Irreducibility

Definition

Let A be an entire ring. A non-zero element $a \in A$ will be called irreducible if it is a non-unit and any factorization

$$a = bc$$

with $b, c \in A$ satisfies that either b or c is a unit.

Question

In $\mathbb{R}[x]$, is $x^2 + 1$ irrreducible?

In $\mathbb{C}[x, y]$, is $xy + 1$ irreducible? What about $x^2y^2 + x + 1$?