CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

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Maria Sanford, Room 101

Examples of Recreational Mathematics Using Undergraduate Mathematics

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ABSTRACT

Traditional mathematical techniques can be applied to recreational mathematics, which has at least two payoffs. First, problems, puzzles and games are a way to interest students. Second, it shows how to apply mathematics to novel situations. This talk solves a number of problems with a recreational mathematical flavor using techniques from probability, algebra, topology, real analysis, number theory, linear algebra, calculus, and dynamical systems. Four examples are given below. Finally, although the level of the mathematics in this talk varies from example to example, it is all at an undergraduate level. So come and have some mathematical fun.

1. From a chess board remove two squares of opposite colors. Can the remaining board always be tiled with dominoes?
2. $(1+\sqrt{2})^{23} \approx 636562078.00000000157$, which is very close to an integer. Is this by chance?
3. Player 1 picks a sequence of Heads and Tails of length three, e.g., HHT, which is announced. Then Player 2 picks a different sequence of length three, e.g., THH. Flip a coin repeatedly. The Player whose sequence appears first wins, e.g., HTHTTHTTTHH is a win for Player 2 in this case. In general, which player has the advantage?
4. In general, $x_{n+1} = x_n - f(x_n)/f'(x_n)$ is Newton's method to find a root of f(x) given an initial value, x_0. Let $f(x) = x^2 - b$. What happens when Newton's method is applied to the case b = -1?

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