PuzzleCorner

Some news from our readers, two of whom are more involved with puzzles now than ever. Mary Lindenberg will be reviewing problems for *Mathematics Teacher* magazine. Frank Rubin, now retired from IBM, "[does] puzzles full time, as both vocation and avocation." He runs the "Contest Center" at 59 DeGarmo Hills Road, Wappingers Falls, NY 12590.

Problems

M/J 1. Jorgen Harmse, inspired by a previous Bridge column asking how good you could do with a lousy hand, has a reverse question basically asking how bad can things get when you have a great hand. Specifically Harmse writes: You hold the AKQ of spades, hearts, and diamonds and the AKQJ of clubs (I told you it was a great hand!). What is the highest contract the opponents can make against best defense?

M/J 2. Mark Oshin notes that, given a regular tetrahedron, there is a plane that is equidistant from the four vertices; in fact there are several such planes. How many?

M/J 3. The late Bob High was "behind the eight ball": A billiard ball with a small black dot on the exact top is rolled around a circle of radius equal that of the ball. Assume no slippage or twisting. Where is the black dot when the ball returns to its original position?

Speed Department

A cute set from Pete Chandler. Note that the answer to the first one is given so that you get the idea. The remainder are answered at the end of the column, as usual for speed problems.

I I / O O	Le Vel	Y O JUST M E	T O U C H ↓
CAKE	Knee / Lights	Bridge / Water	F F R R I misunderstanding I E E N N D D

SEND PROBLEMS, SOLUTIONS, AND COMMENTS TO: ALLAN GOTTLIEB
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Solutions

Jan 1. Theodore Hoffman is dismayed to realize that he gains weight just by moving his scales. He writes:

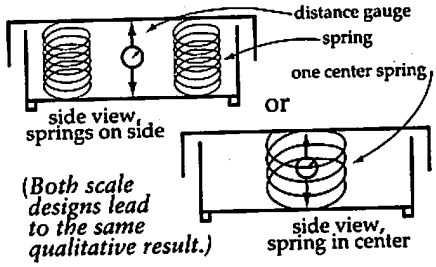
The puzzle surfaced when I moved my bathroom "Detecto" scales from a section of bare wood floor to a rug. Imagine my surprise when I found that, according to the scales, I had gained 10 pounds in the process of moving them. So, I made a few readings under varied conditions. Here they are:

Object	Scales Location/Reading on Scales			
	On floor or wood	On 3/8" foam pad	On 5/8" pile rug	On 3/4" wood on top of rug or foam
Scales alone	0	0	0	0
Me	145	153	155	145
2 weights	18 1/2	19 1/2	19 3/4	18 1/2

(The Detecto scales register from 0 to 255. The overhang of the weight-carrying top platform clears all surfaces by 3/8".)

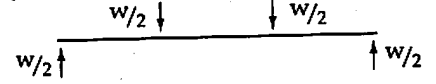
This seems to be one for the M.E.s. Len Nasser writes: Although you've probably heard from every other M.E. grad, I'll add my response.

Assuming that the Detecto scale has feet on the bottom, the explanation for the differing weight values is simply due to bending of the bottom plate, a classic beam problem. The figures below illustrate the assumed design:



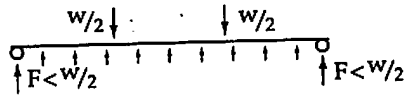
(Both scale designs lead to the same qualitative result.)

When a person stands on top of the scale on a solid floor, the forces acting on the bottom plate are:



This causes the plate to bow downward, increasing the distance for the distance gauge. However, since the scale is most likely calibrated this way, it is accounted for in the weight determination.

On a carpet, the compressed carpet material between the scale feet also exerts an upward force, tending to keep the bottom plate flatter:



This causes the distance gauge to read less of a distance, and hence give a greater "weight." And the thicker the carpeting, the greater this effect. There are three ways I can think of to eliminate the problem: (1) use a rigid (i.e., thick) bottom plate; (2) put wide feet directly under the springs; or (3) eliminate the feet altogether. (By the way, the beam deflections are all given in *Mark's Standard Handbook for Mechanical Engineers.*)

Jan 2. Donald Savage asks: The present U.S. flag has 50 stars arranged in alternate rows of 6 and 5. If Puerto Rico were to become a state, what would be an appropriate arrangement of the stars on the revised U.S. flag?

Avi Ornstein suggests a 7x9 rectangle with truncated corners and Harry Hochheiser suggests alternating rows of 8 and 9. Winslow Hartford noticed that the latter solution is given by Marilyn vos Savant in the February 13 issue of *Parade Magazine.*

Other Responders

Responses have also been received from C. Helin, P. Lally, P. Molten, K. Rosato, R. Sacks, S. Silberbergand D. Weidman.

Proposer's Solution To Speed Problem

1. Circles under the eyes 2. Split level 3. Just between you and me 4. Touchdown 5. Upside-down cake 6. Neon lights 7. Water under the bridge 8. Misunderstanding between friends