

INTRODUCTION

Alan Faller asks a question that comes up from time to time always worded something like “Are there (or why aren’t there) any books compiling TR puzzles?”. My standard reply is that there are no copyright problems known to me. As far as I can tell, “all” that is needed is for a potential co-author to volunteer to select problems and deal with some publisher.

It has been a year since I reviewed the criteria used to select solutions for publication. Let me do so now. As responses to problems arrive, they are simply put together in neat piles, with no regard to their date of arrival or postmark. When it is time for me to write the column in which solutions are to appear, I first weed out erroneous and illegible responses. For difficult problems, this may be enough; the most publishable solution becomes obvious. Usually, however, many responses still remain. I next try to select a solution that supplies an appropriate amount of detail and that includes a minimal number of characters that are hard to set in type. A particularly elegant solution is, of course, preferred as are contributions from correspondents whose solutions have not previously appeared. I also favor solutions that are neatly written, typed, or sent via email, since these produce fewer typesetting errors.

PROBLEMS

JUL 1. Somehow I forgot to include the hand with **F/M 1**. Not surprisingly no one was able to solve the problem without the hand so I am repeating the complete problem now and renaming it **Jul 1**.

In the hand below, submitted by Doug Van Patter, the bidding was short and sweet: South opened with 1H, West bid 2C, North bid 4H, and everyone then passed. How can South make the contract after opening lead of the King of Clubs?

North				East																					
	S	J 8 6		S	Q 7 5 4 2																				
	H	K 7 4		H	9 8																				
	D	K Q 10		D	A J 7 6 5																				
	C	A 10 9 8		C	3																				
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">West</th> <th colspan="2" style="text-align: center;">South</th> </tr> </thead> <tbody> <tr> <td style="width: 5%;">S</td> <td style="width: 15%;">K 10 3</td> <td style="width: 5%;">S</td> <td style="width: 15%;">A 9</td> </tr> <tr> <td>H</td> <td>10 3</td> <td>H</td> <td>A Q J 6 5 2</td> </tr> <tr> <td>D</td> <td>8 4</td> <td>D</td> <td>9 3 2</td> </tr> <tr> <td>C</td> <td>K Q J 7 5 2</td> <td>C</td> <td>6 4</td> </tr> </tbody> </table>						West		South		S	K 10 3	S	A 9	H	10 3	H	A Q J 6 5 2	D	8 4	D	9 3 2	C	K Q J 7 5 2	C	6 4
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C	K Q J 7 5 2	C	6 4																						

JUL 2. Phil Bonomo seems to like “space cadet” problems, especially those involving navigation satellites. In 93 he asked about their velocity, now he questions their altitude.

Geosynchronous orbits are generally taken to be the orbits of largest radius (highest altitude) for earth-orbiting spacecraft. These circular orbits, of radius R_s ($\approx 26,300$ miles), are characterized by a 24 hr orbital period and are typically used by the equatorial, “stationary” class of communications spacecraft. Another class of communications spacecraft (the Russian “Molniya” class) employ inclined, highly eccentric orbits characterized by a 12 hour orbital period.

For what orbital conditions, if any, is the largest (apogee) radius of a Molniya orbit greater than the synchronous orbital radius R_s ?

JUL 3. Nob Yoshigahara wants you to figure out the area of X in the figure below.

Please place figure number 1 here.

SPEED DEPARTMENT

Here is one Steve Chilton gives his “methodology and statistics” class every year.

Around the turn of the century, back when you could still buy a ten-cent beer, a small logging town on the U.S.-Canadian border was experiencing a strange currency exchange situation. On the Canadian side of the border, a U.S. dollar was only worth ninety Canadian cents, while on the U.S. side, a Canadian dollar was only worth ninety U.S. cents. (In other words, the citizens of both countries discounted the other country’s currency by ten percent.)

In this particular town, the international border ran right down the center of the main street, and there were bars on both sides catering to loggers from the surrounding area. One Saturday, an American logger rolled into town with little money (only U.S. \$1.00) but lots of financial cunning. He stopped at the first bar he found on the U.S. side of the street, ordered himself a ten-cent beer, paid with his U.S. dollar, and asked for a Canadian dollar in change (worth only U.S. \$.90, remember). After finishing his beer, he walked across the street to a Canadian bar, ordered another ten-cent beer, paid with the Canadian dollar, and asked for a U.S. dollar in change (there, worth only Canadian \$.90). Back he went to the American side for another beer, then back across to the Canadian side -- and so on all afternoon and evening, finally staggering back to his camp after a final drink from a Canadian bar and a U.S. one-dollar bill in change -- just as he had started out with.

But what his fellow loggers could never figure out was, who paid for the beer?

SOLUTIONS

F/M 1. As indicated above this problem was incomplete and the complete version is now **Jul 1** above.

F/M 2. Eugene Sard begins this month's offerings with a geometry problem. Given a triangle ABC, find a geometrical construction of a point X that minimizes the sum S of the lengths $AX+BX+CX$. Calculate the value of S in terms of the side lengths AB, BC, and CA.

The following solution is from Matthew Fountain

Please place figure number 2 here.

F/M 3. Warren Himmelberger asks a variation of the birthday problem that he first encountered in *One Hundred Mathematical Curiosities* by William Ransom. What are the odds that (at least) two people in a random group of 16 people have birthdays on consecutive days? Now replace 16 by 30.

This problem is harder than it might appear even after you assume 365 days in every year and that 31 Dec and 1 Jan are consecutive. For a group of two people the chances of not having consecutive birthdays is $363/365$ (the second birthday can be in any of the 363 days not consecutive with the first). But for three people it is not $(363/365)(361/365)$ since there are not always 361 days that fail to be consecutive with the first two non-consecutive birthdays (two reasons: the two birthdays could coincide leaving 363 non-consecutive days, and the two birthdays could have just one day between leaving 362). It gets worse for groups of more than 3. Tom Harriman avoided this trap. His solution follows.

Please place figure number 3 here.

BETTER LATE THAN NEVER

1995 Jul 3. Mihail Ionescu and Lowell Schwartz found more direct solutions.

OTHER RESPONDERS

Responses have also been received from D. Eckhardt, S. Feldman, I. Mazin, K. Rosato, and R. Sinclair.

PROPOSER'S SOLUTION TO SPEED PROBLEM

The central banks [ed.].