17) Let $\mathbb{R}_{\geq 0} = \{a \in \mathbb{R} \mid a \geq 0\}$ be the set of nonnegative real numbers. For each of the following functions determine whether the function is one-to-one, and whether it is onto. (It might be helpful to sketch the function, e.g. by using `www.desmos.org`.) Justify your answer.:

a) $f\colon \mathbb{R} \to \mathbb{R}$, $x \mapsto |x|$ (absolut value)

b) $f\colon \mathbb{R} \to \mathbb{R}_{\geq 0}$, $x \mapsto |x|$

c) $f\colon \mathbb{R} \to \mathbb{R}$, $x \mapsto x^3 - 3x^2 + 1$

d) $f\colon \mathbb{R}_{\geq 0} \to \mathbb{R}$, $x \mapsto \frac{1}{x+1}$.

e) For $A = \mathbb{R} \setminus \{0\}$ let $f\colon A \to A$, $x \mapsto \frac{1}{x}$.

18) For $\mathbb{R}_{\geq 0}$ as in problem 17, let $f\colon \mathbb{R}_{\geq 0} \to \mathbb{R}_{\geq 0}$, $x \mapsto (x+2)^2 - 4$. Show that the function is one-to-one and onto, and find the inverse function.
Hint: You might find it easiest to find the inverse first and use its existence to show the properties.