Let a, b, c $\in \mathbb{Z}$

(a) $(a|b) \ \wedge \ (b|c) \Rightarrow (a|c)$
$(a|b) \wedge (b|c) \Rightarrow \exists (k, k') \in \mathbb{Z}^2 \mid (b = ka) \wedge (c = k'b)$
$\Rightarrow c = k'ka$■

(b) $(a|b) \wedge (b|a) \Rightarrow a = \pm b$
$(a|b) \wedge (b|a) \Rightarrow \exists (k, k') \in \mathbb{Z}^2 \mid (a = kb) \wedge (b = k'a)$
$\Rightarrow k'a = ka$
$\Rightarrow (k = k' = 1) \vee (k = k' = -1)$■

(c) $(a|b) \wedge (a|c) \Rightarrow (a|(b + c)) \wedge (a|(b - c))$
$(a|b) \wedge (a|c) \Rightarrow (b + c = a(k + k')) \wedge (b - c = a(k - k'))$■