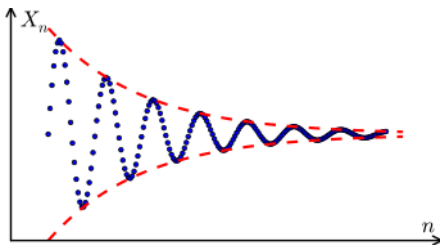
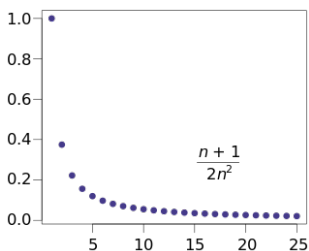


9.1 Sequences

- list of terms $s_1, s_2, \dots, s_n, \dots$ often arranged in a fixed pattern
- algebraic, numeric and graphical representations
- new vocab: monotone, alternating, recursive, bounded
- $\lim_{n \rightarrow \infty} s_n$? converges or diverges?



Clicker Question

1. For the sequence $1, -3, 5, -7, 9, \dots$
find a formula for s_n , with $n \geq 1$,

a) $(-1)^{n+1}(2n + 1)$

b) $(-1)^n(2n - 1)$

c) both work

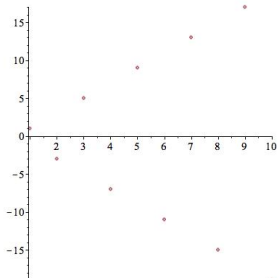
d) none of the above work, but I can provide one that will

e) there is no algebraic expression that will work

Clicker Question

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- a) $(-1)^{n+1}(2n + 1)$
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- c) both work
- d) none of the above work, but I can provide one that will
- e) there is no algebraic expression that will work



Clicker Question

2. Which is true about the sequence

$$s_n = \frac{n^2 - 5n^3}{n^3 + 1}$$

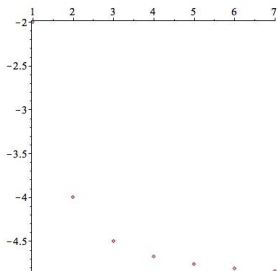
- a) It converges and I have a good reason why
- b) It converges but I'm not sure of why
- c) It diverges but I'm not sure of why
- d) It diverges and I have a good reason why
- e) it is neither convergent nor divergent

Clicker Question

2. Which is true about the sequence

$$s_n = \frac{n^2 - 5n^3}{n^3 + 1}$$

- a) It converges and I have a good reason why
- b) It converges but I'm not sure of why
- c) It diverges but I'm not sure of why
- d) It diverges and I have a good reason why
- e) it is neither convergent nor divergent



Teaching
Experiment



"I have a hunch:
Is it a nine?"

1, 2, 3, 4, ?

"Egore,
it's a five!
It's a fiiive!!!"

"Dr. Stein, a bunch of people
are outside with torches...
Do they want to enroll?"

*Creating a school was a frustrating,
monstrous task for Dr. Frank N. Stein.*

LanceAF #91 (6-21-13)
www.mathplane.com



History and Applications

- 1202 Leonardo de Pisa (Fibonacci)
 - Cauchy sequence: Augustin-Louis Cauchy
 - 1940 Pavel Aleksandrov: exact sequences
 - 1954 Jean Pierre Serre: Field's Medal in part for spectral sequences
 - sequence of investments each year, sequence of digits of π
 - sequence of slot machine pulls (legislation for standards of statistical randomness)
 - sequence of magic numbers of nuclear shells in physics
 - on-line encyclopedia of integer sequences
- John Riordan prize for open problems

