

Problem Solving

Set 16

19 July 2012

1. Let n, k be positive integers and suppose that the polynomial $x^{2k} - x^k + 1$ divides $x^{2n} + x^n + 1$. Prove that $x^{2k} + x^k + 1$ divides $x^{2n} + x^n + 1$.
2. Find all solutions in integers of

$$x^3 + y^3 + z^3 = 3xyz.$$