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.
   TRUE

(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.
   FALSE

(3) $\phi : \mathbb{Z} \to \mathbb{Z}$ defined by $\phi(n) = 2n$ is a ring homomorphism.
   FALSE

(4) The set of all odd numbers in $\mathbb{Z}$ form an ideal in $\mathbb{Z}$.
   FALSE

(5) The set $\{\sum_{i=0}^{n} a_i x^i \in \mathbb{Z}[x] \mid a_0 = 1\}$ is an ideal in $\mathbb{Z}[x]$.
   FALSE

(6) (0) is a prime ideal in $\mathbb{Q}[x]$.
   TRUE