A ring $R$ is a set with 2 closed binary relations satisfying certain properties. The operations are usually written “$+$” and “$\cdot$”, as a ring is a generalization of the integers $(\mathbb{Z}, +, \cdot)$:

1. $(R, +)$ is an abelian group: so there is an additive identity 0, and additive inverses.
2. $(R, \cdot)$ is associative.
3. Distributive properties: for every $a, b, c \in R$ $(a + b) \cdot c = a \cdot c + b \cdot c,$
   and $a \cdot (b + c) = a \cdot b + a \cdot c.$

Properties of Rings.

We showed, for a ring $R$ and any $a \in R$, that $0a = 0$.

1. Show, for any $a, b \in R$, $(-a)b = -ab.$

2. Show, for any $a, b \in R$, $(-a)(-b) = ab.$