

PROPOSITION 10.4

"if a, b are integers, then any common factor of a and b also divides $\gcd(a,b)$ "

EXAMPLE

1. $a = 36, b = 52$

2. $a = 28, b = 100$

PROOF:

let a, b be integers, and $d = \gcd(a,b)$
by proposition 10.3,
there are integers s, t such that $d = sa+tb$.

if integer m is a common factor of a and b
i.e. $m|a, m|b$,

then $m|sa+tb$ by proposition 10.2
thus, $m|d$, meaning m also divides $\gcd(a,b)$

APPLICATION:

it can be used to determine the number of common divisors of two numbers a and b , which is the same as the number of divisor of $\gcd(a,b)$