

Proposition 3.1.32

⊛ Euclid's Lemma

VERY IMPORTANT!!!!

$$\left[(a \perp b) \wedge (a \mid bc) \right] \Rightarrow \left[a \mid c \right]$$

Assume $a \perp b$ and $a \mid bc$

Corollary 3.1.31 $\rightarrow au + bv = 1$ and $a \mid bc$ (def. of divides)

$au + bv = 1$ and $ak = bc$

multiply both sides by c ⊕ multiplying both sides is a proof technique to keep in mind!

$acu + bcv = c$

$acu + akv = c$ (Substitute)

$a(cu + kv) = c$

$a \mid c$

TAKEAWAYS:

- ⊛ Be able to recognize the LHS $\left[(a \perp b) \wedge (a \mid bc) \right]$ in a proof setting easily so you can apply this proposition
- ⊛ High School math sometimes trains us to constantly be simplifying things, but in a proof setting, it can be helpful to actually multiply both sides by something and make it more complicated