Exercise 22

For the following exercises, find the domain of each function using interval notation.

$$f(x) = \frac{\sqrt{x-4}}{\sqrt{x-6}}$$

Solution

You cannot take the square root of a negative number or divide by zero, so it's necessary that

$$x - 4 \geq 0 \quad \text{and} \quad x - 6 \geq 0 \quad \text{and} \quad \sqrt{x-6} \neq 0.$$

Solve for x.

$$x \geq 4 \quad \text{and} \quad x \geq 6 \quad \text{and} \quad x \neq 6$$

Combine the conditions.

$$x \geq 4 \quad \text{and} \quad x > 6$$

$$x > 6$$

Therefore, the domain is $(6, \infty)$. This is reflected in the graph of $f(x)$ versus x.