Puzzle Corner

Upon our 35th wedding anniversary, I dedicate this issue to my beautiful and accomplished wife, Alice (née Bendix). I am not sure if she deserves more kudos for her seminal work in psoriasis, her dedication to family, or her patience in staying with me all these years.

Problems

M/A 1. Jorgen Harmse wonders, What is the correct play of the following hand for declarer after an opening lead of the diamond ace?

	♠ K J T 8 6 2		♠
North	♥ 9 4	South	♥ A K Q J T 7 6 3
	♦ 9 7 2		♦
	♣ 7 2		♣ A K J 6 3

The bidding was

S	W	N	E
7H	All pass.		

M/A 2. Richard Hess offers us a problem similar to the yearly offering every January. He wants you to use the digits 2, 3, and 4 once and only once each to form arithmetic expressions that equal the whole numbers from 1 to 20. You may use addition, subtraction, multiplication, division, powers, and decimal points.

M/A 3. Gordon Stallings notes that, just as there are scalene right triangles with integer-length sides, there are also scalene triangles with a 60° angle and integer-length sides. Indeed, Stallings wants you to show that for any triangle of the first class with perimeter *P*, you can find a corresponding triangle of the second class with perimeter 1.5*P*. For example, corresponding to 3-4-5, we have 3-7-8.

Speed Department

A "Tom Swifty" submission from H. Ingraham. "Oops, I've dropped my toothpaste," said Tom, ______.

Solutions

N/D 1. We start with a bridge problem from Larry Kells, who, rather than worrying about making his contract against any opponents' distribution, is content to make it against just one. Specifically, he wants you to find a distribution such that South can make a slam against best defense.

	♠ 10 7 6 5		♠ A 8 4 3
North	♥ K Q J	South	♥ A 9 7
	♦ A K Q 7 3		♦ 5
	♣ 6		♣ A K 8 4 2

Ira Gershkoff must be accustomed to bad trump splits, as he had little trouble with this problem. He writes,

"Six hearts can be made with the following distribution for the East-West hands:

	♠ K Q J 9		♠ 2
West	♥	East	♥ 10 8 6 5 4 3 2
	♦ 8 6 4 2		♦ J 10 9
	♣ Q J 10 9 3		♣ 7 5

"For any opening lead, South wins with the ace and cashes the top diamonds, then returns to his hand with a black-suit ace and cashes the top clubs. At this point, South has taken the first six tricks, and the lead is in his hand. East is down to seven trumps. Then it's club ruff, diamond ruff (overruffing East as cheaply as possible), club ruff, diamond ruff, club ruff. Now South has 11 tricks and still has the ace of trumps in his hand. South makes six hearts with a 3-3 fit and a 7-0 trump break, and there's no defense."

As was also noted by several others, only the suit distribution of East and West's hands matters. I.e., which specific spades, hearts, and clubs they each hold is not relevant.

N/D 2. Donald Aucamp has sent us a variation of his three-hat problem, which first appeared in the October 2003 issue. The variation proceeds as follows:

Three logical people, A, B, and C, are wearing hats with positive integers painted on them. Each person sees the other two people's numbers, but not his own. Each person knows that the numbers are positive integers and that one of them is the sum of the other two. They take turns (A, B, then C, then A, etc.) in a contest to see who can be the first to determine his number. In the first two rounds, A, B, and C all pass, but in the third round C correctly asserts that his number is 60. What are the other two numbers, and how did C determine his was 60?

Richard Hess believes that this genre of problem originated with Johathan Welton in England. The following solution is from Jonathan Hardis:

"The other two numbers are 10 and 50. Each person knows his own number within a choice of two: the sum and the positive difference of the two numbers he sees. For example, C knows that he is 40 or 60. Since no one can be wearing zero, a person will determine his own number if he sees two equal numbers on the others. B and C both know that A is 10. So in the first round, when B passes, he tells C that C cannot be 10. Likewise, when C passes, he tells B that B cannot be 10. But additionally, he tells B that B cannot be 20. For given that A is 10, if B were 20, C would have known that his number was either 10 or 30. Since B's first pass eliminated one of those possibilities, C would have identified his number as 30 in the first round. In the second round, when B passes, he tells C that C cannot be 20 or 30, and when C passes, he tells B that B cannot be 30 or 40. In the third round, when B passes, he tells C that C cannot be 40 or 50. (If C were 40, B would know he was either 30 or 50, the possibility of 30 having been eliminated in round two.) So at C's turn in the third round, he knows he must be wearing 60."

N/D 3. For our final regular problem Richard Hess offers us a "cross-number" problem in which you are to place 13 three-digit perfect squares in the grid below.

Gary Cheng appears to be a fan of using a left-right combination in boxing. Mark Fineman, on the other hand, used a literal cut-and-paste approach and sent in a 3-D solution with the three-digit numbers cut out and pasted on top of each other to make the desired shape. Cheng writes,

"Let's first list out the three-digit perfect squares: 100, 121, 144, 169, 196, 225, 256, 289, 324, 361, 400, 441, 484, 529, 576, 625, 676, 729, 784, 841, 900, and 961.

"The digits in the numbers are all interrelated. So I focused on the pattern

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which appears twice in the puzzle Let's call each instance of the pattern a 'box.'

"There are only a certain number of combinations of numbers that can populate just this box. For example, numbers such as 100 or 900 would not work simply because the 0 digit does not appear first in any other number. Breaking up the problem and figuring out the combination for each box is much easier than solving the whole puzzle.

"I was able to find five combinations that would successfully fill each box.

A

7	2	9
8		6
4	4	1

B

3	2	4
6		4
1	2	1

C

3	2	4
6		8
1	4	4

D

2	2	9
5		7
6	7	6

E

1	6	9
4		6
4	4	1

We can eliminate A because of the 8 in the middle of column one. This 8 would also have to serve as the last digit of another number. None of the three-digit perfect squares has an 8 as its last digit. We can also eliminate C because of its 8. This 8 would have to serve as the first digit for another number. The only number that would fit the bill is 841. But the 1 in 841 would have to serve as the middle digit for another three-digit number, and none of the squares has a 1 in the middle. There are only three boxes left to play with, so it's relatively simple trial and error to see which two of them fit together.

"The solution I found is to link boxes E and D together."

8		1	6	9		2	2	5		1
4	8	4		6	2	5		7	2	9
1		4	4	1		6	7	6		6

Better Late than Never

2006 J/A 2. Richard Hess offers $2^{5^{.4}}-.6-(.3^9/7)^{(.8^{.1})}$, which differs from π by less than $6.\ 6 \times 10^{-13}$.

J/A 3. Words shorter than "priest" having the property that all subsets of the letters can form words have been found by several readers. The following is from John Iler.

"I don't have a longer word in answer to J/A 3, but I would like to respond to Usman Mobin's comment in the November/December issue that 'it would be harder to find words shorter than "priest" with this property.' Here is an offering of four-, three-, and two-letter solutions, where each shorter solution is a subset of the previous solution:

raid: aid, rid, air
aid: id, ad, ai
ai: i, a

"I'm sure 'ai' must have been invented just to use up Scrabble tiles."

N/D SD. As was patiently explained to me by numerous readers, I was wrong in asserting that it is impossible to pass the last-place runner. The error illustrates my overemphasis on the straight and narrow at the expense of all the topology I (allegedly) learned. Indeed, races run on closed courses permit everyone from first to next-to-last to pass the last-place runner.

Other Responders

Responses have also been received from R. Ackerberg, J. Andresen, S. Avgoustiniatos, M. Badavam, V. Barocas, A. Bates, A. Baum, S. Brown, R. Byard, G. Coram, R. de Marrais, A. Dvornik, S. Erickson, J. Feil, R. Francis, E. Friedman, J. Gersh, R. Giovanniello, M. Haggerty, J. Harmse, R. Hess, C. Hulstein, L. Iori, M. Ivory, C. Jackson, B. Layton, N. Markovitz, J. Martinez, M. Mashaal, H. McIlvried, J. Miller, R. Moeser, Z. Moledina, A. Ornstein, G. Perry, J. Rankin, K. Rosato, T. Royappa, S. Samuels, M. Schmiechen, E. Sheldon, E. Signorelli, S. Sperry, S. Sperry, M. Tajerian, M. Turk, D. Wachsman, G. Waugh, C. Welch, and K. Yeh.

Proposer's Solution to Speed Problem

Crestfallen.

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