= suv + twv =

sL + twv .

Since w divides both terms on the right @-@ hand side , it must also divide the left @-@ hand side , v. This result is known as Euclid 's lemma . Specifically , if a prime number divides L , then it must divide at least one factor of L. Conversely , if a number w is coprime to each of a series of numbers a1 , a2 , ? , an , then w is also coprime to their product , a1 × a2 × ? × an .

Euclid 's lemma suffices to prove that every number has a unique factorization into prime numbers . To see this , assume the contrary , that there are two independent factorizations of L into m and n prime factors , respectively