Let $G\_{1}$ and $G\_{2}$ be groups and $φ:G\_{1}\rightarrow G\_{2}$ a map. Which of the following is a group homomorphism? Explain your answers. If $φ$ is a homomorphism, describe the kernel and the image of$ φ$.

1. $G\_{1}=C\_{4}=\left〈a|a^{4}=e\right〉, G\_{2}=Z\_{2}$ (the integers modulo 2 with the operation$ +$), $φ:a^{i}↦i$ (mod 2).
2. $G\_{1}=G\_{2}=Z\_{5}$ (the integers modulo 5 with the operation$ +$), $φ:n↦an$(mod5) where $a\in Z\_{5}\\left\{0\right\}=\{1,2,3,4\}$ is fixed.