Promoting Inquiry with Recreational Problems in a Liberal Arts Math Course

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Dordt College
MathFest Denver
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Sal and Saul

From *My Best Mathematical and Logic Puzzles* by Martin Gardner:

> *Saul and Sal race each other for 100 yards. Sal wins by 10 yards. They decide to race again, but this time, to even things up, Sal begins 10 yards behind the start line. Assuming that both run with the same constant speed as before, who wins?*

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- The students: humanities, education, agriculture, and a math major
- The goal: offer a modern terminal math course that leaves a positive impression

Modern and Positive

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Syllabus design question: what dispositions will the course seek to cultivate, and how will our work promote them?

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Good problems will:

- Capture student interest/imagination
- Be accessible
- Encourage the development of mathematical habits of mind (questioning, conjecturing, strategizing, etc.)
- Generate productive questions/discussion

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Bonus if it is related to the day's discussion, but not required.

Examples

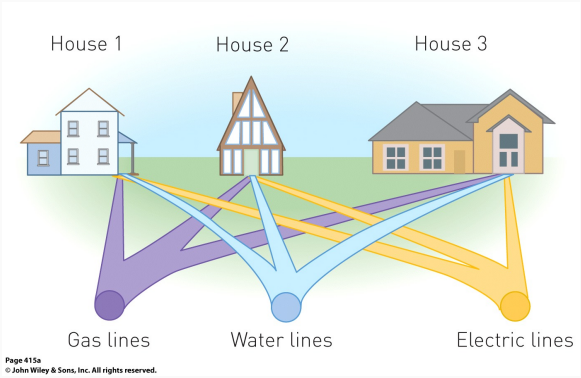

SEND
+ MORE
MONEY

Marbles in boxes

Imagine that you have three boxes, one containing two black marbles, one containing two white marbles, and the third, one black marble and one white marble. The boxes were labeled for their contents–BB, WW, and BW–but someone has switched the labels so that every box is now incorrectly labeled. You are allowed to take one marble at a time out of any box, without looking inside, and by this process of sampling you are to determine the contents of all three boxes. What is the smallest number of drawings needed to do this?

Utilities

Three houses need water, natural gas, and electricity. Is it possible to set up the lines so that none of them cross?



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Student responses

- Will ask for them if they are skipped
- Email from former student

3 credit

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Student question: How far back would Sal have to start for them to tie? 11 yards?

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Student question: How far back would Sal have to start for them to tie? 11 yards? 11.1 yards? 11.11 yards?

Thanks!

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Resources

- NCTM Reasoning and Sense Making Task Library:
  `https://www.nctm.org/rsmtasks/`
- FiveThirtyEight's Riddler Column:
  `https://fivethirtyeight.com/tag/the-riddler/`
- Martin Gardner puzzles (Dover books, old *Scientific American* columns)
- `mike.janssen@dordt.edu`