

A Little Excitement at the Pharmacy

THIS ISSUE'S PUZZLES

Puzzle Number 1. The pharmacy's technician, Mr. White, receives 10 bottles of medicine ZZZ. Each bottle contains 1,000 pills. While Mr. White is arranging the bottles on a shelf, a mailman brings a message from the manager, Ms. Black. "Urgent. Please refrain from selling the bottles of medicine ZZZ. The pharmacist made a mistake, and each pill in one of the bottles contains 90 mg of ZZZ, 10 mg less than normal. Please send me the bad bottle right away." Mr. White has only one chance to weigh the pills. How should he proceed?

Puzzle Number 2. Six months later, the same pharmacy receives another 10 bottles of the same medicine. The mailman brings a new message from the manager: The newly hired pharmacist (replacing the one who was fired) made an even more serious mistake. It could be any number of bottles in which each pill contains 90 mg of ZZZ. Mr. White has just one chance to weigh the pills and send back the bad bottles. Can he do the job?

Puzzle Number 3. A year later, the same pharmacy receives 10 bottles of a newly developed medicine called "TinyPills." Each bottle has an enormously high number of very tiny pills. This time, the mailman brings a very scary letter. It seems that a filling pharmacist was so absent-minded that the pills in different bottles could differ in weight dramatically. Each could weigh 10 ng (nanograms), 20 ng, 30 ng, ..., 90 ng, or a normal 100 ng. Fortunately, the pills in a given bottle are of the same weight. Mr. White has only one chance to determine the weight of the pills in each bottle. What will his strategy be? Is the solution feasible?

Solutions may be e-mailed to cont_puzzles@yahoo.com or mailed to Puzzles, 25 Sparrow Walk, Newtown, Pa. 18940. There will be two solvers lists—one for regular puzzles and one for chess puzzles. Please send solutions as soon as possible to make the solver lists.



LAST ISSUE'S PUZZLE:

Each of three brilliant, infallible logicians—A, B, and C—is blindfolded and randomly draws a hat from a sack that contains five black and three white hats. Each takes two hats and places them on his head, one on top of the other. Their blindfolds are then removed; they face each other in a circle and each can see the hats the others are wearing, but not his own hats.

It's decided that they will take turns trying to deduce which color hats they're wearing. They decide to go in continual order; first A will try to determine which two hats he is wearing. If he succeeds, he will announce his findings to the group, but if he is unable to determine which hats he is wearing, then it will be B's turn. Similarly, if B is unable to determine his hat colors, it will be C's turn; and if at this point C cannot determine his hat colors, they will continue again in order A, B, C, A, B, . . . etc., stopping after a logician has determined which two hats he's wearing.

As it turns out, each of the logicians selected at the start of the game both a black and a white hat.

Which of the three logicians is first to deduce which hats he is wearing, and in which round does he do it?

Answer: Logician B determines his hat colors in round 2

Solution: This puzzle is based on the Eight Stamp puzzle that appears Joseph S. Madachy's book, *Mathematics on Vacation*. The following solution, based on Kevin Trapp's submission, is one of several similar solutions submitted.

In seeing two W's, B knows that he doesn't have WW. So it's either WB or BB.

B imagines that he has BB. If so, then B would know that A would know that if A had BB, then C would have figured it out in the 1st round.

For, C would see four B's and know that he doesn't have BB. And C would know that he couldn't have WW or B would have figured out in the 1st round that he had BB by A's failure to see the third W and deduce that A had BB.

So A would know that he doesn't have BB. And similarly, he would know that he doesn't have WW or B would have deduced having BB in the 1st round since he can see C's W.

Therefore A would have got it in the 2nd round. A's failure to get it means B knows that he does not have BB and so he must have WB.

Obvious, no?

Lastly: I'd like to wish Yan Fridman much success as the new Puzzles Editor. Yan coincidentally had the first correct submission for this puzzle; he sent a very clear analysis which I am sure he would be happy to send upon request. NS

November /December Solvers

Francis Bernardi, Bob Byrne, Michael Dubin, Yan Fridman, Eliza Khuner, Chi Kwok, Israel Krakowski, Lee Michelson, Al Spooner, Elnatan Sulimanoff, Kevin Trapp, Jennie Young

Additional Sep/Oct solvers

D. Baldwin, L. Dyrland, K. Trapp

CHESS PUZZLE							
White to Move and Mate in Three							
8							
7							
6							
5							
4							
3			♙				
2	♜				♞		
1	♚		♗				
	A	B	C	D	E	F	G