Andy Ub

4) Let a and b be two integers such that $b \geq 2$ and a is divisible by b. Prove that $(a+1)$ not divisible by b.

Proof: Suppose a and b are integers such that $b \geq 2$ and a is divisible by b. Suppose for the purpose of contradiction that b divides $(a+1)$. Then there exists integers x and y such that $a = bx$ and $a+1 = by$. Then, $bx + 1 = by$. This is equivalent to $1 = by - bx = b(y-x)$, which tells us b divides 1. but 1 has no divisors itself. Therefore this is a contradiction and thus, b cannot divide both a and $(a+1)$, but only a. ■