

Name:

Problem 1: *True, false, or insufficient information to answer:
If $ac \equiv bc \pmod{m}$, then $a \equiv b \pmod{m}$.*

For full credit you must justify your answer.

Solution:

In general this statement is **false**. Indeed, it is the case that $3 \cdot 2 \equiv 3 \cdot 6 \pmod{12}$, but $2 \not\equiv 6 \pmod{12}$.

We note that if $(m, c) = 1$, then the statement is true, so one might say that there is insufficient information to answer. However, in mathematics we usually label a statement as false if it is not always true, or if extra information is necessary to make it true so false is a better answer.