Exercise 38

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.

$$f(x) = 3x^2 + 4x + 1,\ g(x) = x + 1$$

Solution

$$f+g = f(x)+g(x) = (3x^2+4x+1)+(x+1) = 3x^2+5x+2 \quad \text{Domain:} \quad \{x \mid -\infty < x < \infty\}$$

$$f-g = f(x)-g(x) = (3x^2+4x+1)-(x+1) = 3x^2+3x \quad \text{Domain:} \quad \{x \mid -\infty < x < \infty\}$$

$$f \cdot g = f(x)g(x) = (3x^2+4x+1)(x+1) = 3x^3+7x^2+5x+1 \quad \text{Domain:} \quad \{x \mid -\infty < x < \infty\}$$

$$f/g = \frac{f(x)}{g(x)} = \frac{3x^2+4x+1}{x+1} \quad \text{Domain:} \quad \{x \mid x \neq -1\}$$