1. Prove that $f : \mathbb{R} \to \mathbb{R}$ defined by $f(x) = x^3 + 2x^2 - x - 1$ has no inverse. Hint: Go root-hunting!

2. Define $f : (\mathbb{R} - \{2\}) \to \mathbb{R}$ by $f(x) = \frac{x}{x-2}$. Find the range of f and then find f^{-1} on that set.

3. Define $f : \mathbb{Z}_6 \to \mathbb{Z}_6$ by $f([x]) = [5x + 2]$. Show that f has an inverse by showing that it is injective and surjective.