Exercise 22

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

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

Solution

The square root of a negative number cannot be taken, and the denominator of a rational function cannot be zero.

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

Solve for x.

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

Combine the second and third conditions.

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

Therefore, the domain of $f(x)$ is

$$[6, \infty).$$