## 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:

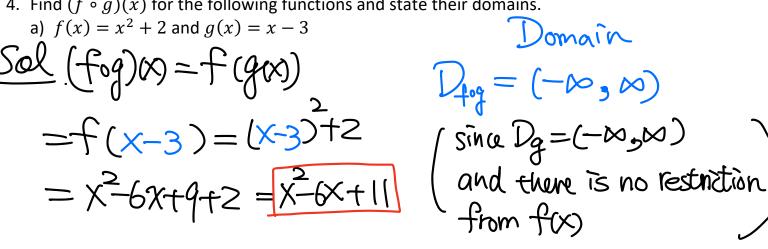
The Algebra of functions	Notation	Definition	Domain
Sum	(f+g)(x) := f	$^{2}(x) + g(x)$	$D_{f+g} = D_f \cap D_g$
Difference	(f-g)(x) := -	$-(\times) - g(\times)$	$D_{f-g} = D_{f} \cap D_{g}$
Product	(f.g)(x) := f	-(X) · 9(X)	$D_{f \cdot g} = D_f \cap D_g$
Quotient	$(\frac{f}{g})(x) := \frac{f}{g}$	$(x)$ , provided $(x) \neq 0$	$D_{\frac{f}{g}} = D_{f} \cap D_{g}$ and $g(x) \neq 0$

Here, 
$$D_f \cap D_g = \{x \mid \frac{\chi \in D_f}{\chi} \text{ and } \chi \in D_g \}$$

2. Let 
$$f(x) = x^2 + 5x + 6$$
 and  $g(x) = x + 2$ . Find the following functions and state their domains.  $D_f = (-\omega, \omega)$   $D_g =$ 

3. Complete the definition of <b>the Composition of Functions</b> :
Let $f(x)$ and $g(x)$ be two functions. The composition of the function $f$ with $g$ is denoted $f(x)$ and is defined by the equation $f(x)$ := $f(g(x))$ .
The domain of the composition of the function $f \circ g$ is the set of all $x$ such that $x$ is the $g(x)$ of $g(x)$ and $g(x)$ is the domain of $f(x)$ .
The notation of the domain of the composition of the function $f\circ g$ is
Prog = {x   x \in Da and g \in \in D_{\footnote{}}}
A Find (f. a)(a) for the following functions and state their demands

by



b)  $f(x) = \frac{2}{x-3}$  and  $g(x) = x^2 + 2x$ Sol  $(f \circ g)(x) = f(g(x))$  = f(x+2x)  $= \frac{2}{(x+2x)-3} = \frac{2}{x^2+2x-3}$ We start it from  $D_g = (-\infty, \infty)$ Since f has a restriction, as a fraction, its denominator can't be zero, thus two points are excluded from

2 are excluded from  $x+2x-3 \neq 0 \Rightarrow (x+3)(x+1) \neq 0$  are excluded from  $x+3 \neq 0$  and  $x+4 \Rightarrow x+3 \neq 0$  and  $x+4 \Rightarrow x+3 \Rightarrow x+$