Math 300 Intro Math Reasoning
Worksheet 07: Functions

(1)

    (1) $f_1 : \mathbb{R} \to codom(f_1)$, defined by $f_1(x) = 5x - x^2$.
        Compute $f_1(1)$.

    (2) $f_2 : P(\mathbb{R}) \to codom(f_2)$, defined by $f_2(x) = x \cap \mathbb{N}$.
        Compute $f_2(\{1, \pi, -1\})$ and $f_2((-\infty, 5))$.

    (3) $f_3 : P(\mathbb{R}) \to codom(f_3)$, defined by $f_3(X) = \langle X \cap \mathbb{N}, X \cap \mathbb{Z}, X \cap \mathbb{Q} \rangle$.
        Compute $f_3(\mathbb{Z})$ and $f_3([-1, 1])$.

(2) For each of the functions from the previous exercise, find their domain and codomain.

(3) Prove that for any two functions $f : A \to B$ and $g : B \to C$, and any $X \subseteq A$,
$(g \circ f) \restriction X = g \circ (f \restriction X)$.