Operations on Functions

KEY CONCEPT *For Your Notebook*

Operations on Functions

Let f and g be any two functions. A new function h can be defined by performing any of the four basic operations on f and g.

Operation	Definition	Example: $f(x) = 5x$, $g(x) = x + 2$
Addition	$h(x) = f(x) + g(x)$	$h(x) = 5x + (x + 2) = 6x + 2$
Subtraction	$h(x) = f(x) - g(x)$	$h(x) = 5x - (x + 2) = 4x - 2$
Multiplication	$h(x) = f(x) \cdot g(x)$	$h(x) = 5x(x + 2) = 5x^2 + 10x$
Division	$h(x) = \frac{f(x)}{g(x)}$	$h(x) = \frac{5x}{x + 2}$ $x \neq -2$

The domain of h consists of the x-values that are in the domains of both f and g. Additionally, the domain of the quotient does not include x-values for which $g(x) = 0$.

Let $f(x) = 5x^{1/3}$ and $g(x) = -11x^{1/3}$

a. find $f(x) + g(x)$ $5x^{\frac{1}{3}} + (-11x^{\frac{1}{3}}) = -6x^{\frac{1}{3}}$

b. find $f(x) - g(x)$ $5x^{\frac{1}{3}} - (-11x^{\frac{1}{3}}) = 16x^{\frac{1}{3}}$

Let $f(x) = 8x$ and $g(x) = 2x^{5/6}$

Find $f(x) * g(x)$ $= 8x^{1} \cdot 2x^{\frac{5}{6}} = 16x^{1+\frac{5}{6}} = 16x^{\frac{11}{6}}$

Find $\frac{f(x)}{g(x)}$ $= \frac{8x^{1}}{2x^{\frac{5}{6}}} = 4x^{1-\frac{5}{6}} = 4x^{\frac{1}{6}}$