

HOMWORK ASSIGNMENT 1

All of the questions from Part A will be graded. One of the questions from Part B will be graded in detail, while the other will be marked for completion. Assignments will be submitted via *Crowdmark*.

Part A. [Short Questions; 4pts]

Exercise 1. Let n be an integer. What are the possible remainders when n^2 is divided by 7?

Exercise 2. If $d = \gcd(1246, 382)$, find x and y such that $1246x + 382y = d$.

Part B. [Proof Questions; 6pts]

Exercise 3. Prove that if a and b are integers such that $7|a^2 + b^2$, then $7|a^2$ and $7|b^2$. [Hint: Exercise 1 may help.]

Exercise 4. Prove that if $\gcd(a, b) = 1$ and $c|(a + b)$, then $\gcd(a, c) = \gcd(b, c) = 1$.