
Puzzle corner

Send problems, solutions, and comments to Allan Gottlieb at New York University, 60 Fifth Ave., Room 316, New York, NY, 10011, or gottlieb@nyu.edu. For other solutions and back issues, visit the Puzzle Corner website at cs.nyu.edu/~gottlieb/tr.

It has been a year since I specified the size of the backlogs for the various kinds of problems. Currently, I have a large queue of regular problems and a comfortable supply of speed problems. Bridge and other game problems, however, remain in short supply.

Seeing an advertisement for disk drives reminds me of a story I sometimes tell to my OS class. Early in my NYU career, I was an active member of the (at that time) well-known Ultracomputer project. One result of my involvement was an invitation to NASA's Langley Research Center to see their ICASE project, in particular their MPP (Massively Parallel Project). I was shown not only the MPP but also their quite rare storage system, which had a capacity of one terabyte. I believe it dominated a good-size room.

When I returned to NYU, I enjoyed my one week of fame: *You* saw a terabyte? How big was it? How noisy? How hot?

Needless to say, my current students are not impressed with 1 TB of storage. Indeed, one is listed for \$45 on Amazon. Oh, how times have changed.

Jerold Grossman informs us that the National Council of Teachers of Mathematics website contains a contribution that is quite similar to our yearly problem.

Problems

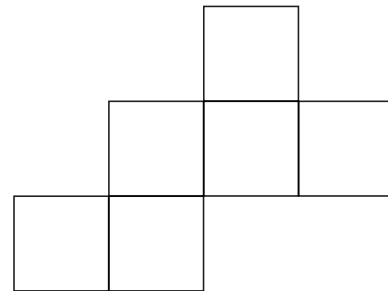
M/J 1. Larry Kells wonders: What is the most high-card points declarer can hold and still be able to make any contract?

M/J 2. Nob Yashigahara sent us a cryptarithmic problem from Kyoko Ohnishi. You are to substitute a digit for each letter in the following multiplication problem. As usual, when a letter is repeated, each occurrence must become the same digit.

$$\begin{array}{r} \phantom{} \text{PEN} \\ \times \phantom{} \text{INK} \\ \hline \phantom{} \text{LETTER} \end{array}$$

M/J 3. Another of the popular Modest Hexominoes problems from Richard Hess and Robert Wainwright. In these problems you must design a connected tile so that n of them cover the maximum area of a hexomino. The tiles are identical in size and

shape and may be turned over so that some are mirror images of the others. They must not overlap each other. For the problem below you are to cover at least 88% of the figure using five tiles.



Speed department

Sorab Vatcha knows a simple formula that approximates pi to eight places but uses only the digits 1, 2, 3, and 4 (each digit can be used one or more times). What is the formula?

Solutions

J/F 1. Robert Virgile and some unnamed groundhog sent us the following bedtime story. Each night, the groundhog thought about aces as he fell to sleep. But his dreams always disappointed.

His recurring nightmare hand always began with the two of clubs and the two of diamonds. Despite the fact that he never held any aces, and despite the fact that his partner never held any worthwhile cards at all, he did always make 3 no-trump ... night after night after night. He tried to change the outcome, but found that he was powerless to do so. As long as he followed suit, he could play his cards in any order, he could try to lose tricks, he could even enlist the opponents to help him. But he still always took exactly nine tricks in 3 no-trump.

Sketch out the hands.

Jim Larsen reports that it took a few tries but he finally had the inspirational moment.

The following hand meets the groundhog requirement of South always making 3 no-trump regardless of the play.

North

♠ 2
♥ 4, 3, 2
♦ 6, 5, 4, 3
♣ 7, 6, 5, 4, 3

West

♠ A 7 6 5 4 3
♥ A 8 7 6 5
♦ A
♣ A

East

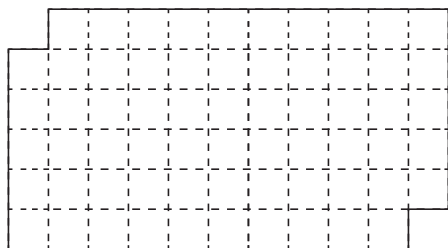
♠
♥
♦ K Q J 10 9 8 7
♣ K Q J 10 9 8

South

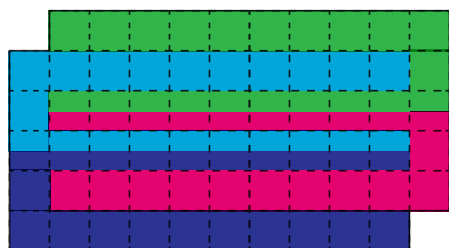
♠ K Q J 10 9 8
♥ K Q J 10 9
♦ 2
♣ 2

The “Aha” realization is that both West and South must be restricted to one card each. If they were to have more of either suit, the number of winning tricks could vary depending on whether South played his/her other card(s) to win or lose or there might even opportunities for entry to East. As it is, the number of cards in each suit for both West and South is evenly matched, with South having the remaining high cards after West’s aces. There are no entries to East’s high cards. The play is totally restricted to West and South, with West always winning his/her aces, and South always winning the remaining tricks for 3 no-trump.

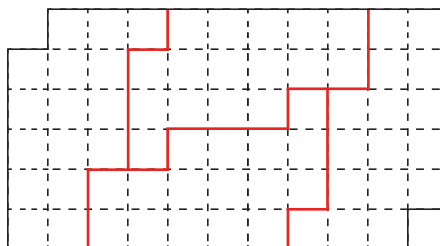
J/F 2. We have another Golomb Gambit. This time you are to divide the figure below into four congruent pieces. There are two solutions.



Our first solution is from Marc Strauss.



The second is from Solomon Golomb himself



Better late than never

2015 S/O SD. As mentioned in the N/D column, Michael Barr has been studying the infinite tower of exponentials $x^{x^{x^{\dots}}}$ and conjectured that the largest x for which the tower converges is $e^{1/e}$. Michael Branicky sent us the following reference verifying the conjecture: en.wikipedia.org/wiki/Tetration#Infinite_heights.

2018 S/O 1. Jarek Langer doesn’t believe the solution given is correct and writes: “Just realized that the published S/O 1 solution doesn’t work because 7 no-trump can also make on that layout.

“This is because the West hand eventually gets squeezed in hearts and clubs. The lead doesn’t matter—let’s assume it’s a heart lead. South wins, plays club to dummy, spade to hand, diamond to dummy, spade to hand, diamond back to dummy, and then cashes two diamond winners, discarding lowest spade from hand on last diamond. Now he leads a spade from dummy to the queen; the four-card ending is shown below. When he cashes the ace of spades, pitching a heart from dummy, West is squeezed. If he pitches a heart, South plays ace of hearts, club to dummy’s ace, and the last heart is good. If he pitches a club, club to dummy’s ace, heart back to hand, and the last club is good.”

Y2018. Frank Weigert noticed that the answer given for 4 is incorrect; one correct solution is $8/2 + 0 \times 1$. Carl Jones found $16 = 2^{01} \times 8$.

Other responders

Responses have also been received from M. Bolotin, J. Chandler, and R. Morgan.

Solution to speed problem

$$\left(\frac{2143}{22}\right)^{1/4}$$