►. **Conjecture 1**. For each integer $a$, we have that

$$a \equiv 2 \pmod 8 \text{ if and only if } (a^2 + 4a) \equiv 4 \pmod 8.$$

1. Symbolically write Conjecture 1, using the biconditional ( $\iff$ ).
2. Symbolically write Conjecture 1 as the conjection ($\wedge$) of two conditional ( $\implies$ ) statements.
3. For each of the two conditional statements in Part 2 above, determine if the conditional statement is true or false. If the conditional statement is true, write a proof. If it is false, provide a counterexample.
4. Is Conjecture 1 true or false? Explain.

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