

MAT 1375, Classwork5, Fall2024

ID: _____ Name: _____

1. Complete the definition of the **Algebra of Functions**:

Let $f(x)$ and $g(x)$ be two functions with the domain D_f and D_g , respectively. We have sum, difference, product, and quotient of functions:

The Algebra of functions	Notation	Definition	Domain
Sum	$(f+g)(x) :=$		$D_{f+g} =$
Difference	$(f-g)(x) :=$		$D_{f-g} =$
Product	$(fg)(x) :=$		$D_{f \cdot g} =$
Quotient	$(\frac{f}{g})(x) :=$, provided $g(x) \neq 0$	$D_{\frac{f}{g}} =$

Here, $D_f \cap D_g = \{x \mid \underline{\hspace{10cm}}\}$

2. Let $f(x) = x^2 + 5x + 6$ and $g(x) = x + 2$. Find the following functions and state their domains.

$$(f + g)(x) =$$

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

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

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

3. Complete the definition of **the Composition of Functions**:

Let $f(x)$ and $g(x)$ be two functions. The composition of the function f with g is denoted by _____ and is defined by the equation

$$\text{_____} := \text{_____}.$$

The domain of the composition of the function $f \circ g$ is the set of all x such that x is the _____ of $g(x)$ and _____ is the domain of $f(x)$.

The notation of the domain of the composition of the function $f \circ g$ is

$$\text{_____} = \{ x \mid \text{_____} \}$$

4. Find $(f \circ g)(x)$ for the following functions and state their domains.

a) $f(x) = x^2 + 2$ and $g(x) = x - 3$

b) $f(x) = \frac{2}{x-3}$ and $g(x) = x^2 + 2x$