

Latex help: “ a divides b ” and “ a does not divides b ” and “ a is congruent to $b \pmod n$ ” and “ a is not congruent to $b \pmod n$ ”:

$$a \mid b \quad , \quad a \nmid b \quad , \quad a \equiv b \pmod n \quad , \quad a \not\equiv b \pmod n.$$

Do not forget needed parentheses: $a \mid (b - 17)$ is correct while $a \mid b - 17$ is not right.

►. **Conjecture 1.** For all integers a , b , and c such that $a \neq 0$, if a divides $b - 1$ and a divides $c - 1$, then a divides $bc - 1$.

1. Symbolically write Conjecture 1. As universes, use \mathbb{Z} and/or $\mathbb{Z}^{\neq 0}$ and/or some cross product of these. As always, when we symbolically write, we can use the math symbol for divides (e.g., $a \mid (b - 1)$ is fine to use).
2. Say whether Conjecture 1 is true or false.
3. If Conjecture 1 is true, then provide a proof of Conjecture 1. If Conjecture 1 is false, then provide a counterexample that shows (and clearly explains) why Conjecture 1 if false.

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DELETE this whole sentence and THEN put your answer to ALL parts down here.