

1. For a homomorphism from $G \rightarrow H$, is the kernel always a subgroup?

- A Yes, because the homomorphism property implies that it is a closed subset of G , with inverses.
- B Yes, because all generators of G are in it.
- C No, because it depends on the rank of H .
- D No, because isomorphisms have no kernel.

2. Can an infinite group be isomorphic to a finite group?

- A Yes, but only if both are abelian.
- B No, because isomorphisms must be bijections.
- C Yes, because what matters is that they have the same composition law.
- D No, because there is no homomorphism from an infinite group to a finite group.

3. Which of the following groups is cyclic? Choose all that apply.

- A The integers \mathbf{Z} .
- B The finite group \mathbf{Z}_{10} .
- C The lattice \mathbf{Z}^2 .
- D The symmetries of a regular pentagon.