

# Calendar

Tanya Khovanova

March 8, 2010

Salesman: “Ma’am, this vacuum cleaner will cut your work in half.”

Customer: “Terrific! Give me two of them.”

## Class Discussion

John Conway’s Doomsday algorithm.

## Warm-up

**Exercise 1.** In a rectangular array of people, which will be taller, the tallest of the shortest people in each column, or the shortest of the tallest people in each row?

**Exercise 2.** Complete each phrase as shown in the first bullet.

- 26 l. of the a. = 26 letters of the alphabet
- 7 w. of the a. w. = ?
- 1001 A. N. = ?
- 12 s. of the z. = ?
- 52 c. in a d. = ?
- 52 w. in a y. = ?
- 88 p. k. = ?
- 13 s. on the A. f. = ?
- 200 d. for p. g. in m. = ?
- 8 s. on a s. s. = ?
- 29 d. in F. in l. y. = ?

- 5 d. in a z. c. = ?
- 1000 w. a p. i. w. = ?
- 99 b. of b. on the w. = ?

## Calendar

**Exercise 3.** What days are the following dates?

- October 7, 2010
- November 11, 2010
- July 29, 1926
- January 25, 2040
- January 7, 1961

**Exercise 4.** Are months the same length in every country? What could be the longest month in Russia?

## Challenge Problems

**Exercise 5.** Eight coins weighing  $1, 2, \dots, 8$  grams are given, but which weighs how much is unknown. Baron Münchhausen claims he knows which coin is which; and offers to prove himself right by conducting one weighing on a balance scale, so as to unequivocally demonstrate the weight of at least one of the coins. Is this possible, or is he exaggerating?

**Exercise 6.** You have 6 coins weighing 1, 2, 3, 4, 5 and 6 grams that look the same, except for their labels. The number (1, 2, 3, 4, 5, 6) on the top of each coin should correspond to its weight. How can you determine whether all the numbers are correct, using the balance scale only twice?

**Exercise 7.** Three people check into a hotel. They pay \$30 to the manager and go to their room. The manager finds out that the room rate is \$25 and gives \$5 to the bellboy to return. On the way to the room the bellboy reasons that \$5 would be difficult to share among three people so he pockets \$2 and gives \$1 to each person.

Now each person paid \$10 and got back \$1. So they paid \$9 each, totalling \$27. The bellboy has \$2, totalling \$29. Explain the paradox.