Worksheet §12.1b

For each of the following, determine if the given description gives a well-defined function. If not, explain why not. If it is well-defined, you do not have to justify it.

1. $h : \mathbb{R} \to \mathbb{R}$ given by $h(x) = \frac{x}{1-x}$.

2. $j : \mathbb{N} \to \mathbb{N}$ given by $j(x) = x^3 - 1$.

3. $g : \mathbb{Q} \to \mathbb{Z}$ given by $g(\frac{a}{b}) = a + b$.

4. $f : \mathbb{R} \to \mathbb{Z}$ given by $x \mapsto$ the first digit after the decimal point of x.

5. $F : \mathbb{Z}_4 \to \mathbb{Z}_2$ given by $[x] \mapsto [x]$.

6. $G : \mathbb{Z}_4 \to \mathbb{Z}_3$ given by $G([x]) = [x]$.

7. $\rho : \mathbb{Q} \to \mathbb{Q}$ given by $\rho(\frac{a}{b}) = \frac{ab}{a^2+b^2}$.