PuzzleCorner

As I reported a few months ago, this past summer I turned 50 and was "treated" to the expected gifts for someone reaching this milestone (jars of Metamucil, membership in AARP, etc.). Well the latest reminder that I am, to quote the president of NYU, "experience advantaged" came from home: I now find myself pleading, shouting, and jumping up and down trying to get my teenage son to turn down the volume on his electric guitar. Although I won't tell him this, I do remember playing records (you know those vinyl, oversized, CDs stored in cardboard) by groups such as the Jefferson Airplane at high dB ratings myself. NOTE: Bridge and Chess problems are in very short supply. If there is a desire for us to continue publishing such problems, please submit your favorites.

Problems

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

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 mimimizes the sum S of the lengths AX+BX+CX. Calculate the value of S in terms of the side lengths AB, BC, and CA.

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.
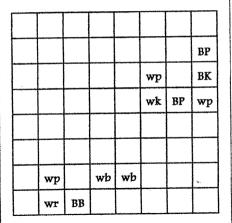
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Speed Department

For many of the early years of "Puzzle Corner," John Mattill was the editor I reported to. Now editor emeritus, John sends us this quicky suggested by Professor Alan Guth. A year is about 365 1/4 days long. Describing the earth from the point of view of an inertial reference frame, how many times a year does the earth rotate about its axis?

Solutions

OCT 1. We begin with a chess problem from Richard Freedman. White to move and mate in 2.

						BP
					wp	BK
				wk	BP	wp
wp			wb	wb		
wr	BB					

The proposer and several readers claim that Black's last move must have been b7-b5 and hence White can now capture en passant and then mate the next move. However, Mike Mulligan points out that the previous moves for White and Black might have been Pxf6 check, K-h6 in which case no en passant is possible. Other readers suggested the solution B-b4, any; B-g8 mate but I believe they overlooked B-b4, P-g4; B-g8 KxP. Hence I conclude that there is no mate in two. Sorry.

OCT 2. Here is a pair from Nob Yoshigahara: Consider a number factored into primes.
$$a = b \cdot c \cdot d \cdots$$
The first goal is to find an example where the equation contains all nine digits 1-9, exactly once each. The second goal is similar but involves the ten digits 0-9.

Steve Feldman (with the help of an anonymous Basic interpreter) sent us the following solution.

I wrote a Basic program to spin through values of "a," factor them and compare the various digits. for the first problem, I came up with
$$5986 = 2 * 41 * 73$$
$$8614 = 2 * 59 * 73$$
To the second problem, I came up with
$$28651 = 7 * 4093$$
$$65821 = 7 * 9403$$
I find it interesting that the solutions to the first problem contain 2 common factors, and the solutions to the second problem contain the same digits in "a."

OCT 3. Bob High first had this problem appear in *New Scientist*: Uncle Fibo is on a brief, enforced vacation from the racetrack. Missing the excitement of the turf, he has come up with a substitute: he and his associates—Earl Garth and Hal—have among them a single coin. They flip this coin repeatedly, producing a sequence of heads and tails. Each man has a "horse"—a sequence of three heads or tails—and the one whose horse appears first wins the "race".

For example, suppose Uncle Fibo chose HTH and Earl chose THT, and these two had a race. If the coin produced the sequence, H H T T H T..., then Earl would win.

On the particular day of interest to us, the men have chosen the following horses: Earl, HTT; Uncle Fibo, HHT; Garth, THH; and Hal, TTH. They run four separate races: Earl against Uncle Fibo; Uncle Fibo against Garth; Garth against Hal; and Hal against Earl. Assuming their coin is fair, who would you expect to win each race?

The following solution is from Matthew Fountain

Fibo (HHT) defeats Earl (HTT) 2

Puzzle

times out of 3. After the first H appears the four possible continuations for the next two throws are TT, HH, HT, and TH. Earl wins with TT, Fibo wins with HT and is assured of winning with HH. TH brings the series to a situation equivalent to that existing after the first H appeared.

Garth (THH) defeats Fibo (HHT) 3 times out of 4. Fibo wins when the first three throws are HHT and is assured of winning when the first three throws are HHH. Garth wins when the first three throws are THH and is assured of winning when they are HHT, HTH, THT, TTH, or TTT, since now THH will appear before HHT.

Hal (TTH) defeats Garth (THH) 2 times out of three. This is equivalent to the contest between Fibo (HHT) and Earl (HTT). With fair coins it does not matter which side of a coin is termed heads.

Earl (HTT) defeats Hal (TTH) 3 times out of four. This is equivalent to the contest between Garth (THH) and Fibo (HHT).

George and Susan Blondin remark that a winning strategy is to let your opponent choose his or her horse first and then take the opponents first 2 letters as your last 2 and take the reverse of his middle letter as your first. This is the pattern of Earl, Fibo, Garth, and Hal.

Other Responders

Responses have also been received from R. Hess, H. Hirschland, W. Himmelberger, R. Lenoil, B. McCue, R. Nordstrom, A. Ornstein, E. Passow, R. Raines, K. Rosato, J. Rosenthal, G. Rowsam, D. Savage, L. Schaider, M. Seidel, S. Shapiro, J. Stiehler, H. Stern, and F. Tydeman.

Proposer's Solution to Speed Problem

366 1/4.