A-1. For each of the functions below, answer the following questions, and *give a complete proof that your answers are correct.*

- Is the function injective?
- Is the function surjective?
- If the function is not surjective, what is its range?

(You may use without proof the following standard fact about the real numbers: for every nonnegative real number x, there exists a unique nonnegative real number $\sqrt{x}$, called the **square root of** $\boldsymbol{x}$, such that $\left(\sqrt{x}\right)^2 = x$.)

(a) $f\colon \mathbb{R} \to [0, \infty)$, defined by
$$f(x) = (2 - x)^2.$$

(b) $g\colon \mathbb{R} \setminus \{1\} \to \mathbb{R}$, defined by
$$g(x) = \frac{x}{1 - x}.$$