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ince this is the first issue of a new
academic year, I once more review
the ground rules under which this
department is conducted.

In each issue I present three regular
problems (the first of which is chess,
bridge, go, or computer-related) and one
"speed" problem. Readers are invited to
submit solutions to the regular prob-
lems, and three issues later, one submit-
ted solution is printed for each problem;
I also list other readers who responded.
For example, solutions to the problems
you see below will appear in the Febru-
ary/March issue and this issue contains
solutions to the problems posed in
May/June. Since I must submit the Feb-
uary/March column in November, you
should send your solutions to me dur-
ing the next few weeks. Late solutions,
as well as comments on published solu-
tions, are acknowledged in subsequent
issues in the "Other Respondents" sec-
tion. Major corrections or additions to
published solutions are sometimes print-
ed in the "Better Late than Never" sec-
tion as are solutions to previously
unsolved problems.

For speed problems the procedure
is quite different. Often whimsical, these
problems should not be taken too seri-
ously. If the proposer submits a solution
with the problem, that solution appears
at the end of the same column in which
the problem is published. For example,
the solution to this issue's speed prob-
lem is given below. Only rarely are
comments on speed problems pub-
lished.

There is also an annual problem, pub-
lished in the January issue of each year;
and sometimes I go back into history to
reproduce problems that remained
unsolved after their first appearance.

Problems

OCT 1. We begin with a Bridge prob-
lem from Jorgen Harmse:

SEND PROBLEMS, SOLUTIONS, AND
COMMENTS TO: ALLAN GOTTLIEB
NEW YORK UNIVERSITY
715 BROADWAY, 10TH FLOOR
NEW YORK, N.Y. 10012.
OR TO: GOTTLIEB@NYU.EDU

A K 3 2
\v 9 8 3
\v A Q 10 T 6
4 3
9 8 7
10 7 x 2
4 3 2
7 6 2

You lead the deuce of hearts against
3NT, and your partner's ace brings

\down Declarer's king. Your partner
leads the queen and Declarer discards.

\Explain the importance of your third
heart (marked x).

OCT 2. Nob Yoshigahara has a color-
based crypt-arithmetic problem. As
usual, you are to substitute digits for let-
ers to validate the following equations.

YELLOW + YELLOW + RED = ORANGE
RED x BLUE = YELLOW
RED x RED = WHITE

OCT 3. Winslow Hartford writes that
his misspent youth at conventions infes-
ted with salesmen convinced him to write
the following in a column about cancer
clusters for the Charlotte Observer:
"Dollar-bill poker": This is a friendly
scam practiced at conventions. As there
are eight numbers on the bill and 10 dig-
its in all, you'd think multiple digits
would be rare. But of 10 bills drawn
from my wallet, nine showed "clusters" (two
full-houses, four two-pair, three
one-pair). The "operator" of this scam,
having changed a $30 bill in advance, is
almost sure to have five of a kind). This
report suggests a question for Puzzle
Corner: How many random $1 bills
does the operator need to:
a) have a 50% chance of 5 of a kind?
b) have a 90% chance of 5 of a kind?

Speed Department

George Blondin wishes to tell "Speedy
Jim" [Landau] that there is an English
word [kinda sorta] with SIX consecutive
double letters. What is it?

Solutions

M/1. Jorgen Harmse, inspired by a previous
Bridge column asking how well 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?
Joseph Kelin shows us that things can really
go bad even when "you've got the goods."

In no trump the opponents make zero tricks
regardless of who is on lead and how the hand is
played. In a trump contract the defense must take
at least three trump tricks, so the best the oppo-

ponents can make is 10 tricks, which is possible with
the following layout in spades. (Four hearts or
diamonds can be made with analogous layouts.)

\north (Vul)

\v X X X
\v X X X X
\v X X X X

\west
\v X X X X
\v X X X X
\v Contract: 4 spades by
\v South
\v A K Q
\v A K Q

\v south (Vul)
\v X X X X X X
\v X X X X

\west's best lead is a club. South ruffs, South
crossruffs diamonds and clubs three times end-
ing in the South hand. At this point South and
East each have three trumps. South keeps lead-
ing diamonds until East ruffs in. At this point
South has three trumps and East only two. If
East draws trump South can trump whatever
East returns and make his remaining diamonds.
If East returns a heart, South ruffs and contin-
ues diamonds, putting East in the same position
as before. South ends up making three ruffs in
the North hand and four ruffs and three dia-
monds in the South hand. If West had lead

\v either a diamond or heart, the play is similar.

South ends up in his own hand after ruffling
three diamonds in the North hand and three
hearts or clubs in the South hand. At this point
he has four spades to East's three, although that
hardly matters. He continues leading diamonds
as before with the same result.

Although you asked for a maximum contract
and not maximum score, the maximum score
that can be achieved with a contract of one spade
(or heart) doubled and redoubled for a score
of 770 plus game bonus in contract bridge and
1270 in duplicate.

M/1. 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?

The following solution is from Charles
Wampler:

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Puzzle

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Since all four vertices cannot lie on the same side of the plane, the plane must either pass between a vertex and the opposing face or between two opposing edges. For each of the four vertices, the plane passing through the midpoints of the three adjacent edges is equidistant from all vertices (a). For each of the three pairs of opposing edges, the plane passing through the midpoints of the four edges joining them is equidistant (b). Hence the total number of equidistant planes is seven.

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?

I will admit to some trepidation on this one. It is a problem from Bob High so an easy solution is not expected. Moreover, some of our regular contributors submitted moderately difficult solutions, but it seems to me that the following simple solution from Eugene Sard is correct.

The intuitive answer is that the black dot is on the top of the ball when the ball returns to its original position. Surprisingly, however, the ball makes two complete revolutions in achieving this result. This can be seen by comparing the described situation with the cycloid generated by the black dot, if the ball were rolling on a flat surface. When the ball is halfway through its travels, the dot touches the fixed surface, which is at the top of the ball for the actual circular surface. Hence, one complete revolution has occurred when the bottom of the circle is reached, and the second revolution occurs in the remaining travel back to the top of the circle.

Kasner and Newman in Mathematics and the Imagination (chapter on paradoxes) describe a similar situation with one coin rolling halfway around a second identical coin.

I discussed this problem with my assistant, Maria Katsouras, and we agree that the "arc of contact" traversed on the ball must at all times be of the same length as the "arc of contact" traversed on the circle. Thus when the ball comes back on top of the circle, the ball's "arc of contact" is a complete (great) circle.

Other Responders


Proposer's Solution to Speed Problem

Raccoonookkeeper.