

NPTEL COURSE - Introduction to Commutative Algebra

Assignment - Week 1

State whether each of the the following statements is **TRUE** or **FALSE**:

- (1) $(\mathbb{Z}, +, \cdot)$ is a commutative ring with identity.
- (2) $M_n(\mathbb{R})$ = the set of all $n \times n$ matrices with entries in \mathbb{R} with matrix addition and matrix multiplication is a commutative ring with identity.
- (3) $\phi : \mathbb{Z} \rightarrow \mathbb{Z}$ defined by $\phi(n) = 2n$ is a ring homomorphism.
- (4) The set of all odd numbers in \mathbb{Z} form an ideal in \mathbb{Z} .
- (5) The set $\{\sum_{i=0}^n a_i x^i \in \mathbb{Z}[x] \mid a_0 = 1\}$ is an ideal in $\mathbb{Z}[x]$.
- (6) (0) is a prime ideal in $\mathbb{Q}[x]$.