Worksheet 1

1. State the definition of the following.
   (a) relation
   (b) equivalence relation
   (c) function
   (d) injective function
   (e) surjective function
   (f) bijective function

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2. Show that the function $f : \mathbb{R} \to \mathbb{R}$, $f(x) = 2x$ is a bijection.

3. Is the function $f : \mathbb{R} \to \mathbb{R}$, $f(x) = x^2$ a bijection ? Why or why not?

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Define the following equivalence relation on $\mathbb{R}$: $x \sim y$ if and only if $x \cdot y \geq 0$. Is this an equivalence relation?