1. (6 pts.) Write the multiplication table for $\mathbb{Z}_4$.

$\cdot$	$[0]$	$[1]$	$[2]$	$[3]$
$[0]$	$[0]$	$[0]$	$[0]$	$[0]$
$[1]$	$[0]$	$[1]$	$[2]$	$[3]$
$[2]$	$[0]$	$[2]$	$[0]$	$[2]$
$[3]$	$[0]$	$[3]$	$[2]$	$[1]$

2. (4 pts.) Suppose $[a], [b] \in \mathbb{Z}_{15}$. Prove or disprove: If $[a] \cdot [b] = [0]$, then $[a] = [0]$ or $[b] = [0]$.

This is **false**

Counterexample: Let $[a] = [3]$ and $[b] = [5]$.

Then $[a] \cdot [b] = [3] \cdot [5] = [15] = [0]$,

but $[a] \neq 0$ and $[b] \neq 0$.

3. (4 pts.) Consider the partition $P = \left\{ \{0\}, \{-1, 1\}, \{-2, 2\}, \{-3, 3\}, \{-4, 4\}, \dots \right\}$ of $\mathbb{Z}$.
Describe the equivalence relation R whose equivalence classes are the elements of P.
Express your answer in the form "mRn means ...."

$m R n$ means $m = \pm n$

or

$m R n$ means $|m| = |n|$

or

$m R n$ means $m^2 = n^2$ etc.