

Last Name: _____ Name: _____ Student No.: _____

This quiz has **three** questions. Make your answers as clear as you can. You have 30 minutes to complete this quiz.

1. (*4 points*) Suppose $p = 2^n + 1$ is a prime with $n > 1$. Show that 3 is not a quadratic residue modulo p .

2. (*3 points*) Show that every prime of the form $p \equiv 3 \pmod{13}$ is a divisor of some number of the form $n = m^2 - 13$ for some m .

3. (*3 points*) Show that if $p = 4k + 1$ is a prime number, then the product of all the quadratic non-residues modulo p is a quadratic residue modulo p .