

Your Colors Don't Match!

THIS ISSUE'S PUZZLE

Would life be simpler if they made all socks the same? In any event ...

Consider the following two decks of 52 regular playing cards:

Deck one:

Here the cards have first been prearranged black-red-black-red ... etc. throughout the deck, which is placed facedown.

This deck is shuffled in the following manner: 26 cards are drawn off, one at a time, and placed facedown to create a new 26-card pile adjacent to the original (i.e., the original top card should now be the bottom card of the new pile). The two 26-card piles are then given one riffle shuffle.

Assume that in riffle shuffling cards, the number of alternating "grouped" cards taken from each pile follows this distribution: three cards probability 1/3, two



cards probability 1/3, and one card probability 1/3—if at the end of a pile fewer

than three cards are available, then the distribution is 50/50 (2 or 1 card) where two cards are available, and obviously 100% where only one card is available.

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Deck two:

This is a deck that is thoroughly randomized. Cards are riffle shuffled one more time as above.

Question: Assume that the cards are now taken two at a time from the top of deck one. Suppose the precise mathematical expected number of pairs in which colors don't match is called **X**.

Similarly, assume that cards are taken two at a time from the top of deck two. Call the precise mathematical expected number of pairs in which the colors don't match **Y**.

What is X-Y?

Please submit your answers via e-mail to PuzZles@aol.com or by mail to: PUZZLES, 17 Ravine Rd., Great Neck, NY 11023. No solution is required. Please submit answers as soon as possible to make the solvers list.

Please send any ideas, and new or old favorite puzzles that you think may be useful for future issues, to the same address or e-mail.

SOLUTION TO JULY/AUGUST PUZZLE

Puzzle: $A/BC + D/EF + G/HI = 1$ where each letter represents a different digit 1-9. What does each letter represent?

Answer: Obviously, there are six permutations of the three fractions requested.

The unique fractions that work are $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{5}{8}$.

Note that this puzzle was actually first formulated over 120 years ago. As you can imagine, brute force was serious business in those pre-computer days. Although some solvers of this puzzle presented assorted "shortcuts," a complete algebraic type of solution was not formulated.

JULY/AUGUST SOLVERS

J. Abraham, B. Ballmer, M. Barth, B. Bartholomew, B. Bartle, E. Baumann, FT. Beasley, R. Burton, B. Byrne, H. Callif, B. Campbell, T. Connell, E. Crane, A. Dean, L. Derrick, J. Dinius, D. Doddridge, L. Dyrland, M. Evans, M. Failor, B. Feldman, M. Fienman, C. Fievoli, S. Flanagan, N. Franceschine, M. Frantz, Y. Fridman, S. Gallancy, D. Gillette, N. Graner, B. Greer, J. Gutierrez, D. Harris, R. Hay, T. Haynes, N. Herbert, E. Herman, R. Ho, R. Hochgesang, M. Horowitz, B. Hupf, H. Ingraham, M. Jacobs, B. Kamps, P. Kauffman, D. Krenk, I. Krueger, W. Leisinger, J. Lemke, J. Levy, B. Maguire, R. Malkani, C. Malmquist, J. McLane, B. Miller, C. Norman, J. Normand, B. Oder, M. Pantzlaff, S. Peeples, W. Peoples, D. Perry, C. Platania, D. Promislow, J. Reinbolt, B. Roberts, A. Schallhorn, R. Schauder, J. Shi, B. Simanek, R. Simmons, L. Simon, J. Sitrin, A. Solak, E. Solomon, E. Sondergeld, A. Spooner, R. Stokes, M. Streiff, S. Tanenbaum, K. Trapp, S. Vincent, J. Washer, N. Watkins, L. Williams, T. Wing, K. Yen, D. Zimmerman

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