Correct   »   🔍 88%   ⤢

A geometric series is a special kind of series, where the ratio between subsequent terms is constant.

Assaf Bar-Natan

Marzipan's Problem

Marzipan is modeling the mouse population in the barn. She finds three mice in the barn, and measures that the number of mice is multiplied by a factor of 1.3 every week. She writes:

"I want to know how many mice will be in the barn by summertime. If summer many many weeks away, I'll approximate using the formula for the inifinite geometric series to get:

$$\text{number of mice} = 3 + 3(1.3) + 3(1.3)^2 + \cdots = \frac{3}{1 - 1.3} = -10$$

So there will be -10 mice over the summer."

Can you help Marzipan interpret her answer?

Plans for the Future

For next time:
Do WeBWork 9.3 and actively read section 9.3

What is the area of the shaded region?

✓ **55%** Answered Correctly

A	π		15
B	$\dfrac{2\pi}{3}$		75
C	$\dfrac{4\pi}{3}$		24
D	∞		23

Invalid date ▾ | Segment Results | Compare with session | Show percentages | Hide Graph | Condense Text

137/137 answered ⟳ Ask Again

∧ ⟨ ⟩ | ● Open | ● Closed | ≡ Responses | ✓ Correct | » | 🔍 88% ⤢

Submissions Closed

Write the limit of the sequence $\{1, 1.1, 1.11, 1.111, 1.1111, 1.11111, 1.111111, \ldots\}$ as a series.

✓ **60%** Answered Correctly

A	$\sum_{n=0}^{\infty} \left(\frac{1}{10}\right)^n$		83
B	$\sum_{n=0}^{\infty} (1.1)^n$		49
C	$\sum_{n=0}^{\infty} (1)^n$		6

Invalid date ▼ | Segment Results | Compare with session

Show percentages | Hide Graph | Condense Text

138/138 answered

↻ Ask Again

∧ | < | > | ● Open | ⊘ Closed | ☰ Responses | ✓ Correct | »

🔍 88%

Write the limit of the sequence $\{0.9, 0.99, 0.999, 0.9999, 0.99999, \ldots\}$ as a series.

✓ **45%** Answered Correctly

A	$\displaystyle\sum_{n=0}^{\infty} (0.9)^n$		7
B	$\displaystyle\sum_{n=0}^{\infty} 9\,(0.1)^n$		45
C	$\displaystyle\sum_{n=0}^{\infty} 0.9\,(1)^n$		23
D	$\displaystyle\sum_{n=0}^{\infty} 0.9\,(0.1)^n$		61

Invalid date ▾   Segment Results   Compare with session

Show percentages   Hide Graph   Condense Text

136/136 answered

⟳ Ask Again

∧   <   >   ● Open   ○ Closed   ☰ Responses   ✓ Correct   »   🔍 88%