Math 235 - Dr. Miller - Discussion/Participation #3 - Spring 2025

Below is an attempted proof by contradiction given in Problem #12 on p.51 of our text. Critique what is done well and what is missing or incorrect.

Prop. - Suppose a, b, and c are integers. If a divides both b and c, then a divides $b + c$.

"Proof." Assume that a *does not divide* $b + c$.

Then there is no integer k *such that* $ak = b + c$.

However, a *does divide* b*, so* $am = b$ *for some integer* m*; and* a *divides* c *for some integer* n.

Thus $am + an = a(m + n) = b + c$.

Therefore $k = m + n$ *is an integer satisfying* $ak = b + c$.

Thus, the assumption that a *does not divide* $b + c$ *is false (*$\Rightarrow\Leftarrow$*), and* a *does divide* $b + c$.