

Rockhurst University Mathematics Problem of the Month

Congratulations to Peter Simone and Laura Setchfield, winners of December's contest. They each win a puzzle from the Problem of the Month collection. Honorable mention goes to Ferd Niemann, Josh Hilliard, Andrew Silver, Br. Glen Kerfoot, Prof. Sheri Adams, Prof. Kevin Burger, and Prof. D. Philip Colombo. The contest is open to any currently enrolled Rockhurst student. The winner will be chosen according to who has the best solution (not just answer) to the problem. Ties will be resolved by considering the order in which the solutions were received.

Solutions should be submitted to Keith Brandt (Richardson 120) by the end of the month. The winners will receive wonderful prizes, so give these problems some thought!

Problems For January 2004:

- In the card game Hearts, 26 points (each Heart counts 1 and the Queen of Spades counts 13) are distributed among the players each round. The only exception is if one of the players "shoots the moon." In this case, the person who shoots the moon gets 0 points and every other player gets 26 points. The game ends when a player (the big loser) reaches 100 points. If the game has four players,
 - What is the minimum number of rounds before a game can end?
 - What is the maximum number of rounds before a game can end?
- When viewed as a function from \mathbf{R}^3 to \mathbf{R}^3 , what does the following matrix do?

$$\left(\begin{array}{ccc} \frac{1}{14} & \frac{1}{7} - \frac{3}{\sqrt{14}} & \frac{3}{14} + \sqrt{\frac{2}{7}} \\ \frac{1}{7} + \frac{3}{\sqrt{14}} & \frac{2}{7} & \frac{3}{7} - \frac{1}{\sqrt{14}} \\ \frac{3}{14} - \sqrt{\frac{2}{7}} & \frac{3}{7} + \frac{1}{\sqrt{14}} & \frac{9}{14} \end{array} \right)$$