

Appendix D: The Algebra of Functions

❖ The Sum, Difference, Product, or Quotient of Two Functions

The Algebra of Functions

If f and g are functions and x is in the domain of both functions, then:

$$1. (f + g)(x) = f(x) + g(x);$$

$$2. (f - g)(x) = f(x) - g(x);$$

$$3. (f \cdot g)(x) = f(x) \cdot g(x);$$

$$4. \left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}, \quad g(x) \neq 0.$$

Ex. Let $f(x) = -3x + 1$ and $g(x) = x^2 + 2$. Find

(a) $(f + g)(-1)$

(b) $(f - g)(4)$

(c) $(f \cdot g)(3)$

(d) $\left(\frac{g}{f}\right)(2)$

(e) $(f + g)(x)$

(f) $(f - g)(x)$

(g) $(f \cdot g)(x)$

Ex. Let $f(x) = 3x^2 - 9x$ and $g(x) = 3x$. Find $\frac{f}{g}$ and its domain.

Ex. Let $p(x) = 6x - 8$ and $q(x) = 14x + 4$. Find $\frac{p}{q}$ and its domain.

Ex. Let $f(x) = 2x + 3$ and $g(x) = 4x^2 - 4x - 1$. Find $\frac{g}{f}$ and its domain.