Problems - 2.1/2.2 Continuous Functions

(9) Show that

$$\lim_{x \to -3} \frac{x^2 - 9}{x + 3} = -6.$$

(12) Show that

$$\lim_{x \to 9} \frac{x - 9}{\sqrt{x} - 3} = 6.$$

(21) For all $x \in \mathbb{R}$, define

$$f(x) = \begin{cases} 1 & \text{if } x \text{ is a rational number} \\ 0 & \text{if } x \text{ is an irrational number} \end{cases}$$

Show that every value of x, f is not continuous.