Name:_____

Notesheet. Section 2.2

Math 1210

Definition 1. Given the functions f and g, what are the sum, difference, product, and quotient functions of f and g? What are the domains of these functions (given that the domain of f is A and the domain of g is B)?

Challenge 2. Let $f(x) = x^2 + 2x + 1$ and $g(x) = x$. What are the sum, difference, product, and quotient functions?

Challenge 3. Let $j(x) = \sqrt{x-1}$ and $k(x) = x - 3$. What is the domain of the product function jk? What is the domain of the quotient function j/k? (Hint: Start by identifying the domain of j and the domain of k, each as a subset of the real numbers $\mathbb{R}$)

Definition 4. Given the functions f and g, what is the composition function $g \circ f$? What is the domain of this function?

Challenge 5. Let $f(x) = \sqrt{x}$ and $g(x) = x^2 - 1$.

(a) What is the composition $g \circ f$? What is the domain?

(b) What is the composition $f \circ g$? What is the domain?

Challenge 6. An environmental impact study for city Y indicates that under existing environmental protection laws, the level of carbon monoxide (CO) present in the air due to automobile exhaust will be $0.01x^{2/3}$ parts per million when the number automobiles is x thousand. A separate study conducted by the government estimates that t years from now, the number of automobiles in city Y will be $200t^2 + 4{,}000t + 64{,}000$.

What is the concentration of CO in the air from automobiles t years from now? (As a function of t)