1. Does a ring homomorphism preserve units?
2. Does a ring homomorphism preserve zero divisors?
    - Kinda and not really.
    - Consider the natural $\varphi : \mathbb{Z}/6\mathbb{Z} \longrightarrow \mathbb{Z}/2\mathbb{Z}$.
    - 3 and 2 are zero divisors in $\mathbb{Z}/6\mathbb{Z}$, because $3 \cdot 2 = 6 = 0$
    - But $\varphi(3) = 1$ and $\varphi(2) = 0$. It is still $\varphi(3) \cdot \varphi(2) = 0$, but $\varphi(2)$ is already 0.
3. The same two things but with injective / surjective homomorphisms.
4. To show two ideals are equal, I just need to check the generators.