



# Lewis & Clark College

## Department of Mathematical Sciences

### Problem of the Week #5 (Fall 2011)

Let  $x_0 = 1$  and for natural numbers  $n$ , define  $x_n \in [0, 1]$  implicitly by the recurrence

$$(1 - x_n)^2 - (1 - x_{n-1})^2 = \frac{x_n + x_{n-1}}{\alpha},$$

where  $\alpha > 1$ . Show that

$$\sum_{n=1}^{\infty} x_n = \frac{1}{2}(\alpha - 1).$$

- This problem is due to Tom Beatty of Florida Gulf Coast University.
- Solvers should include their name, address, and status at the College. Solutions can be mailed to MSC 110 via campus mail or placed in Yung-Pin Chen's mailbox in the Math Department Office. Solutions to the above *Problem of the Week* should be received by 5:00 p.m. Monday, October 3, 2011.
- Ali Brauer (fr.), Kathleen Daly (jr.), Alice Feber (fr.), Colin Gavin (fr.), Colter Hanna (fr.), Henry Kreiman (fr.), Chris Mitchell (sr.), Martha Morrise (special), Dan Sakaguchi (special), Yusef Shari'ati (sr.) John Sibandze (fr.), Sam Stewart (fr.), Adam Taylor (jr.), and Erin Yoshida (so.) solved *Problem of the Week* #4. Congratulations to them.