

PROBLEM 1

Show that $2\mathbb{Z} \cup 3\mathbb{Z}$ is not a subring of \mathbb{Z} .

SOLUTION TO PROBLEM 1

The set $2\mathbb{Z} \cup 3\mathbb{Z}$ consist of integer multiples of 2 and integer multiples of 3. In order to be a ring, the set must be closed under addition and multiplication. However $2, 3 \in \mathbb{Z} \cup 3\mathbb{Z}$ but clearly $2 + 3 = 5 \notin 2\mathbb{Z} \cup 3\mathbb{Z}$