University of Colorado
Department of Mathematics
Problem of the Month
September 2011

Let $n > 1$ be an integer.

(1) Show that the product $\displaystyle\prod_{\substack{1\le m<n\\ \gcd(m,n)=1}} m$ is congruent to either $+1$ or -1 modulo n.

(2) For which n is it true that $\displaystyle\prod_{\substack{1\le m<n\\ \gcd(m,n)=1}} m \equiv -1 \pmod{n}$?