

PROBLEM 3

If a, b and c are elements of a ring, does $ax + b = c$ always have a solution x in the ring?

SOLUTION TO PROBLEM 3

No, suppose the ring is \mathbb{Z} and let $a = b = 2$ and $c = 1$. Then

$$2x + 2 = 1$$

only has the solution $x = \frac{-1}{2}$, which isn't in \mathbb{Z} . If on the other hand a is a unit in the ring, there there will always be a solution.