

Name (IN CAPITAL LETTERS!): TID:

CID: Personal tutor:

Question 3.

Let us say that:

- An integer $p > 1$ is *irreducible* if: $p = ab$ with a, b positive integers implies $a = 1$ or $b = 1$;
- An integer $p > 1$ is *prime* if: p divides ab for a, b positive integers implies p divides a or p divides b .

(a) Prove that p prime implies p irreducible.

(b) Prove that p irreducible implies p prime. [*Hint* If $d = \text{hcf}(m, n)$, then there exist $x, y \in \mathbb{Z}$ such that $d = xm + yn$.]