Math 120 Intermediate Algebra

The Algebra of Functions

Let $f$ and $g$ be functions where $x$ 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) $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$, provided $g(x) \neq 0$.

Ex 1 Let $f(x) = -2x + 3$ and $g(x) = x^2 - 5$. Find each.

a) $f(4) + g(4)$

b) $g(-3)/f(-3)$

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

d) $(fg)(x)$

e) $\left(\frac{g}{f}\right)(x)$

Ex 2 Let $G(x) = x^2 - 2x - 1$. Find $G(x + h)$.

Determining the Domain

The domain of $f + g$, $f - g$, or $fg$ is the set of all values common to the domains of $f$ and $g$.

The domain of $\frac{f}{g}$ is the set of all values common to the domains of $f$ and $g$, excluding any values for which $g(x) = 0$.

Ex 3 For the pair of functions, determine the domain of the sum, difference, and product of the two functions. $f(x) = x^3 + 1$

$g(x) = \frac{5}{x}$

Ex 4 Determine the domain of $\frac{f}{g}$ where $f(x) = x + 2$ and $g(x) = x^2 - 4$. 