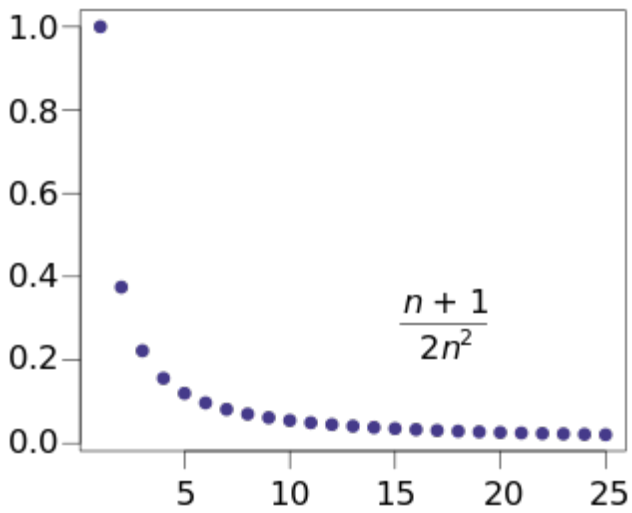
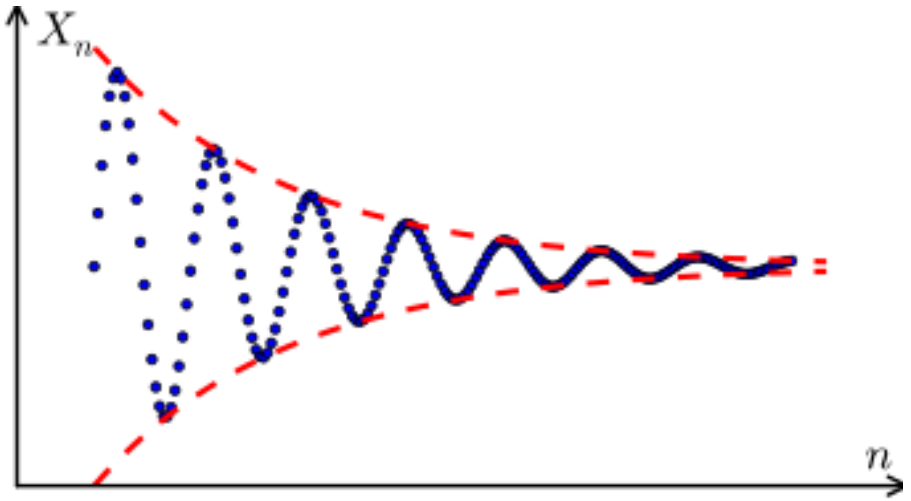
9.1 Sequences

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





Clicker Question

1. The alternating sequence $1, -3, 5, -7, 9...$

a) converges

b) diverges

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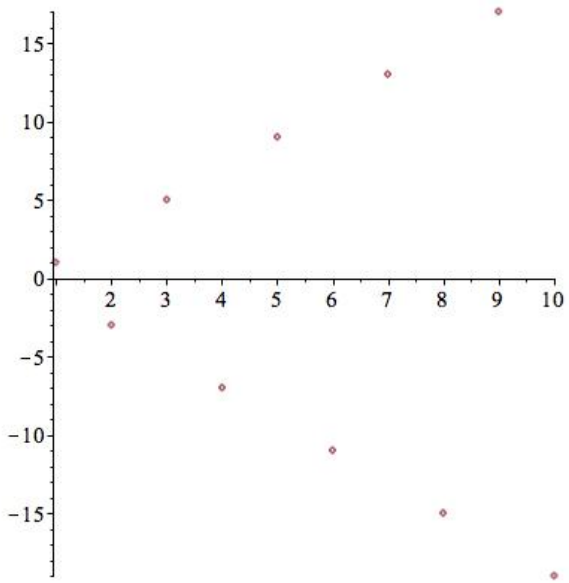

formula for s_n, with $n \geq 1$: $(-1)^{n+1}(2n-1)$ or equivalent

Clicker Question

2. Which is true about the sequence $s_n = \dfrac{n^2 - 5n^3}{n^3 + 1}$

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

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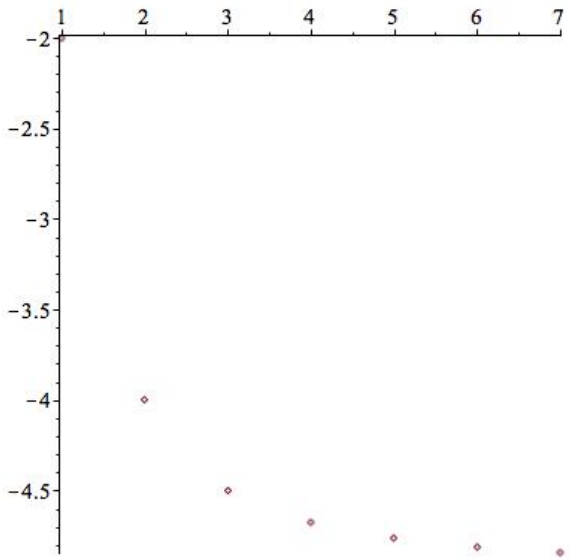

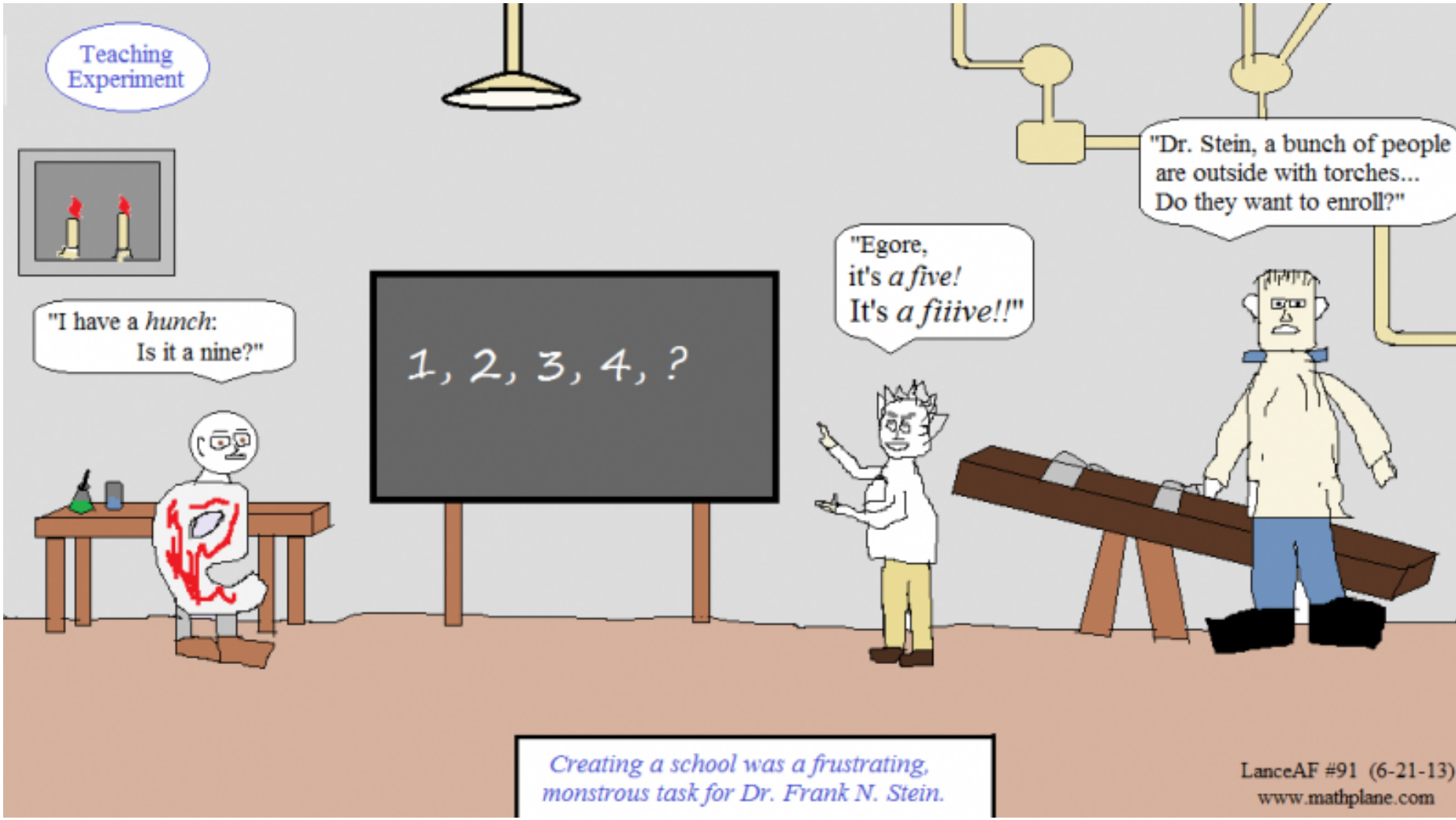
Teaching Experiment
"I have a *hunch*: Is it a nine?"
1, 2, 3, 4, ?
"Egore, it's *a five!* It's *a fiiive!!*"
"Dr. Stein, a bunch of people are outside with torches... Do they want to enroll?"
Creating a school was a frustrating, monstrous task for Dr. Frank N. Stein.
LanceAF #91 (6-21-13)
www.mathplane.com

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 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