

Section 2.2: The Algebra of Functions

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11:03 AM

consider:

$$f(x) = x - 2$$

$$g(x) = \frac{1}{x}$$

domain: \mathbb{R}

domain: $\{x \mid x \neq 0\}$

algebra of functions:

$$(f+g)(x) = f(x) + g(x) = x - 2 + \frac{1}{x}$$

$$(f-g)(x) = f(x) - g(x) = x - 2 - \frac{1}{x}$$

$$(fg)(x) = f(x) \cdot g(x) = (x-2) \cdot \frac{1}{x} = \frac{x-2}{x}$$

$$(f/g)(x) = \frac{f(x)}{g(x)} = \frac{x-2}{\frac{1}{x}} = x(x-2)$$

domain: for all of these, $(f+g)(x) \dots (f/g)(x)$, the resulting domain is the intersection of those two domains, plus any new restrictions that turn up (see next example)

example: $f(x) = \sqrt{x+6}$
 $g(x) = \frac{1}{x}$

domain: $[-6, \infty)$
domain: $(-\infty, 0) \cup (0, \infty)$

find $(f-g)(x)$ and domain
 $(f \cdot g)(x)$ " "
 $(f/g)(x)$ " "
 $(g/f)(x)$ " "

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

$$\text{domain: } [-6, 0) \cup (0, \infty)$$