Exercise 41

For the following exercises, for each pair of functions, find a. $f+g$ b. $f-g$ c. $f \cdot g$ d. f/g. Determine the domain of each of these new functions.

$$f(x) = 6 + \frac{1}{x},\ g(x) = \frac{1}{x}$$

Solution

$$f+g = f(x)+g(x) = \left(6+\frac{1}{x}\right)+\left(\frac{1}{x}\right) = 6+\frac{2}{x} \qquad \text{Domain:} \quad \{x \mid x \neq 0\}$$

$$f-g = f(x)-g(x) = \left(6+\frac{1}{x}\right)-\left(\frac{1}{x}\right) = 6 \qquad \text{Domain:} \quad \{x \mid x \neq 0\}$$

$$f \cdot g = f(x)g(x) = \left(6+\frac{1}{x}\right)\left(\frac{1}{x}\right) = \frac{6}{x}+\frac{1}{x^2} \qquad \text{Domain:} \quad \{x \mid x \neq 0\}$$

$$f/g = \frac{f(x)}{g(x)} = \frac{6+\frac{1}{x}}{\frac{1}{x}} = \frac{6x+1}{1} = 6x+1 \qquad \text{Domain:} \quad \{x \mid x \neq 0\}$$

Note that the domain for any expression is the same regardless of simplification.