



Lewis & Clark College

Department of Mathematical Sciences

Problem of the Week #12 (Fall 2011)

Let $f : [0, 1] \rightarrow \mathbb{R}$ be a continuously differentiable function such that

$$\int_0^1 f(x) dx = 1; \quad \int_0^1 x f(x) dx = 2; \quad \int_0^1 x^2 f(x) dx = 3.$$

Prove that for every $t \in [-24, 60]$, there exists a $c \in (0, 1)$ such that $f'(c) = t$.

- This problem is due to Duong Viet Thong of National Economics University, Vietnam. This is the last *Problem of the Week* for Fall 2011.
- 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, December 5, 2011.
- Hilary Cline (sr.) and Colin Gavin (fr.) solved *Problem of the Week* #11. Congratulations to them.