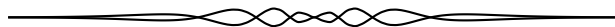


## UNSOLVED CRUX PROBLEMS

*As remarked in the problem section, no problem is ever closed. We always accept new solutions and generalizations to past problems. Chris Fisher published a list of unsolved problems from **Crux** [2010 : 545, 547]. Below is a sample of two of these unsolved problems.*



**527.** [1980: 78; 1981: 88-89]

*Proposed by Proposed by Michael W. Ecker, Pennsylvania State University, Worthington Scranton Campus.*

a) You stand at a corner in a large city of congruent square blocks and intend to take a walk. You flip a coin – tails, you go left; heads, you go right – and you repeat the procedure at each corner you reach. What is the probability that you will end up at your starting point after walking  $n$  blocks?

b)★ Same question, except that you flip the coin twice: TT, you go left; HH, you go right; otherwise, you go straight ahead.

**714★.** [1982: 48; 1983: 58]

*Proposed by Harry D. Ruderman, Hunter College Campus School, New York.*

Prove or disprove that for every pair  $(p, q)$  of nonnegative integers there is a positive integer  $n$  such that

$$\frac{(2n - p)!}{n!(n + q)!}$$

is an integer.

(This problem was suggested by **Crux** problem 556 [1981: 282] proposed by Paul Erdős.)

